

General Technical Farticulars	Units	
Type of Cell	Onito	2TBS100
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		100
Initial	AH	100
Rated	AH	100
End of Life	AH	80
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		
U U	E.C.V.	Ah output
1 hour	1.67	51.00
2 hour	1.70	64.20
3 hour	1.75	74.70
4 hour	1.76	79.20
5 hour	1.77	85.80
6 hour	1.77	89.60
7 hour	1.78	92.70
8 hour	1.78	95.00
9 hour	1.80	97.90
10 Hour	1.80	100.00
Maximum momentary current for 1 min till 1.60 e.c.v		180
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	1.45
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	15
ii) Voltage	V	2.23 vpc
b) Boost charging		-
i) Starting Current	A	12
ii) Finishing current	A	6
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	100
ii) Maximum		100
	mA	400
Equalising charge		400
a) Voltage	V	2.3
a) Voltage b) Current	V A	2.3 5
a) Voltage b) Current c) Duration	V A Hrs.	2.3 5 6
a) Voltage b) Current	V A	2.3 5
a) Voltage b) Current c) Duration	V A Hrs.	2.3 5 6
a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs.	2.3 5 6
 a) Voltage b) Current c) Duration d) Interval between succesive equalising charge Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 	V A Hrs.	2.3 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.	2.3 5 6 3 1.220 +/- 0.005



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation Overall dimensions	deg C deg C	50 45
Each Cell L x W x H	mm	103 x 206 x 430
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	112
Quantity of Electrolyte per Cell	litres	4.9
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell without acid	kg	8.7
with acid	kg	14.6
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	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		2
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	250
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.091
No. of negative plates per cell		2
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	23
Clearance between top of the plates and top of container	mm	56
Whether explosion vents are offerred		YES



Container		
Thickness of Container	mm	6
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	3
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood 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	3.2
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
Recommended Storage life of Battery (Dry shelf life)		12 months



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Type of Cell		2TBS120
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	120 120 96
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		
	E.C.V.	Ah output
1 hour	1.67	61.20
2 hour	1.70	77.04
3 hour	1.75	89.64
4 hour	1.76	95.04
5 hour	1.77	102.96
6 hour	1.77	107.52
7 hour	1.78	111.24
8 hour	1.78	114.00
9 hour	1.80	117.48
10 Hour	1.80	120.00
Maximum momentary current for 1 min till 1.60 e.c.v		216
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	1.45
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	18
ii) Voltage	V	2.23 vpc
b) Boost charging		
i) Starting Current	А	14.4
ii) Finishing current	A	7.2
iii) Voltage	V	2.75
Trickle Charging Rate	- 0	400
i) Minimum ii) Maximum	mA	120
ii) Maximum	mA	480
Equalising charge		0.0
a) Voltage	V	2.3
b) Current	A	6
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 chargec) when Battery is discharged at 10 hours rate		1.240 +/- 0.005 1.160 - 1.130
Permissible max. temperature of Electrolyte		
i) During Initial Charging	deg C	50
ii) During Normal Operation	deg C	45
Overall dimensions		
Each Cell L ${}^{\pm_3}x W^{\pm 3} x H^{\pm 5}$	mm	103 x 206 x 430
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	112
Quantity of Electrolyte per Cell	litres	4.7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid	kg	9.3
with acid	kg	15.0
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	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		2
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	250
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.091
No. of negative plates per cell		3
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	23
Clearance between top of the plates and top of container	mm	56
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic made



