

General Technical Farticulars	Units	
Type of Cell	Units	YAP 5
		174 0
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1652 / BS6290
IS Nomenclature		P16P - HDP
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.85 ecv		
Initial	AH	16
Rated	AH	16
End of Life	AH	16
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Capacity in AH at various end cell voltages and duratio	'n	
of discharge	E.C.V.	Ah output
5 minutes	1.62	2.30
15 minutes	1.65	5.25
30 minutes		
	1.69	7.30
45 minutes	1.71	8.96
1 hour	1.75	9.60
2 hour	1.78	11.81
3 hour	1.80	12.98
4 hour	1.81	13.79
5 hour	1.82	14.40
6 hour	1.83	14.88
7 hour	1.83	15.22
8 hour	1.84	15.54
9 hour	1.84	15.81
10 Hour	1.85	16.00
Maximum momentary current for 1 min till 1.60 e.c.v		35.84
Expected life of battery under normal operation & maintainence conditions	Years	15 - 20 years
Internal Resistance of cell (IR)	milli ohms	6.869
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for		
a) Float Charging		
i) Limit current	А	3.2
ii) Voltage	V	2.25 vpc
b) Boost charging		
i) Starting Current	А	2.24
ii) Finishing current	A	1.12
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	10
ii) Maximum	mA	30
Equalising charge		
a) Voltage	V	2.3
b) Current	A	0.8
c) Duration d) Interval between succesive equalising charge	Hrs. Months	6 6
,	WOULD S	U
Recommended Specific gravity at 27 deg C		4 005 - 1 0 005
a) for first filling		1.205 +/- 0.005
b) at full charge		1.215 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.120 - 1.130
Pormissible may temperature of Electrolyte		
Permissible max. temperature of Electrolyte i) During Initial Charging	deg C	50
ii) During Normal Operation	deg C	50 45
	uey C	4 0



Each Cell L x W x H	mm	114*133*260
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	123
Quantity of Electrolyte per Cell	litres	1.7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%)		
Each cell without acid	kg	2.7
with acid	kg	4.7
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		99.99% Pure Lead
Height of Positive Plate	mm	106
Thickness of Positive Plate	mm	7.3
No. of positive plates per cell		2
Whether positive plates of individual calls are		
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
		Yes, but not recommended
interchangeable		Yes, but not recommended Lead - Antimony alloy grid
interchangeable ii) Negative Plates	mm	
interchangeable ii) Negative Plates Material	mm	Lead - Antimony alloy grid
interchangeable ii) Negative Plates Material Height of Negative Plate		Lead - Antimony alloy grid 119
interchangeable ii) Negative Plates Material Height of Negative Plate Thickness of Negative Plate		Lead - Antimony alloy grid 119 3.81
interchangeable ii) Negative Plates Material Height of Negative Plate Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are		Lead - Antimony alloy grid 119 3.81 3
interchangeable ii) Negative Plates Material Height of Negative Plate Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable		Lead - Antimony alloy grid 119 3.81 3
interchangeable ii) Negative Plates Material Height of Negative Plate Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators		Lead - Antimony alloy grid 119 3.81 3 Yes, but not recommended
interchangeable ii) Negative Plates Material Height of Negative Plate Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators Material	mm	Lead - Antimony alloy grid 119 3.81 3 Yes, but not recommended PVC
interchangeable ii) Negative Plates Material Height of Negative Plate Thickness 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	mm	Lead - Antimony alloy grid 119 3.81 3 Yes, but not recommended PVC 3.43
interchangeable ii) Negative Plates Material Height of Negative Plate Thickness 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 mm	Lead - Antimony alloy grid 119 3.81 3 Yes, but not recommended PVC 3.43 21



Container		
Thickness of Container	mm	3
Material of Container		Transperant Styrene Acrylonitrile (SAN)
Cover		
Type of cover		Adhesive Sealed
Material of Cover		Opaque Styrene Acrylonitrile (SAN)
Connections		
Material of Inter-Cell Connectors		Lead Plated Copper
Thickness of Inter-Cell Connectors	mm	2
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	0.512
No. of air exchanges required per hour		Depends on the size of battery room
Gasification Voltage per Cell	Volt	2.36
Efficiency		
Ah efficiency	%	> 92 %
Watt Hr efficiency	%	> 80 %
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)		2 yrs.(with the plugs closed tightly)



