

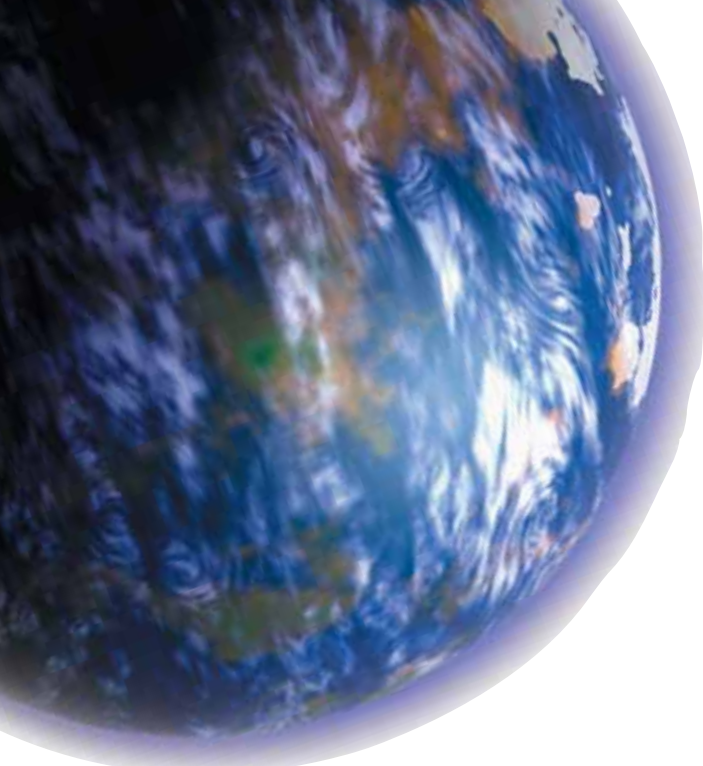


YUCEL batteries

Technical manual 0,8 Ah à 200 Ah



***Valve Regulated
Lead Acid batteries***



YUCEL battery range

YUASA offers an extensive range of gas recombination valve-regulated lead-acid batteries (VRLA). The YUCEL range, with capacities from 0.8 Ah to 200 Ah, is designed for general applications in a floating charge configuration.

General characteristics

- AGM (Absorbed Glass Mat) electrolyte immobilisation system
- Operates in all positions (except recharging upside down)
- Over 99% gas recombination
- Low pressure safety valve
- Easy to maintain



Specifications

	Battery type	Nominal voltage (V)	Nominal capacity		Length (mm)	Width (mm)	Height inc. terminals (mm)	Weight (Kg)	Layout (p2)	Terminals (p2)	Maximum current in 1 min (A)	Maximum current in 1 sec. (A)	Internal impedance (mΩ)**
			(Ah/20 h)*	(Ah/10 h)*									
	Y0.8-12	12	0.8	0.72	96	25	62	0.34	6	F	3	12	180
	Y1-6	6	1.0	0.93	50	42	57	0.28	5	A	12	36	50
	Y1.2-6	6	1.2	1.11	97	24	57.5	0.3	1	A	12	36	60
FR	Y1.2-12	12	1.2	1.11	97	43	58	0.6	3	A	12	36	110
FR	Y2.1-12	12	2.1	1.9	178	35	66	1	1	A	21	63	65
	Y2.8-6	6	2.8	2.6	134	34	66	0.62	1	A	28	84	30
FR	Y3.2-12	12	3.2	3	134	67	66.5	1.3	3	A	32	96	50
FR	Y4-12	12	4	3.7	90	70	107	1.6	1	A	40	120	40
FR	Y7-12	12	7	6.3	151	65	100	2.5	4	A	40	210	25
FR	Y10-6	6	10	9.25	151	50	100	1.9	1	A	40	300	8
FR	Y12-6	6	12	11.1	151	51	100	2	1	B	75	360	8
FR	Y12-12	12	12	11.1	151	98	101	3.9	4	B	75	360	16
FR	Y17-12I	12	17	15.8	181	77	167	5.8	2	C	150	500	15
FR	Y24-12I	12	24	22.2	166	177	129	7.2	2	C	150	500	9.5
FR	Y38-12I	12	38	35.2	197	165	170	13.5	2	C	200	500	7.5
	Y60-12	12	62	60	260	168	216	21	1	D	500	800	6
FR	Y65-12I	12	65	60.1	348	167	178	22.2	2	D	500	800	5.5
	Y100-12	12	111	103	330	173	220	32	1	E	600	1000	4.3
	Y200-6	6	226	210	322	178	234	32.5	5	E	1200	2000	1.3

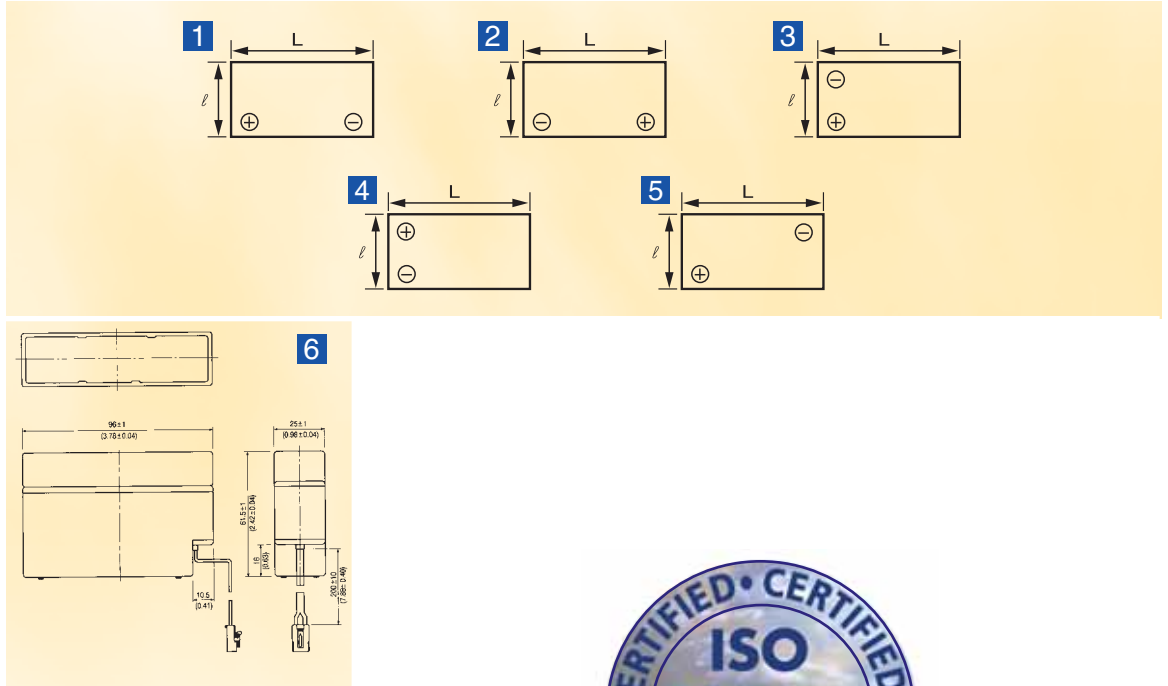
* : Final voltage 1.75 V per cell – Temperature 20°C.