Container		
Thickness of Container	mm	6
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	3
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood Depends on the battery layout
Ventilation requirements		
Cubic content of battery rooms	m³	To be provided by customer
Gas generation per single cell per hour	Lit	3.84
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 Farticulars	Units	
Type of Cell	oniko	3TBS150
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		450
Initial	AH	150
Rated End of Life	AH	150
End of Life	AH	120
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		
C C C C C C C C C C C C C C C C C C C	E.C.V.	Ah output
1 hour	1.67	76.50
2 hour	1.70	96.30
3 hour	1.75	112.05
4 hour	1.76	118.80
5 hour	1.77	128.70
6 hour	1.77	134.40
7 hour	1.78	139.05
8 hour	1.78	142.50
9 hour	1.80	146.85
10 Hour	1.80	150.00
Maximum momentary current for 1 min till 1.60 e.c.v		270
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	1.05
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for		
a) Float Charging		20 -
i) Limit current	A	22.5
ii) Voltage b) Boost charging	V	2.23 vpc
i) Starting Current	А	18
ii) Finishing current	A	9
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	150
ii) Maximum	mA	600
Equalising charge		
a) Voltage	V	2.3
b) Current	A	7.5
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)	mm	103 x 206 x 430
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	112
Quantity of Electrolyte per Cell	litres	4.4
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%)		
Each cell without acid	kg	10.1
with acid	kg	16.3
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	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		3
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	250
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.091
No. of negative plates per cell		3
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	23
Clearance between top of the plates and top of container	mm	56
Whether explosion vents are offerred		YES



Container		
Thickness of Container	mm	6
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	3
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood 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	4.8
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



Type of Cell Nominal Voltage per cell Manufacturer's Name Standards to which battery is manufactured IS Nomenclature Number of cells in the battery bank Nominal Voltage of Battery Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated	Volts Volts	2 Exide Industries Ltd. IS 1651 n
Manufacturer's Name Standards to which battery is manufactured IS Nomenclature Number of cells in the battery bank Nominal Voltage of Battery Declared Capacity at 27 degree C upto 1.80 ecv Initial		Exide Industries Ltd. IS 1651
Standards to which battery is manufactured IS Nomenclature Number of cells in the battery bank Nominal Voltage of Battery Declared Capacity at 27 degree C upto 1.80 ecv Initial	Volts	IS 1651
IS Nomenclature Number of cells in the battery bank Nominal Voltage of Battery Declared Capacity at 27 degree C upto 1.80 ecv Initial	Volts	
Number of cells in the battery bank Nominal Voltage of Battery Declared Capacity at 27 degree C upto 1.80 ecv Initial	Volts	n
Nominal Voltage of Battery Declared Capacity at 27 degree C upto 1.80 ecv Initial	Volts	n
Declared Capacity at 27 degree C upto 1.80 ecv Initial	Volts	
Initial		2 X n
Rated	AH	180
End of Life	AH AH	180 144
	Ап	144
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		
	E.C.V.	Ah output
1 hour	1.67	91.80
2 hour	1.70	115.56
3 hour	1.75	134.46
4 hour	1.76	142.56
5 hour	1.77	154.44
6 hour	1.77	161.28
7 hour 8 hour	1.78 1.78	166.86 171.00
9 hour	1.78	176.22
10 Hour	1.80	180.00
Maximum momentary current for 1 min till 1.60 e.c.v		324
Eveneted life of bottom under normal operation 9		
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR) m	nilli ohms	1.05
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	27
ii) Voltage	V	2.23 vpc
b) Boost charging		
i) Starting Current	A	21.6
ii) Finishing current	A	10.8
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum ii) Maximum	mA	180
ii) Maximum	mA	720
Equalising charge		
a) Voltage	V	2.3
b) Current	A Hre	9
c) Duration d) Interval between succesive equalising charge	Hrs. Months	6 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	103 x 206 x 430 Depends on the battery layout
Distance between cell centres	mm	112
		4.4
Quantity of Electrolyte per Cell	litres	4.4
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	10.5 15.9
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	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		3
No. of positive plates per cell		0
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	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 250
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 250 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 250 4.5 0.091
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 250 4.5 0.091 4
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 250 4.5 0.091 4
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 250 4.5 0.091 4 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 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 250 4.5 0.091 4 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 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 250 4.5 0.091 4 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	mm sqm mm	Yes, but not recommended Lead - Calcium alloy grid 250 4.5 0.091 4 Yes, but not recommended Synthetic fibre based material 1.7 23