<u>General reclinical l'alticulais</u>	Units	
Type of Cell	Onita	YAP 7
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1652 / BS6290
IS Nomenclature		P24P - HDP
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.85 ecv Initial	АН	24
Rated	AH	24 24
End of Life	AH	24
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge	n	
-	E.C.V.	Ah output
5 minutes	1.62	3.46
15 minutes	1.65	7.87
30 minutes	1.69	10.94
45 minutes 1 hour	1.71 1.75	13.44 14.40
2 hour	1.78	17.71
3 hour	1.80	19.46
4 hour	1.81	20.69
5 hour	1.82	21.60
6 hour	1.83	22.32
7 hour	1.83	22.82
8 hour	1.84	23.30
9 hour	1.84	23.71
10 Hour	1.85	24.00
Maximum momentary current for 1 min till 1.60 e.c.v		53.76
Expected life of battery under normal operation & maintainence conditions	Years	15 - 20 years
Internal Resistance of cell (IR)	milli ohms	4.579
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	4.8
ii) Voltage	V	2.25 vpc
b) Boost charging		
i) Starting Current	A	3.36
ii) Finishing current iii) Voltage	A V	1.68 2.75
, C	v	2.15
Trickle Charging Rate i) Minimum	mA	15
ii) Maximum	mA	45
Equalising charge		
a) Voltage	V	2.3
b) Current	A	1.2
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	6
Recommended Specific gravity at 27 deg C a) for first filling		1.205 +/- 0.005
b) at full charge		1.205 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.120 - 1.130
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Permissible max. temperature of Electrolyte		
i) During Initial Charging	deg C	50
ii) During Normal Operation	deg C	45



Each Cell L x W x H	mm	114*133*260
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	123
Quantity of Electrolyte per Cell	litres	1.6
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	3.5 5.4
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		99.99% Pure Lead
Height of Positive Plate	mm	106
Thickness of Positive Plate	mm	7.3
No. of positive plates per cell		3
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Antimony alloy grid
Height of Negative Plate	mm	119
Thickness of Negative Plate	mm	3.81
Thickness of Negative Plate No. of negative plates per cell	mm	3.81
-	mm	
No. of negative plates per cell Whether negative plates of individual cells are	mm	4
No. of negative plates per cell Whether negative plates of individual cells are interchangeable	mm	4
No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators	mm	4 Yes, but not recommended
No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators Material		4 Yes, but not recommended PVC
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	mm	4 Yes, but not recommended PVC 3.43
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	4 Yes, but not recommended PVC 3.43 21
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	4 Yes, but not recommended PVC 3.43 21 69
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 container Whether explosion vents are offerred	mm	4 Yes, but not recommended PVC 3.43 21 69 YES
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 container Whether explosion vents are offerred Type of Vent and Filling Plugs	mm	4 Yes, but not recommended PVC 3.43 21 69 YES