** : Battery charged, measured at 1000 Hz.

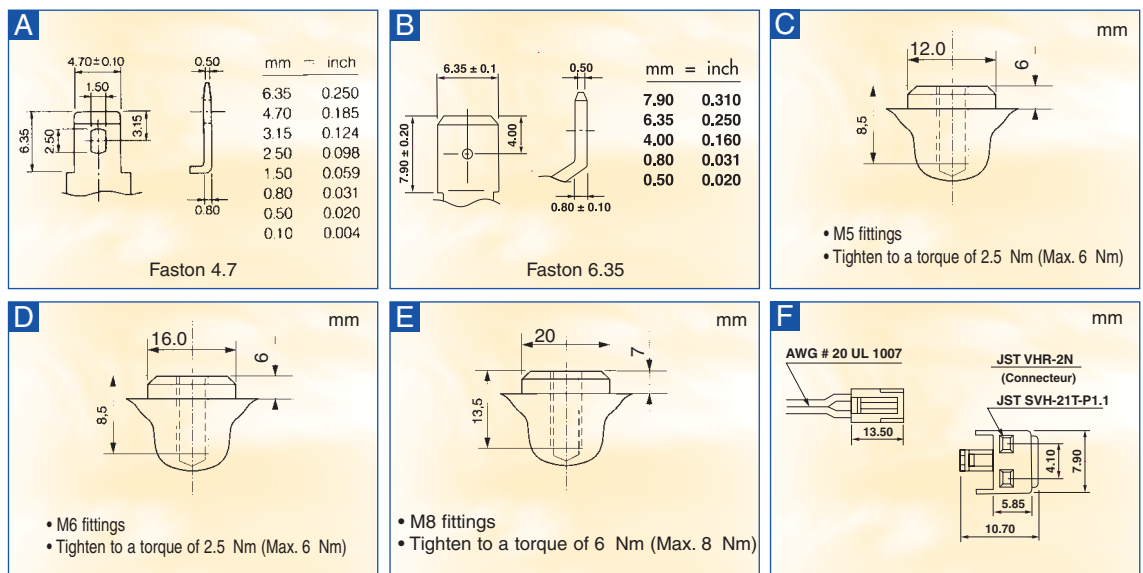
FR: Optionally available in UL94-V0 tray.

Other models may be available on request. Contact us for details.

Terminal layout and overall dimensions



Terminals



Charging

The performance and service life of the batteries depend directly on the efficiency of charging.

Floating charge

To recharge and correctly maintain the charge of these batteries, we recommended charging at a constant voltage of 2.275 V +/- 1% per cell (at 20°C). At this voltage there is no need to limit the charge current. The batteries will limit the current peak ($<3 \times C_{20}^*$ max) at the start of charging.

The ripple current must be no more than $0.05 C_{20}^*$.

Note that for batteries connected in series, the floating voltages for each self-contained battery may vary due to gas recombination.

A dispersion of +6% / -3% may be observed at the start of the batteries' life, dropping to +/- 2% after 6 months of use.

Fast charge, floating application

To recharge the batteries more quickly, charge at a constant voltage of 2.35 V to 2.50 V +/- 1% per cell (subject to the special precautions below).

Precautions to avoid over-charging

- At this voltage level the charge current must be limited to $0.25 C_{20}^*$.
- The fast charge should not last more than 20 hours or should be stopped to resume floating charge once the charge current drops to below $0.07 C_{20}^*$.

Charging time

For a charge limited to $0.1 C_{20}^*$ or $0.25 C_{20}^*$, fully discharged batteries (100% deep discharge) will take approximately 72 hours to recharge with a floating charge.

With a quick charge, fully discharged batteries cannot be recharged in less than 4 hours.

Figures 1, 2, 3 and 4 show the voltage, current and charge volume of the batteries as a function of time, for different charge methods.

Note that the charge volume:

- must reach 110 to 115% charge to obtain 100% available capacity.
- will be greater, for a given time, at high temperatures and less at low temperatures.

*: C_{20} represents the battery capacity in 20 hours (final voltage = 1.75 V/cell).