Container		
Thickness of Container	mm	6
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	3
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood Depends on the battery layout
Ventilation requirements		
Cubic content of battery rooms	m³	To be provided by customer
Gas generation per single cell per hour	Lit	5.76
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 reclinical rationals	Units	
Type of Cell	cc	3TBS200
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	200
Rated	AH	200
End of Life	AH	160
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	ı	
U -	E.C.V.	Ah output
1 hour	1.67	102.00
2 hour	1.70	128.40
3 hour	1.75	149.40
4 hour	1.76	158.40
5 hour	1.77	171.60
6 hour	1.77	179.20
7 hour	1.78	185.40
8 hour	1.78	190.00
9 hour	1.80	195.80
10 Hour	1.80	200.00
Maximum momentary current for 1 min till 1.60 e.c.v		360
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.95
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for		
a) Float Charging i) Limit current	А	30
ii) Voltage	v	2.23 vpc
b) Boost charging	•	2.20 000
i) Starting Current	А	24
ii) Finishing current	A	12
iii) Voltage	V	2.75
Trickle Charging Rate		000
i) Minimum ii) Maximum	mA mA	200 800
Equalising charge		
a) Voltage	V	2.3
b) Current	A	10
	Hrs.	6
c) Duration d) Interval between succesive equalising charge	Months	3
,	Months	3
 d) Interval between succesive equalising charge Recommended Specific gravity at 27 deg C a) for first filling 	Months	1.220 +/- 0.005
d) Interval between succesive equalising charge Recommended Specific gravity at 27 deg C	Months	



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	103 x 206 x 430
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	112
Quantity of Electrolyte per Cell	litres	4.2
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	11.5 16.7
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	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		3
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	250
Thickness of Negative Plate	mm	4.5, 3.2
Area of Negative Plate	sqm	0.091
No. of negative plates per cell		4
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	23
Clearance between top of the plates and top of container	mm	56
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic made



Container		
Thickness of Container	mm	6
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	3
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood Depends on the battery layout
Ventilation requirements		
Cubic content of battery rooms	m³	To be provided by customer
Gas generation per single cell per hour	Lit	6.4
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	Units	
Type of Cell	Units	4TBS250
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
S 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		050
Initial Rated	AH AH	250 250
End of Life	AH	200
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 duratior of discharge	n	
Juscharge	E.C.V.	Ah output
1 hour	1.67	127.50
2 hour	1.70	160.50
3 hour	1.75	186.75
4 hour	1.76	198.00
5 hour	1.77	214.50
6 hour	1.77	224.00
7 hour	1.78	231.75
8 hour 9 hour	1.78 1.80	237.50 244.75
10 Hour	1.80	244.75
Maximum momentary current for 1 min till 1.60 e.c.v		450
Expected life of battery under normal operation &		
maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.74
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	37.5
ii) Voltage	V	2.23 vpc
b) Boost charging		
i) Starting Current	А	30
ii) Finishing current	A	15
iii) Voltage	V	2.75
Trickle Charging Rate i) Minimum	mA	250
ii) Maximum	mA	1000
Equalising charge	V	2.2
a) Voltage b) Current	V A	2.3 12.5
c) Duration	A Hrs.	6
d) Interval between succesive equalising charge	Months	3
Recommended Specific gravity at 27 deg C		4 000 / 0 005
a) for first filling b) at full charge		1.220 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.240 +/- 0.005 1.140 - 1.120
of when ballery is uscridiged at 10 hours fale		1.140 - 1.120



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	103 x 206 x 430
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	112
Quantity of Electrolyte per Cell	litres	3.9
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	13.7 18.5
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	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		4
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	250
Thickness of Negative Plate	mm mm	250 4.5, 3.2
Thickness of Negative Plate Area of Negative Plate		
-	mm	4.5, 3.2
Area of Negative Plate	mm	4.5, 3.2 0.091
Area of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are	mm	4.5, 3.2 0.091 3, 2
Area of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable	mm	4.5, 3.2 0.091 3, 2
Area of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators	mm	4.5, 3.2 0.091 3, 2 Yes, but not recommended
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	4.5, 3.2 0.091 3, 2 Yes, but not recommended Synthetic fibre based material
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	4.5, 3.2 0.091 3, 2 Yes, but not recommended Synthetic fibre based material 1.7
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	4.5, 3.2 0.091 3, 2 Yes, but not recommended Synthetic fibre based material 1.7 23