ype of cover Adhesive Sealed aterial of Cover Opaque Styrene Acrytonitrile (SAN) onnections aterial of Inter-Cell Connectors aterial of Inter-Cell Connectors mm aterial of connection Bolted ter-row, Inter-tier connectors and end take-offs mished? Yes aterial of Bolt, Nut and Washer for Inter-Cell and Cable onnections Lead plated MS acks Lead plated MS acks Depends on the battery layout Depends on the battery layout Depends on the battery layout Steel / Teak wood c) Type of racks Depends on the battery layout Steel / Teak wood c) Type of racks Depends on the battery layout Steel / Teak wood c) Type of racks mm anterial of rack Depends on the battery layout Steel / Teak wood c) Type of racks Depends on the battery layout Steel / Teak wood c) Type of racks Depends on the battery layout Steel / Teak wood c) Type of racks Depends on the battery layout Steel / Teak wood c) To be provided by customer as generation per single cell per hour c) of air exchanges required per hour Lit 0.768 c) of air exchanges required per hour Depends on the size of battery room a			
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rnished? Yes aterial of Bolt, Nut and Washer for Inter-Cell and Cable onnections Lead plated MS acks Lead plated MS acks Depends on the battery layout Depends on the battery layout or Type of racks or Type of racks Depends on the battery layout Depends on the battery layout steel / Teak wood Depends on the battery layout steel / Teak wood Depends on the battery layout antiation requirements To be provided by customer as generation per single cell per hour Lit 0.768 b. of air exchanges required per hour Depends on the size of battery room asification Voltage per Cell Volt 2.36 fficiency % 92 % h efficiency % 80 % commended Max. period of cell storage before the first S0 %	Nethod of connection		Bolted
Lead plated MS acks Depends on the battery layout Steel / Teak wood Depends on the steel / Teak wood Depends	nter-row, Inter-tier connectors and end take-offs urnished?		Yes
acks 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 entilation requirements ubic content of battery rooms as generation per single cell per hour b) of air exchanges required per hour b	Naterial of Bolt, Nut and Washer for Inter-Cell and Cable Connections		Lead plated MS
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 Depends on the battery layout e) Dimensions of the racks Depends on the battery layout entilation requirements steel / Teak wood ubic content of battery rooms m ³ content of battery rooms m ³ o. of air exchanges required per hour Lit o. of air exchanges required per hour Depends on the size of battery room asification Voltage per Cell Volt 2.36 fficiency % > 92 % h efficiency % > 80 % ecommended Max. period of cell storage before the first Storage before the first	Racks		
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asification Voltage per Cell Volt 2.36	Gas generation per single cell per hour	Lit	0.768
fficiency % > 92 % h efficiency % > 80 % 'att Hr efficiency % > 80 % ecommended Max. period of cell storage before the first	lo. of air exchanges required per hour		Depends on the size of battery room
h efficiency % > 92 % 'att Hr efficiency % > 80 % ecommended Max. period of cell storage before the first	Sasification Voltage per Cell	Volt	2.36
'att Hr efficiency % > 80 % ecommended Max. period of cell storage before the first	fficiency		
ecommended Max. period of cell storage before the first	Ah efficiency	%	> 92 %
	Vatt Hr efficiency	%	> 80 %
	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)

2 yrs.(with the plugs closed tightly)



Ceneral Technical Farticulars	Units	
Type of Cell	Onits	YAP 9
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Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1652 / BS6290
IS Nomenclature		P32P - HDP
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.85 ecv Initial	АН	32
Rated	AH	32
End of Life	AH	32
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge	n	
	E.C.V.	Ah output
5 minutes	1.62 1.65	4.61 10.50
15 minutes 30 minutes	1.69	14.59
45 minutes	1.71	17.92
1 hour	1.75	19.20
2 hour	1.78	23.62
3 hour	1.80	25.95
4 hour	1.81	27.58
5 hour 6 hour	1.82 1.83	28.80 29.76
7 hour	1.83	30.43
8 hour	1.84	31.07
9 hour	1.84	31.62
10 Hour	1.85	32.00
Maximum momentary current for 1 min till 1.60 e.c.v		71.68
Expected life of battery under normal operation & maintainence conditions	Years	15 - 20 years
Internal Resistance of cell (IR)	milli ohms	3.425
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	6.4
ii) Voltage	V	2.25 vpc
b) Boost charging		
i) Starting Current	A	4.48
ii) Finishing current iii) Voltage	A V	2.24 2.75
Trickle Charging Rate	·	2
i) Minimum	mA	20
ii) Maximum	mA	60
Equalising charge		
a) Voltage	V	2.3
b) Current	А	1.6
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	6
Recommended Specific gravity at 27 deg C a) for first filling		1.205 +/- 0.005
b) at full charge		1.205 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.120 - 1.130
· · · ·		
Permissible max. temperature of Electrolyte	1. 0	
i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
	uey C	40



Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	114*133*260
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	123
Quantity of Electrolyte per Cell	litres	1.5
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%)	intes	
Each cell		12
without acid with acid	kg kg	4.3 6.1
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		99.99% Pure Lead
Height of Positive Plate	mm	106
Thickness of Positive Plate	mm	7.3
No. of positive plates per cell		4
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Antimony alloy grid
Height of Negative Plate	mm	119
Height of Negative Plate Thickness of Negative Plate	mm mm	119 3.81
Thickness of Negative Plate		3.81
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are		3.81 5
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable		3.81 5
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators		3.81 5 Yes, but not recommended
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators Material	mm	3.81 5 Yes, but not recommended PVC
Thickness 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	mm	3.81 5 Yes, but not recommended PVC 3.43
Thickness 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 mm	3.81 5 Yes, but not recommended PVC 3.43 21
Thickness 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 container	mm mm	3.81 5 Yes, but not recommended PVC 3.43 21 69
Thickness 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 container Whether explosion vents are offerred	mm mm	3.81 5 Yes, but not recommended PVC 3.43 21 69 YES
Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs	mm mm	3.81 5 Yes, but not recommended PVC 3.43 21 69 YES
 Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container 	mm mm mm	3.81 5 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made
 Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container Thickness of Container 	mm mm mm	3.81 5 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made
 Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container Thickness of Container Material of Container 	mm mm mm	3.81 5 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made
 Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container Thickness of Container Material of Container Cover 	mm mm mm	3.81 5 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made 3 Transperant Styrene Acrylonitrile (SAN)



Connections

Material of Inter-Cell Connectors		Lead Plated Copper
Thickness of Inter-Cell Connectors	mm	2
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	1.024
No. of air exchanges required per hour		Depends on the size of battery room
Gasification Voltage per Cell	Volt	2.36
Efficiency		
Ah efficiency	%	> 92 %
Watt Hr efficiency	%	> 80 %
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)		2 yrs.(with the plugs closed tightly)



	Units	X45.44
Гуре of Cell		YAP 11
lominal Voltage per cell	Volts	2
Ianufacturer's Name		Exide Industries Ltd.
tandards to which battery is manufactured		IS 1652 / BS6290
S Nomenclature		P40P - HDP
Number of cells in the battery bank		n
Iominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.85 ecv		
Initial Rated	AH	40
End of Life	AH AH	40 40
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Capacity in AH at various end cell voltages and duration lischarge	n of	
	E.C.V.	Ah output
1 hour	1.75	24.00
2 hour	1.78	29.52
3 hour	1.80 1.81	32.44 34.48
l hour i hour	1.82	34.48 36.00
) hour	1.83	38.00
' hour	1.83	38.04
3 hour	1.84	38.84
) hour	1.84	39.52
0 Hour	1.85	40.00
Maximum momentary current for 1 min till 1.60 e.c.v		89.6
Expected life of battery under normal operation & naintainence conditions	Years	15 - 20 years
nternal Resistance of cell (IR)	milli ohms	2.748
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for	70	
a) Float Charging		
i) Limit current	А	8
ii) Voltage	V	2.25 vpc
b) Boost charging		
i) Starting Current	Α	5.6
ii) Finishing current	A	2.8
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	30
ii) Maximum	mA	90
Equalising charge		
a) Voltage	V	2.3
b) Current	A	2
c) Durationd) Interval between succesive equalising charge	Hrs. Months	6 6
a) for first filling		1.205 +/- 0.005
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.205 +/- 0.005 1.215 +/- 0.005 1.120 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	
Complete Battery	mm	
Distance between cell centres	mm	
Quantity of Electrolyte per Cell	litres	
Quantity of Electrolyte for battery (Including 10% extra)	litres	
Weight(+/-5%)		
Each cell without acid with acid	kg kg	
Complete Battery without acid with acid	kg kg	
Material and type of Plates i) Positive Plates		
Material		
Height of Positive Plate	mm	
Thickness of Positive Plate	mm	
No. of positive plates per cell		
Whether positive plates of individual cells are interchangeable		
ii) Negative Plates		
Material		
Height of Negative Plate	mm	
Thickness of Negative Plate	mm	
No. of negative plates per cell		
Whether negative plates of individual cells are interchangeable		
Material and type of Separators		
Material		
Thickness of separator	mm	
Clearance between bottom of the plate and the bottom of the container	mm	
Clearance between top of the plates and top of container	mm	
Whether explosion vents are offerred		
Type of Vent and Filling Plugs		