Floating charge at constant voltage

2.275 V/cell/current limit: $0.1 C_{20}$

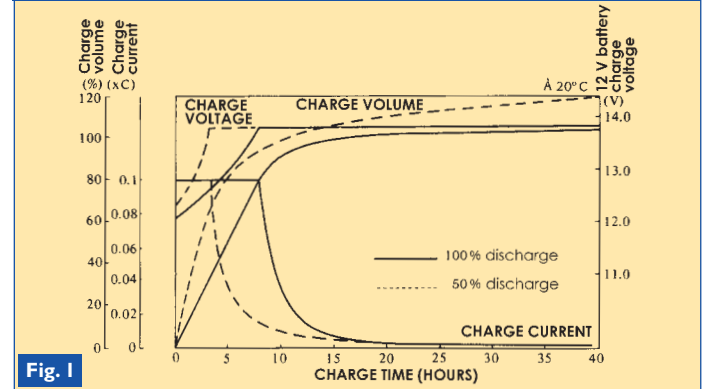


Fig. 1

Floating charge at constant voltage

2.275 V/cell / current limit: $0.25 C_{20}$

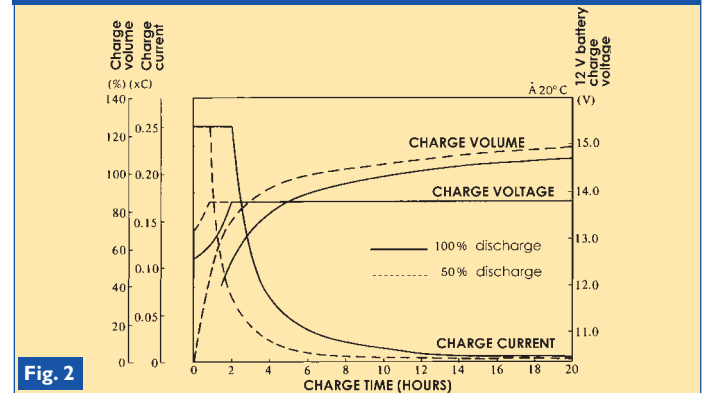


Fig. 2

Fast charge at constant voltage

2.4 V/cell / current limit: $0.1 C_{20}$

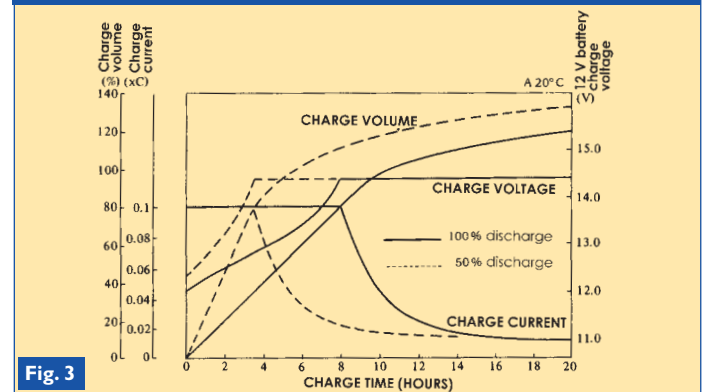


Fig. 3

Fast charge at constant voltage

2.5 V/cell / current limit: $0.25 C_{20}$

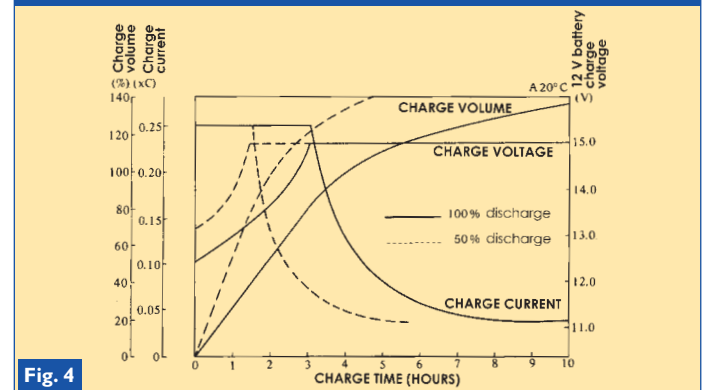


Fig. 4



Temperature compensation

In order to optimise the service life of batteries, it is important to avoid over-charging at high temperatures (risk of thermal runaway) or under-charging at low temperatures. For floating applications, the floating discharge voltage should be compensated by $-3 \text{ mV}/^\circ\text{C}$ for temperatures above 25°C and $+3 \text{ mV}/^\circ\text{C}$ for temperatures below 15°C (central point 2.275 V/cell at 20°C). It is preferable to stop charging if the temperature exceeds 45°C .

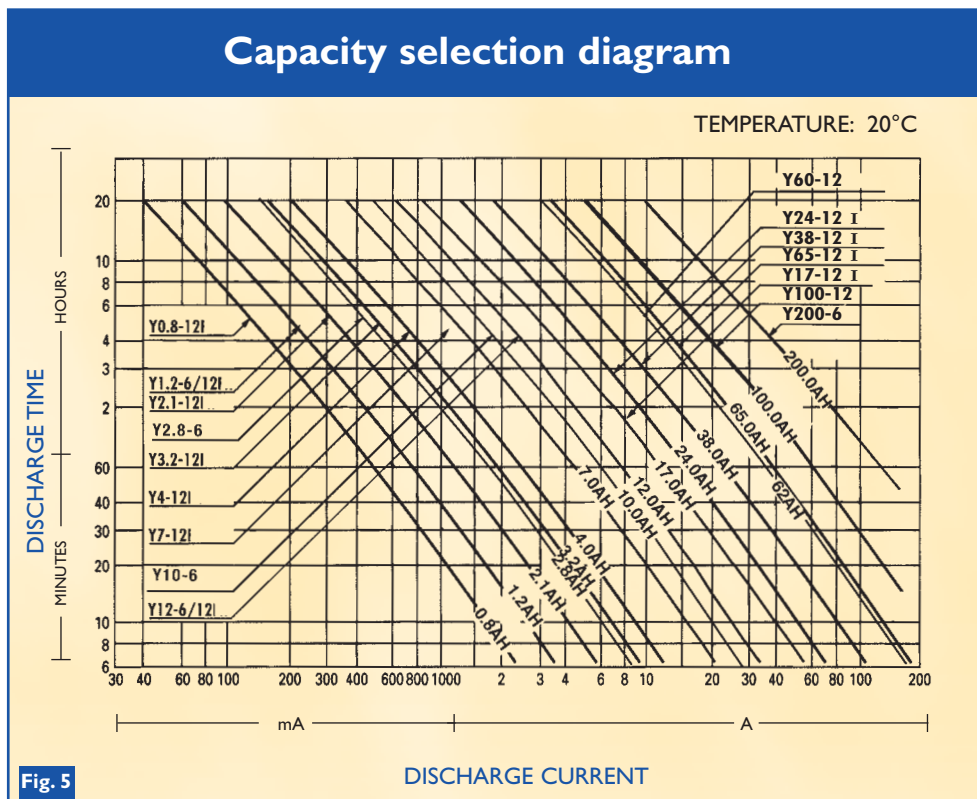
If the batteries are at constant temperature (for example in indoor use) and the charger is not compensated, adjust the floating voltage as a function of the battery temperature.

Discharge

Quick battery capacity selection

The graph in Fig. 5 can be used to quickly determine the required battery capacity in Ah (over 20 hours) as a function of the desired discharge current and autonomy.

Recharge batteries as soon as possible after any discharge.



Final voltage / deep discharge

Figure 6 shows how battery voltage varies depending on discharge rates and times (autonomy).

The dotted line shows the minimum recommended discharge voltage. To avoid deep discharge and deterioration of the batteries by sulphatation of the plates, do not go below this final voltage.

If batteries are accidentally discharged below this limit, recharge them as soon as possible.

Capacity and temperature

Battery capacity varies with temperature. The table below shows the correction coefficients to be applied to the capacity as a function of temperature, which should be taken into account when selecting a battery.