Container		
Thickness of Container	mm	6
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	3
Method of connection		Bolted
Inter-row, Inter-tier connectors and end take-offs furnished?		Yes
Connection hardware with 5% extra 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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood Depends on the battery layout
Ventilation requirements		
Cubic content of battery rooms	m³	To be provided by customer
Gas generation per single cell per hour	Lit	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



<u>General Technical Particulars</u>		
Type of Cell	Units	5TBS300
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	200
Rated	AH	300 300
End of Life	AH	240
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		
0	E.C.V.	Ah output
1 hour	1.67	153.00
2 hour	1.70	192.60
3 hour	1.75	224.10
4 hour	1.76	237.60
5 hour	1.77	257.40
6 hour	1.77	268.80
7 hour	1.78	278.10
8 hour 9 hour	1.78	285.00 293.70
10 Hour	1.80 1.80	300.00
Maximum momentary current for 1 min till 1.60 e.c.v		540
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	45
ii) Voltage	V	2.23 vpc
b) Boost charging		- 1 -
i) Starting Current	А	36
ii) Finishing current	A	18
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	300
ii) Maximum	mA	1200
Equalising charge		
a) Voltage	V	2.3
b) Current	A	15
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		1.140 - 1.120



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	145 x 206 x 430
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	153
Quantity of Electrolyte per Cell	litres	7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%)		
Each cell without acid	kg	16.6
with acid	kg	25.3
Complete Battery without acid with acid	kg kg	n X each cell weight without acion 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	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		5
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	250
Thickness of Negative Plate	mm	(4.5 / 3.2)
Area of Negative Plate	sqm	0.091
No. of negative plates per cell		4,2
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	23
Clearance between top of the plates and top of container	mm	56
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic



Container		
Thickness of Container	mm	6
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	3
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood 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	9.6
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 reclinical Particulars	Units	
Type of Cell	Onito	6TBS350
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	350 350 280
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	E.C.V.	Ah output
1 hour	1.67	178.50
2 hour	1.70	224.70
3 hour	1.75	261.45
4 hour	1.76	277.20
5 hour		
6 hour	1.77	300.30
	1.77	313.60
7 hour	1.78	324.45
8 hour	1.78	332.50
9 hour	1.80	342.65
10 Hour	1.80	350.00
Maximum momentary current for 1 min till 1.60 e.c.v		630
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	52.5
ii) Voltage	V	2.23 vpc
b) Boost charging		
i) Starting Current	А	42
ii) Finishing current	А	21
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	350
ii) Maximum	mA	1400
Equalising charge		
a) Voltage	V	2.3
b) Current	A	17.5
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		1.140 - 1.120



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation Overall dimensions	deg C deg C	50 45
		//- 000 10-
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	145 x 206 x 430
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	153
Quantity of Electrolyte per Cell	litres	6.5
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
with acid	kg kg	19.2 27.3
Complete Battery without acid with acid	kg kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates	Ū	-
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	260
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.094
No. of positive plates per cell		6
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	250
Thickness of Negative Plate	mm	4.5, 3.2
Area of Negative Plate	sqm	0.091
No. of negative plates per cell		5, 2
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	23
Clearance between top of the plates and top of container	mm	56
Whether explosion vents are offerred		YES



Container		
Thickness of Container	mm	6
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	3
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood 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	11.2
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
Recommended Storage life of Battery (Dry shelf life)		12 months



Ceneral reclinical rationals	Units	
Type of Cell	onito	5TBS400
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	400
Rated	AH	400
End of Life	AH	320
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		
	E.C.V.	Ah output
1 hour	1.67	204.00
2 hour	1.70	256.80
3 hour	1.75	298.80
4 hour	1.76	316.80
5 hour	1.77	343.20
6 hour	1.77	358.40
7 hour	1.78	370.80
8 hour	1.78	380.00
9 hour 10 Hour	1.80 1.80	391.60 400.00
	1.00	
Maximum momentary current for 1 min till 1.60 e.c.v		720
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.52
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	60
ii) Voltage	V	2.23 vpc
b) Boost charging		·
i) Starting Current	A	48
ii) Finishing current	A	24
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	400
ii) Maximum	mA	1600
Equalising charge		
a) Voltage	V	2.3
b) Current	A	20
c) Duration d) Interval between succesive equalising charge	Hrs. Months	6 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		1.140 - 1.120