190*133*260
Depends on the battery layout
199
2.9
n X electrolyte per cell X 1.1
5.4
8.8
n X each cell weight without acid n X each cell weight with acid

50 45

99.99% Pure Lead

106
7.0
7.3
5

Yes, but not recommended

Lead - Antimony alloy grid

119)
3.8	1
6	

Yes, but not recommended

PVC

3.43
21
69
YES

Explosion proof microporous ceramic made



Container		
Thickness of Container	mm	3
Material of Container		Transperant Styrene Acrylonitrile (SAN)
Cover		
Type of cover		Adhesive Sealed
Material of Cover		Opaque Styrene Acrylonitrile (SAN)
Connections		
Material of Inter-Cell Connectors		Lead Plated Copper
Thickness of Inter-Cell Connectors	mm	2
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 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	1.28
No. of air exchanges required per hour		Depends on the size of battery room
Gasification Voltage per Cell	Volt	2.36
Efficiency		
Ah efficiency	%	> 92 %
Watt Hr efficiency	%	> 80 %
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)		2 yrs.(with the plugs closed tightly)



General Technical Particulars	Units	
Type of Cell	onits	YAP 13
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1652 / BS6290
IS Nomenclature		P48P - HDP
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.85 ecv		
Initial	AH	48
Rated	AH	48
End of Life	AH	48
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Capacity in AH at various end cell voltages and duration	on	
of discharge		•• · · · · ·
	E.C.V.	Ah output
5 minutes	1.62	6.91
15 minutes	1.65	15.74
30 minutes	1.69	21.89
45 minutes	1.71	26.88
1 hour	1.75	28.80
2 hour	1.78	35.42
3 hour	1.80	38.93
4 hour	1.81	41.38
5 hour	1.82	43.20
6 hour	1.83	44.64
7 hour	1.83	45.65
8 hour	1.84	46.61
9 hour	1.84	47.42
10 Hour	1.85	48.00
Maximum momentary current for 1 min till 1.60 e.c.v		107.52
Expected life of battery under normal operation & maintainence conditions	Years	15 20 марта
		15 - 20 years
Internal Resistance of cell (IR)	milli ohms	2.29
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	9.6
ii) Voltage	A V	9.6 2.25 vpc
	v	2.20 γμυ
 b) Boost charging i) Starting Current 	А	6.72
ii) Finishing current	A	3.36
iii) Voltage	v	2.75
	-	
Trickle Charging Rate	mA	40
i) Minimum ii) Maximum	mA mA	40 120
Equalising charge		
a) Voltage	V	2.3
b) Current	Å	2.4
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	6
Recommended Specific gravity at 27 deg C		4 005 / 0 005
a) for first filling		1.205 +/- 0.005
b) at full charge c) when Battery is discharged at 10 hours rate		1.215 +/- 0.005 1.120 - 1.130
Permissible max. temperature of Electrolyte		
i) During Initial Charging	deg C	50
ii) During Normal Operation	deg C	45
	uey C	40



Each Cell L x W x H	mm	190*133*260
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	199
Quantity of Electrolyte per Cell	litres	2.8
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid	kg	6.9
with acid	kg	9.5
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		99.99% Pure Lead
Height of Positive Plate	mm	106
Thickness of Positive Plate	mm	7.3
No. of positive plates per cell		6
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Antimony alloy grid
Height of Negative Plate	mm	119
Thickness of Negative Plate	mm	3.81
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		PVC
Thickness of separator	mm	3.43
Clearance between bottom of the plate and the bottom of the container	mm	21
Clearance between top of the plates and top of container	mm	69
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic made
Container		
Thickness of Container	mm	3
Material of Container		Transperant Styrene Acrylonitrile (SAN)