Temperature (°C)	-20	-15	-10	-5	0	+5	+10	+15	+20	+25	+30	+35	+40	+45	+50
Coefficient	0.65	0.67	0.73	0.78	0.84	0.89	0.94	0.97	1.00	1.02	1.05	1.07	1.09	1.10	1.11

Self-discharge

The self-discharge rate for YUCEL batteries is approximately 3% per month when stored at 20°C. The self-discharge rate increases with temperature (see fig. 7).

Batteries should be stored in a cool, dry place.

Storage times should be limited to avoid any deterioration of the battery or difficulty in recharging.

The table below shows the maximum storage time as a function of temperature.

STORAGE TEMPERATURE	MAXIMUM STORAGE TIME
0° C to 25°C	12 months
25°C to 30°C	9 months
31°C to 40°C	5 months
41°C to 50°C	2.5 months

If the storage limits are reached, batteries must be recharged at 2.4 V/cell (current limited to 0.25 C₂₀) for 24 hours in order to compensate for the loss of capacity due to self-discharge.

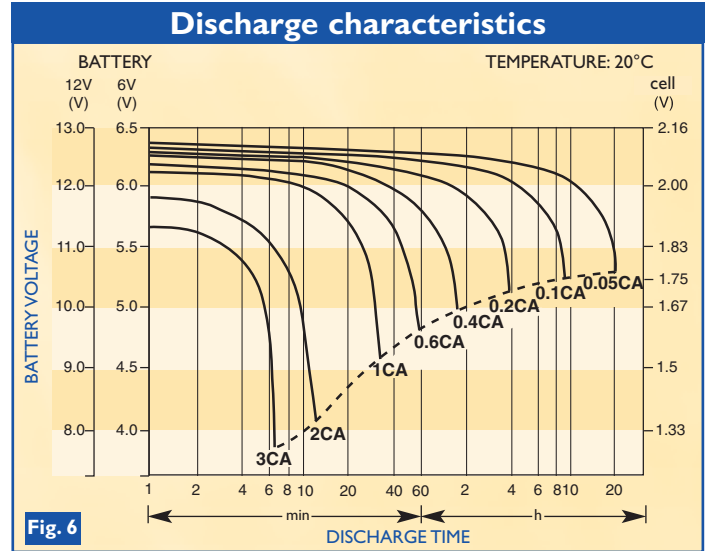


Fig. 6

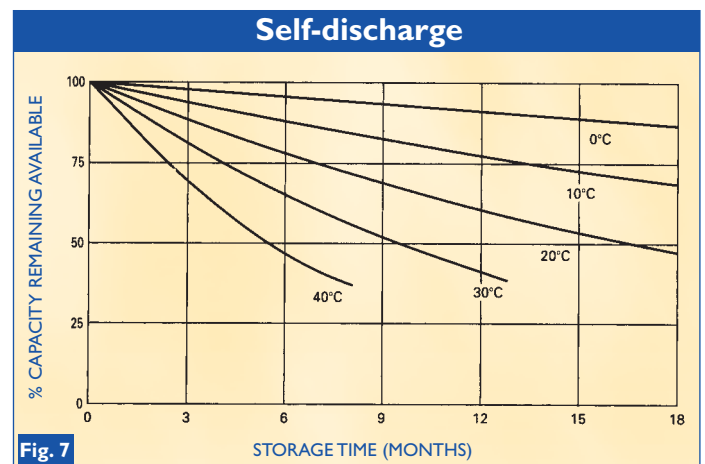


Fig. 7

Open circuit voltage and capacity

The remaining battery capacity can be determined empirically by measuring the open circuit voltage after at least 24 hours' rest (see fig. 8).

Date code

The manufacturing date and factory charging date are given by a code marked on top of the batteries. Please contact us if you need to interpret the code.

Service life with floating charge

YUCEL batteries are designed to operate for 3 to 5 years (except Y200-6, 10 years) in floating configuration, in normal operating conditions:

Floating voltage: 2.275 V/cell (at 20°C).

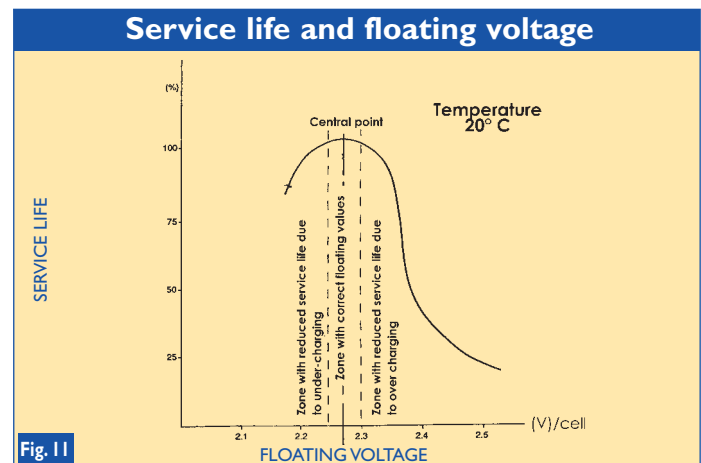
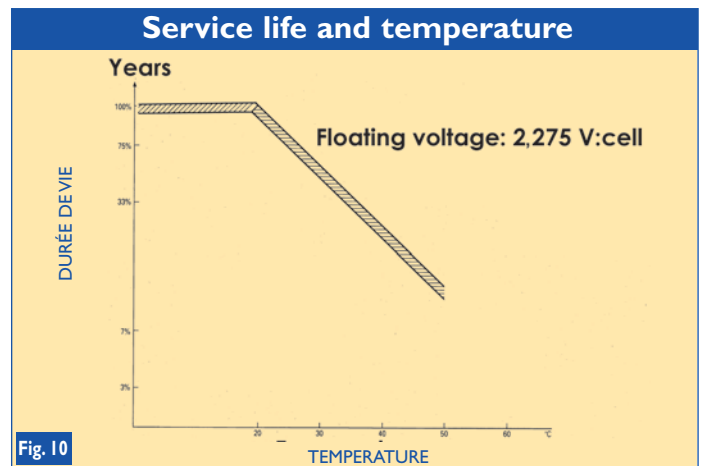
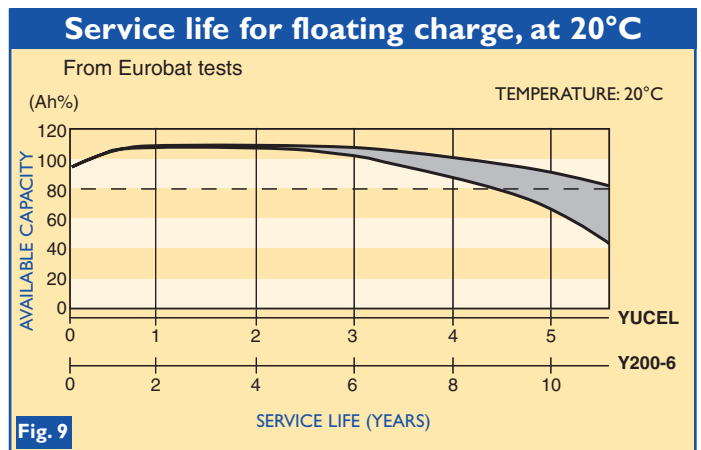
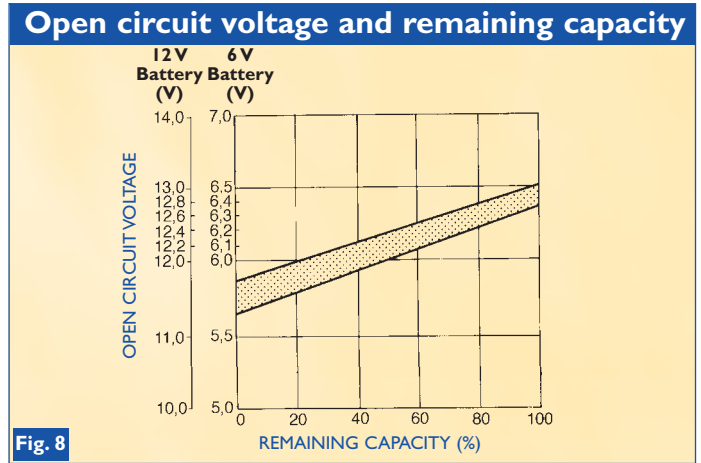
Temperature less than or equal to 20°C.