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	145 x 206 x 546
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	153
Quantity of Electrolyte per Cell	litres	8.2
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	21.0 31.2
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	336
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.112
No. of positive plates per cell		5
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	329.5
Thickness of Negative Plate	mm	4.5, 3.2
Area of Negative Plate	sqm	0.111748
No. of negative plates per cell		4, 2
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	28
Clearance between top of the plates and top of container	mm	90
Whether explosion vents are offerred		YES



Container		
Thickness of Container	mm	6
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
Connection hardware with 5% extra 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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood Depends on the battery layout
Ventilation requirements		
Cubic content of battery rooms	m³	To be provided by customer
Gas generation per single cell per hour	Lit	12.8
No. of air exchanges required per hour		Depends on the size of battery room
Standard Maintenance accessories provided	Yes/No	Yes
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 Farticulars	Units	
Type of Cell	Onito	6TBS450
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	450 450 360
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	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.78 1.80	Ah output 229.50 288.90 336.15 356.40 386.10 403.20 417.15 427.50 440.55
10 Hour	1.80	450.00
Maximum momentary current for 1 min till 1.60 e.c.v		810
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.5
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	67.5 2.23 vpc 54 27 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	450 1800
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 22.5 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 Overall dimensions	deg C deg C	50 45
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	145 x 206 x 546
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	153
Quantity of Electrolyte per Cell	litres	8.3
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%)		
Each cell without acid	kg	25.8
with acid	kg	35.9
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	336
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.112
No. of positive plates per cell		6
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	329.5
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.111748
No. of negative plates per cell		7
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	28
Clearance between top of the plates and top of container	mm	90
Whether explosion vents are offerred		YES



Container		
Thickness of Container	mm	6
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
Cell insulators provided If yes, material of insulator	Yes/No	No
Racks		
Racks a) Number of racks per battery b) Number of cells per rack c) Type of racks d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood 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	14.4
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 reclinical rationals	Units	
Type of Cell	ernie	7TBS500
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	500 500 400
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	E.C.V.	Ah output
1 hour	1.67	255.00
2 hour	1.70	321.00
3 hour	1.75	373.50
4 hour	1.76	396.00
5 hour	1.77	429.00
6 hour	1.77	448.00
7 hour	1.78	463.50
8 hour	1.78	475.00
9 hour 10 Hour	1.80 1.80	489.50 500.00
Maximum momentary current for 1 min till 1.60 e.c.v	1.00	900
-		
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	75
ii) Voltage	V	2.23 vpc
b) Boost charging		
i) Starting Current	A	60
ii) Finishing current	А	30
iii) Voltage	V	2.75
Trickle Charging Rate i) Minimum	mA	500
ii) Maximum	mA	2000
Equalising charge a) Voltage	V	2.3
b) Current	A	2.3
c) Duration	A Hrs.	25 6
d) Interval between succesive equalising charge	Months	8
Recommended Specific gravity at 27 deg C		4 000 1/ 0 005
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		1.140 - 1.120



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	145 x 206 x 546 Depends on the battery layout
Distance between cell centres	mm	153
Quantity of Electrolyte per Cell	litres	7.4
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	27.4 36.4
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	336
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.112
No. of positive plates per cell		7
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	329.5
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.111748
No. of negative plates per cell		7
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	28
Clearance between top of the plates and top of container	mm	90
Whether explosion vents are offerred		YES



Container		
Thickness of Container	mm	6
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 d) Material of rack e) Dimensions of the racks		Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood Depends on the battery layout
Ventilation requirements		
Cubic content of battery rooms	m³	To be provided by customer
Gas generation per single cell per hour	Lit	16
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