Cover		
Type of cover		Adhesive Sealed
Material of Cover		Opaque Styrene Acrylonitrile (SAN)
Connections		
Material of Inter-Cell Connectors		Lead Plated Copper
Thickness of Inter-Cell Connectors	mm	2
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	1.536
No. of air exchanges required per hour		Depends on the size of battery room
Gasification Voltage per Cell	Volt	2.36
Characteristic Curves (furnish curve numbers and attach separate sheet)		
Efficiency		
Ah efficiency	%	> 92 %
Watt Hr efficiency	%	> 80 %
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)		2 yrs.(with the plugs closed tightly)



General Technical Particulars		
Type of Cell	Units	YAP 15
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1652 / BS6290
IS Nomenclature		P56P - HDP
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.85 ecv Initial Rated	AH AH	56 56
End of Life	AH	56
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Capacity in AH at various end cell voltages and duratio discharge		
	E.C.V.	Ah output
5 minutes	1.62	8.06
15 minutes	1.65	18.37
30 minutes	1.69	25.54
45 minutes	1.71	31.36
1 hour	1.75	33.60
2 hour	1.78	41.33
3 hour	1.80	45.42
4 hour	1.81	48.27
5 hour	1.82	50.40
6 hour	1.83	52.08
7 hour	1.83	53.26
8 hour	1.84	54.38
9 hour	1.84	55.33
10 Hour	1.85	56.00
Maximum momentary current for 1 min till 1.60 e.c.v		125.44
Expected life of battery under normal operation & maintainence conditions	Years	15 - 20 years
Internal Resistance of cell (IR)	milli ohms	1.963
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	11.2
ii) Voltage	V	2.25 vpc
b) Boost charging	·	2.20 000
i) Starting Current	А	7.84
ii) Finishing current	A	3.92
iii) Voltage	V	2.75
Trickle Charging Rate i) Minimum	mA	45
i) Maximum	mA	135
Equalising charge		
a) Voltage	V	2.3
b) Current	A	2.8
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	6
Recommended Specific gravity at 27 deg C a) for first filling		1.205 +/- 0.005
b) at full charge		1.215 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.120 - 1.130
Permissible max. temperature of Electrolyte		
i) During Initial Charging	deg C	50
ii) During Normal Operation	deg C	45
	209 0	.0



5 . 1 0 11 1 /3 10 1 /5		
Each Cell L */-3 x W*/-3 x H*/-5	mm	190*133*260
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	199
Quantity of Electrolyte per Cell	litres	2.7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid	kg	7
with acid	kg	10.2
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		99.99% Pure Lead
Height of Positive Plate	mm	106
Thickness of Positive Plate	mm	7.3
No. of positive plates per cell		7
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Antimony alloy grid
Height of Negative Plate	mm	119
Thickness of Negative Plate	mm	3.81
No. of negative plates per cell		8
Whether negative plates of individual cells are interchangeable		Yes, but not recommended
Material and type of Separators		
Material		PVC
Thickness of separator	mm	3.43
Clearance between bottom of the plate and the bottom of the container	mm	21
Clearance between top of the plates and top of container	mm	69
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic made
Container		
Thickness of Container	mm	3
Material of Container		Transperant Styrene Acrylonitrile (SAN)
		Tansperant Styrene ACTYIONILINE (SAN)



Cover		
Type of cover		Adhesive Sealed
Material of Cover		Opaque Styrene Acrylonitrile (SAN)
Connections		
Material of Inter-Cell Connectors		Lead Plated Copper
Thickness of Inter-Cell Connectors	mm	2
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	1.792
No. of air exchanges required per hour		Depends on the size of battery room
Gasification Voltage per Cell	Volt	2.36
Efficiency		
Ah efficiency	%	> 92 %

%

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

Recommended Storage life of Battery (Dry shelf life)

Watt Hr efficiency

12 - 18 hours 2 yrs.(with the plugs closed tightly)