Use for battery backup (fully discharged approx. every three months).

Figure 9 shows how capacity varies over time.

It should be noted that the service life of the batteries is directly affected by:

- Ambient temperature (see fig. 10). The service life is halved for every 10°C above 20°C. Note that the loss of service life can be reduced by 20% by compensating the floating voltage as a function of temperature.
- Floating voltage (see fig. 11).
- Number of discharges.
- Discharge depth and failure to stop at the specified final voltage.
- Poor charge current quality.



Standards

YUCEL batteries :

Comply with or are compatible with the following standards :
IEC896-2, UL94V0/HB, IEC1056.

UL registration No. MH28018.

Manufactured in accordance with an ISO9001(2000)
quality system and ISO14001 environmental management
system.

Maintenance

Ensure that batteries and connectors are kept clean.

Clean batteries with a damp cloth. Do not use solvents.

Every three months, check that the total battery voltage is
equal to $2.275 \text{ V} \times \text{N}$ cells in series for a temperature of
20°C.

Every year, check the individual voltages of each self-contained
battery. Dispersion of + or -2% due to gas recombination
may be observed.

An annual autonomy test may be performed, either by dis-
charging or by measuring the impedance.

Temperature

For charging :

20°C recommended, limit -15°C to +50°C.

For discharging:

20°C recommended, limit -15°C to +60°C.

For storage:

0 to 20°C recommended, limit -20°C to +50°C.

Transport

IATA classification: class 8, group 3, UN2800 **A67**(non-haz-
ardous goods).

Environnement

Used batteries must be recovered and recycled in accordance
with applicable directives.

The WEEE directive and batteries directive are applicable
within EC countries.

Usage recommendations

Persons handling the batteries must be qualified to work with live electrical equipment (in accordance with UTE C 18-510 in France, or equivalent standards).

Terminals must never be short-circuited. Insulated tools which meet applicable standards must be used.

Batteries must not be used in an enclosed space. Natural ventilation is required, in compliance with standard EN 50272-2 or NFC 15-100.

Leave a gap of 5 to 10 mm between batteries for ventilation if possible.

Safety cabling must be used if several self-contained batteries are to be connected together, avoiding high voltages between adjacent terminals, and any risk of electric shock.

The cross-section and length of the connectors must be appropriate for the maximum current.

Tighten terminals to the specified torque (see page 2).

YUCEL batteries are supplied charged. However, it is recommended that they should be recharged with a floating charge for 72 hours before any discharge.

Do not suspend batteries by their handles.

Installation

Our commercial and technical services are at your disposal for any further information and quotations for:

Supply of batteries in cabinets or on wooden or metal stands, with appropriate connection equipment, accessories and wiring diagrams.

On-site installation and wiring by qualified and authorised installers.

YUCEL RANGE Discharge current (A) for final voltage of 1,60V per cell at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	646,0	463,0	343,0	275,0	233,0	202,0	182,0	166,0	152,0	124,0	74,0	54,0	36,0	25,0	20,4	10,5
Y38-12I	123,0	88,2	65,4	52,3	44,5	38,3	34,5	31,5	28,8	23,5	14,1	10,2	6,8	4,8	38,2	19,9
Y60-12	193,0	139,0	103,0	81,5	69,6	60,7	54,6	41,5	45,7	37,6	22,4	16,3	10,9	7,5	6,1	31,3
Y65-12I	211,8	150,9	111,5	87,4	75,9	66,5	59,6	38,0	49,8	40,9	24,4	17,9	11,9	8,2	6,5	33,9
Y100-12	323,0	231,0	171,0	136,0	116,0	101,0	91,0	83,0	76,0	62,0	37,0	27,0	18,0	12,5	10,2	5,2
Y120-12	386,0	278,0	205,0	165,0	140,0	121,0	109,0	99,0	91,2	74,4	44,4	32,4	21,6	15,0	12,2	6,3
Y150-12	484,0	347,0	256,0	206,0	174,0	151,0	136,0	124,0	114,0	93,0	55,5	40,5	27,0	18,7	15,3	7,8
Y200-12	646,0	463,0	343,0	275,0	233,0	202,0	182,0	166,0	152,0	124,0	74,0	54,0	36,0	25,0	20,4	10,5

YUCEL RANGE Discharge current (A) for final voltage of 1,60V per cell at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	592,7	428,7	320,6	257,0	217,8	190,6	171,7	156,6	144,8	118,1	70,5	51,9	34,6	24,0	19,8	10,2
Y38-12I	112,8	81,7	61,1	48,9	41,6	36,1	32,5	29,7	27,4	22,4	13,4	9,8	6,6	4,6	37,1	19,3
Y60-12	177,1	128,7	96,3	76,2	65,0	57,3	51,5	39,2	43,5	35,8	21,3	15,7	10,5	7,2	5,9	30,4
Y65-12I	194,3	139,7	104,2	81,7	70,9	62,7	56,2	35,8	47,4	39,0	23,2	17,2	11,4	7,8	6,3	32,9
Y100-12	296,3	213,9	159,8	127,1	108,4	95,3	85,8	78,3	72,4	59,0	35,2	26,0	17,3	12,0	9,9	5,1
Y120-12	354,1	257,4	191,6	154,2	130,8	114,2	102,8	93,4	86,9	70,9	42,3	31,2	20,8	14,4	11,8	6,1
Y150-12	444,0	321,3	239,3	192,5	162,6	142,5	128,3	117,0	108,6	88,6	52,9	38,9	26,0	18,0	14,9	7,6
Y200-12	592,7	428,7	320,6	257,0	217,8	190,6	171,7	156,6	144,8	118,1	70,5	51,9	34,6	24,0	19,8	10,2

YUCEL RANGE Discharge current (A) for final voltage of 1,65V per cell at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	632,0	438,0	334,0	274,0	232,0	200,0	182,0	166,0	150,0	124,0	74,0	54,0	36,0	26,0	20,3	10,4
Y38-12I	120,0	83,0	63,4	52,0	44,0	38,0	34,5	31,5	28,5	23,5	14,0	10,2	6,8	4,9	3,9	2,0
Y60-12	189,0	131,0	100,0	82,0	69,5	60,0	54,6	49,8	45,0	37,2	22,2	16,2	10,8	7,8	6,1	3,1
Y65-12I	205,0	142,0	108,5	89,0	75,4	65,0	59,1	53,9	48,7	40,3	24,0	17,5	11,7	8,5	6,1	3,3
Y100-12	316,0	219,0	167,0	137,0	116,0	100,0	91,0	83,0	75,0	62,0	37,0	27,0	18,0	13,0	10,1	5,2
Y120-12	379,0	262,7	200,0	164,0	278,0	120,0	109,0	99,5	90,0	74,4	44,4	32,4	21,6	15,6	12,1	6,2
Y150-12	474,0	328,5	250,0	205,0	174,0	150,0	136,5	124,5	112,5	93,0	55,5	40,5	27,0	19,5	15,2	7,8
Y200-12	632,0	438,0	334,0	274,0	232,0	200,0	182,0	166,0	150,0	124,0	74,0	54,0	36,0	26,0	20,3	10,4

YUCEL RANGE Discharge current (A) for final voltage of 1,65V per cell at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	579,8	405,6	312,1	256,1	216,8	188,7	171,7	156,6	142,9	118,1	70,5	51,9	34,6	25,0	19,7	10,1
Y38-12I	110,1	76,9	59,3	48,6	41,1	35,8	32,5	29,7	27,1	22,4	13,3	9,8	6,5	4,7	3,7	1,9
Y60-12	173,4	121,3	93,5	76,6	65,0	56,6	51,5	47,0	42,9	35,4	21,1	15,6	10,4	7,5	5,9	3,0
Y65-12I	188,1	131,5	101,4	83,2	70,5	61,3	55,8	50,8	46,4	38,4	22,9	16,8	11,3	8,1	5,9	3,2
Y100-12	289,9	202,8	156,1	128,0	108,4	94,3	85,8	78,3	71,4	59,0	35,2	26,0	17,3	12,5	9,8	5,0
Y120-12	347,7	243,2	186,9	153,3	259,8	113,2	102,8	93,9	85,7	70,9	42,3	31,2	20,8	15,0	11,7	6,0
Y150-12	434,9	304,2	233,6	191,6	162,6	141,5	128,8	117,5	107,1	88,6	52,9	38,9	26,0	18,8	14,8	7,6
Y200-12	579,8	405,6	312,1	256,1	216,8	188,7	171,7	156,6	142,9	118,1	70,5	51,9	34,6	25,0	19,7	10,1

YUCEL RANGE Discharge current (A) for final voltage of 1,70V per cell at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	556,0	399,0	316,0	269,0	227,0	196,6	179,0	164,0	147,0	121,8	72,5	52,8	34,5	22,8	20,2	10,3
Y38-12I	105,5	76,0	60,2	51,1	43,2	37,4	34,0	31,1	27,9	23,1	13,8	10,0	6,6	4,3	3,8	1,9
Y60-12	166,9	120,0	94,9	80,9	68,2	58,6	53,4	49,2	44,2	36,3	21,7	15,7	10,4	6,9	6,1	3,0
Y65-12I	180,8	130,0	102,8	87,7	73,9	63,4	57,8	53,3	47,9	39,3	23,5	17,0	11,2	7,5	6,6	3,3
Y100-12	278,0	200,0	158,0	134,5	113,6	98,4	89,5	82,0	73,5	60,9	36,3	26,4	17,3	11,4	10,1	5,2
Y120-12	333,5	240,0	190,0	161,3	136,3	118,0	107,3	98,4	88,2	73,0	43,5	31,6	20,7	13,6	12,1	6,2
Y150-12	417,0	300,0	237,0	201,5	170,4	147,5	134,2	123,0	110,0	91,3	54,4	39,5	25,9	17,1	15,1	7,7
Y200-12	556,0	399,0	316,0	269,0	227,0	196,6	179,0	164,0	147,0	121,8	72,5	52,8	34,5	22,8	20,2	10,3

YUCEL RANGE Discharge current (A) for final voltage of 1,70V per cell at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	510,1	369,4	295,3	251,4	212,1	185,5	168,9	154,7	140,0	116,0	69,0	50,8	33,2	21,9	19,6	10,0
Y38-12I	96,8	70,4	56,3	47,8	40,4	35,3	32,1	29,3	26,6	22,0	13,1	9,6	6,3	4,2	3,7	1,9
Y60-12	153,1	111,1	88,7	75,6	63,7	55,3	50,4	46,4	42,1	34,6	20,7	15,1	10,0	6,6	5,9	3,0
Y65-12I	165,9	120,4	96,1	82,0	69,1	59,8	54,5	50,3	45,6	37,4	22,4	16,3	10,8	7,2	6,4	3,2
Y100-12	255,0	185,2	147,7	125,7	106,2	92,8	84,4	77,4	70,0	58,0	34,6	25,4	16,6	11,0	9,8	5,0
Y120-12	306,0	222,2	177,6	150,7	127,4	111,3	101,2	92,8	84,0	69,5	41,4	30,4	19,9	13,1	11,7	6,0
Y150-12	382,6	277,8	221,5	188,3	159,3	139,2	126,6	116,0	104,8	87,0	51,8	38,0	24,9	16,4	14,7	7,5
Y200-12	510,1	369,4	295,3	251,4	212,1	185,5	168,9	154,7	140,0	116,0	69,0	50,8	33,2	21,9	19,6	10,0