> 80 %



General Technical Farticulars	Units	
Type of Cell	Onits	YAP 17
Nominal Voltage per cell	Volts	2
Manufacturer's Name	, ene	– Exide Industries Ltd.
Standards to which battery is manufactured		IS 1652 / BS6290
IS Nomenclature		P64P - HDP
Number of cells in the battery bank		n
-		
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.85 ecv Initial Rated End of Life	AH AH AH	64 64 64
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.009(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge	n	
č	E.C.V.	Ah output
5 minutes	1.62	9.22
15 minutes	1.65	20.99
30 minutes	1.69	29.18
45 minutes 1 hour	1.71 1.75	35.84 38.40
2 hour	1.78	47.23
3 hour	1.80	51.90
4 hour	1.81	55.17
5 hour	1.82	57.60
6 hour	1.83	59.52
7 hour	1.83	60.86
8 hour	1.84	62.14
9 hour	1.84	63.23
10 Hour	1.85	64.00
Maximum momentary current for 1 min till 1.60 e.c.v		143.36
Expected life of battery under normal operation & maintainence conditions	Years	15 - 20 years
Internal Resistance of cell (IR)	milli ohms	1.717
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	А	12.8
ii) Voltage	V	2.25 vpc
b) Boost charging		
i) Starting Current	Α	8.96
ii) Finishing current	A	4.48
iii) Voltage	V	2.75
Trickle Charging Rate i) Minimum	mA	50
i) Maximum	mA	150
Equalising charge		
a) Voltage	V	2.3
b) Current	Α	3.2
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	6
Recommended Specific gravity at 27 deg C a) for first filling		1.205 +/- 0.005
b) at full charge		1.205 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.120 - 1.130
-,		
Permissible max. temperature of Electrolyte		
i) During Initial Charging	deg C	50
ii) During Normal Operation	deg C	45



Each Cell L x W x H	mm	190*133*260
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	199
Quantity of Electrolyte per Cell	litres	2.6
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	7.8 11
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		99.99% Pure Lead
Height of Positive Plate	mm	106
Thickness of Positive Plate	mm	7.3
No. of positive plates per cell		8
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Antimony alloy grid
Height of Negative Plate	mm	119
Height of Negative Plate Thickness of Negative Plate	mm mm	119 3.81
Thickness of Negative Plate		3.81
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are		3.81 9
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable		3.81 9
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators		3.81 9 Yes, but not recommended
Thickness of Negative Plate No. of negative plates per cell Whether negative plates of individual cells are interchangeable Material and type of Separators Material	mm	3.81 9 Yes, but not recommended PVC
Thickness 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	mm	3.81 9 Yes, but not recommended PVC 3.43
Thickness 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 mm	3.81 9 Yes, but not recommended PVC 3.43 21
Thickness 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 container	mm mm	3.81 9 Yes, but not recommended PVC 3.43 21 69
Thickness 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 container Whether explosion vents are offerred	mm mm	3.81 9 Yes, but not recommended PVC 3.43 21 69 YES
Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs	mm mm	3.81 9 Yes, but not recommended PVC 3.43 21 69 YES
Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container	mm mm mm	3.81 9 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made
 Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container Thickness of Container 	mm mm mm	3.81 9 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made
 Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container Thickness of Container Material of Container 	mm mm mm	3.81 9 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made
 Thickness 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 container Whether explosion vents are offerred Type of Vent and Filling Plugs Container Thickness of Container Material of Container Cover 	mm mm mm	3.81 9 Yes, but not recommended PVC 3.43 21 69 YES Explosion proof microporous ceramic made 3 Transperant Styrene Acrylonitrile (SAN)



Connections

Material of Inter-Cell Connectors		Lead Plated Copper
Thickness of Inter-Cell Connectors	mm	2
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	2.048
No. of air exchanges required per hour		Depends on the size of battery room
Gasification Voltage per Cell	Volt	2.36
Efficiency		
Ah efficiency	%	> 92 %
Watt Hr efficiency	%	> 80 %
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)		2 yrs.(with the plugs closed tightly)