YUCEL RANGE Discharge current (A) for final voltage of 1,75V per cell at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	519,0	389,0	309,0	257,5	220,0	193,0	175,0	160,0	143,0	120,0	70,5	50,5	33,8	22,3	20,1	10,1
Y38-12I	98,7	74,2	59,1	49,1	42,1	36,8	33,3	30,4	27,1	22,8	13,4	9,6	6,4	4,3	3,8	1,9
Y60-12	156,0	116,9	93,3	77,6	66,6	58,3	53,0	48,0	42,8	36,0	21,2	15,2	10,2	6,8	6,0	3,0
Y65-12I	169,0	126,6	101,1	84,1	72,2	63,2	57,5	52,0	46,4	39,0	23,0	16,5	11,0	7,3	6,5	3,3
Y100-12	260,0	195,0	155,0	129,0	110,5	96,8	87,6	80,0	71,5	60,0	35,3	25,3	16,9	11,2	10,1	5,1
Y120-12	312,0	234,2	185,5	154,5	132,4	116,0	105,0	96,0	85,5	72,0	42,3	30,3	20,2	13,4	12,1	6,1
Y150-12	389,0	292,0	232,0	193,0	165,0	145,0	131,0	120,0	107,0	90,0	52,9	37,9	25,3	16,8	15,1	7,6
Y200-12	519,0	389,0	309,0	257,5	220,0	193,0	175,0	160,0	143,0	120,0	70,5	50,5	33,8	22,3	20,1	10,1

YUCEL RANGE Discharge current (A) for final voltage of 1,75V per cell at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	476,1	360,2	288,8	240,7	205,6	182,1	165,1	150,9	136,2	114,3	67,1	48,6	32,5	21,4	19,5	9,8
Y38-12I	90,6	68,7	55,2	45,9	39,3	34,7	31,4	28,7	25,8	21,7	12,8	9,2	6,2	4,1	3,7	1,9
Y60-12	143,1	108,2	87,2	72,5	62,2	55,0	50,0	45,3	40,8	34,3	20,2	14,6	9,8	6,5	5,9	2,9
Y65-12I	155,0	117,2	94,5	78,6	67,5	59,6	54,2	49,1	44,2	37,1	21,9	15,9	10,6	7,0	6,3	3,2
Y100-12	238,5	180,6	144,9	120,6	103,3	91,3	82,6	75,5	68,1	57,1	33,6	24,3	16,3	10,8	9,8	4,9
Y120-12	286,2	216,9	173,4	144,4	123,7	109,4	99,1	90,6	81,4	68,6	40,3	29,1	19,4	12,9	11,7	5,9
Y150-12	356,9	270,4	216,8	180,4	154,2	136,8	123,6	113,2	101,9	85,7	50,4	36,4	24,3	16,2	14,6	7,4
Y200-12	476,1	360,2	288,8	240,7	205,6	182,1	165,1	150,9	136,2	114,3	67,1	48,6	32,5	21,4	19,5	9,8

YUCEL RANGE Discharge current (A) for final voltage of 1,80V per cell at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	495	372	280	249	213	190	167	153	138	113,7	68,3	49	32,1	21,6	20	10,1
Y38-12I	94,1	71	53,3	47,3	40,6	36,1	31,8	29,2	26,4	21,5	13	9,31	6,12	4,1	3,8	1,93
Y60-12	147	111,7	86,9	74,88	64,1	57,04	50,3	46,3	41,7	33,9	20,5	14,6	9,64	6,47	6	3,03
Y65-12I	159	121	94,6	81,15	69,45	61,79	54,5	50,2	45,2	36,7	22,2	15,8	10,44	7,01	6,5	3,28
Y100-12	247,5	186,2	140,2	124,6	106,8	95	83,7	76,8	69,4	56,6	34,2	24,5	16,1	10,8	10	5,07
Y120-12	297	223	168	149	128	114	100,5	92,3	83,3	68	41	29,4	19,3	12,9	12	6,08
Y150-12	371	279	210	187	160	142,5	125,5	115	104	85	51,3	36,7	24,1	16,2	15	7,6
Y200-12	495	372	280	249	213	190	167	153	138	113,7	68,3	49	32,1	21,6	20	10,1

YUCEL RANGE Discharge current (A) for final voltage of 1,80V per cell at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20
Y200-6	454,1	344,4	261,7	232,7	199,1	179,2	157,5	144,3	131,4	108,3	65,0	47,1	30,9	20,8	19,4	9,8
Y38-12I	86,3	65,7	49,8	44,2	37,9	34,1	30,0	27,5	25,1	20,5	12,4	9,0	5,9	3,9	3,7	1,9
Y60-12	134,9	103,4	81,2	70,0	59,9	53,8	47,5	43,7	39,7	32,3	19,5	14,0	9,3	6,2	5,8	2,9
Y65-12I	145,9	112,0	88,4	75,8	64,9	58,3	51,4	47,4	43,0	35,0	21,1	15,2	10,0	6,7	6,3	3,2
Y100-12	227,1	172,4	131,0	116,4	99,8	89,6	79,0	72,5	66,1	53,9	32,6	23,6	15,5	10,4	9,7	4,9
Y120-12	272,5	206,5	157,0	139,3	119,6	107,5	94,8	87,1	79,3	64,8	39,0	28,3	18,6	12,4	11,7	5,9
Y150-12	340,4	258,3	196,3	174,8	149,5	134,4	118,4	108,5	99,0	81,0	48,9	35,3	23,2	15,6	14,6	7,4
Y200-12	454,1	344,4	261,7	232,7	199,1	179,2	157,5	144,3	131,4	108,3	65,0	47,1	30,9	20,8	19,4	9,8

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,60V at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	1085,0	796,0	621,0	511,0	440,0	385,5	348,0	317,7	291,0	238,0	142,2	104,2	69,8	48,7	40,8	21,0
Y38-12I	206,0	151,5	118,4	92,3	84,1	73,1	66,0	60,3	55,2	45,1	27,0	19,7	13,3	9,3	7,6	4,0
Y60-12	318,5	237,9	186,6	153,3	130,3	114,3	103,4	93,6	87,0	71,8	42,9	30,7	20,8	14,7	12,0	6,3
Y65-12I	344,0	257,7	202,3	166,1	140,9	123,7	112,0	101,2	94,3	77,9	46,5	33,1	22,5	15,9	13,0	6,8
Y100-12	542,6	397,0	309,0	253,0	219,0	192,8	174,0	158,9	145,5	119,0	71,1	52,1	34,9	24,4	20,4	10,5
Y120-12	648,0	478,0	371,0	307,0	264,5	231,0	208,4	189,5	174,5	142,7	85,3	62,5	41,9	29,3	24,4	12,5
Y150-12	813,0	597,0	463,0	383,0	328,0	288,0	260,0	237,0	218,0	178,0	106,7	78,2	52,4	36,5	30,6	15,7
Y200-12	1085,0	796,0	621,0	511,0	440,0	385,5	348,0	317,7	291,0	238,0	142,2	10,2	69,8	48,7	40,8	21,0

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,60V at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	995,4	737,0	580,4	477,6	411,2	363,7	328,3	299,7	277,1	226,7	135,4	100,2	67,1	46,8	39,6	20,4
Y38-12I	189,0	140,3	110,7	86,3	78,6	69,0	62,3	56,9	52,5	43,0	25,7	18,9	12,7	8,9	7,4	3,9
Y60-12	292,2	220,3	174,4	143,3	121,8	107,8	97,5	88,3	82,9	68,4	40,8	29,5	20,0	14,1	11,7	6,1
Y65-12I	315,6	238,6	189,1	155,2	131,7	116,7	105,7	95,5	89,8	74,2	44,3	31,9	21,6	15,3	12,6	6,6
Y100-12	497,8	367,6	288,8	236,4	204,7	181,9	164,2	149,9	138,6	113,3	67,7	50,1	33,6	23,4	19,8	10,2
Y120-12	594,5	442,6	346,7	286,9	247,2	217,9	196,6	178,8	166,2	135,9	81,2	60,1	40,3	28,2	23,7	12,2
Y150-12	745,9	552,8	432,7	357,9	306,5	271,7	245,3	223,6	207,6	169,5	101,6	75,2	50,4	35,1	29,7	15,2
Y200-12	995,4	737,0	580,4	477,6	411,2	363,7	328,3	299,7	277,1	226,7	135,4	9,8	67,1	46,8	39,6	20,4

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,65V at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	1094,0	762,0	593,0	497,0	429,1	381,6	330,5	320,0	291,0	240,9	144,2	105,4	70,5	51,0	40,2	20,8
Y38-12I	207,0	144,0	113,0	94,6	81,4	72,5	66,2	60,8	55,3	45,7	27,2	19,9	13,3	9,6	7,6	3,9
Y60-12	322,0	228,5	177,7	149,9	128,6	114,4	104,3	95,8	86,9	64,4	42,8	31,3	21,1	14,8	12,1	6,2
Y65-12I	348,0	247,4	192,4	162,5	139,3	123,9	112,9	103,7	94,1	68,5	46,3	33,8	22,9	16,0	13,1	6,7
Y100-12	546,0	381,0	297,0	249,0	214,5	191,0	173,5	160,0	145,0	120,5	72,1	52,6	35,1	25,5	20,0	10,4
Y120-12	655,0	457,0	356,0	298,3	514,0	229,0	209,0	192,0	174,5	144,6	86,5	63,1	42,2	30,6	24,0	12,4
Y150-12	820,0	571,5	445,0	373,0	321,8	286,3	262,0	240,0	218,0	180,7	108,1	79,0	52,8	38,2	30,1	15,6
Y200-12	1094,0	762,0	593,0	497,0	429,1	381,6	330,5	320,0	291,0	240,9	144,2	105,4	70,5	51,0	40,2	20,8

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,65V at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	1003,7	705,6	554,2	464,5	401,0	360,0	311,8	301,9	277,1	229,4	137,3	101,3	67,8	49,0	39,0	20,1
Y38-12I	189,9	133,3	105,6	88,4	76,1	68,4	62,5	57,4	52,7	43,5	25,9	19,1	12,8	9,3	7,4	3,8
Y60-12	295,4	211,6	166,1	140,1	120,2	107,9	98,4	90,4	82,8	61,4	40,8	30,0	20,3	14,3	11,7	6,0
Y65-12I	319,3	229,1	179,8	151,9	130,2	116,9	106,5	97,8	89,6	65,2	44,1	32,5	22,0	15,4	12,7	6,5
Y100-12	500,9	352,8	277,6	232,7	200,5	180,2	163,7	150,9	138,1	114,8	68,6	50,6	33,8	24,5	19,4	10,1
Y120-12	600,9	423,1	332,7	278,8	480,4	216,0	197,2	181,1	166,2	137,7	82,4	60,7	40,6	29,4	23,3	12,0
Y150-12	752,3	529,2	415,9	348,6	300,7	270,1	247,2	226,4	207,6	172,1	103,0	76,0	50,8	36,7	29,2	15,1
Y200-12	1003,7	705,6	554,2	464,5	401,0	360,0	311,8	301,9	277,1	229,4	137,3	101,3	67,8	49,0	39,0	20,1

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,70V at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	979,0	724,0	578,4	491,4	423,0	97,4	340,0	313,5	281,0	234,0	139,1	101,5	66,6	44,0	39,2	20,4
Y38-12I	185,7	137,5	110,0	93,5	80,4	70,6	64,6	59,3	53,5	44,4	26,5	19,3	12,7	8,4	7,5	3,9
Y60-12	293,5	218,4	172,6	147,9	126,8	110,8	101,6	97,8	84,9	69,7	41,9	30,2	19,8	13,3	12,0	6,1
Y65-12I	318,0	237,0	186,8	160,3	137,4	120,0	110,0	106,6	91,9	75,5	45,4	32,9	21,4	14,4	13,0	6,6
Y100-12	489,0	362,0	289,0	246,0	211,0	186,0	170,0	156,5	141,0	117,0	69,9	50,9	33,4	22,0	19,8	10,2
Y120-12	587,0	434,3	347,5	295,1	253,5	223,0	218,5	188,0	169,2	140,2	83,7	61,0	400,0	262,8	237,1	123,0
Y150-12	734,0	543,0	433,7	368,7	317,0	141,7	255,0	235,0	211,0	175,5	104,5	76,2	50,0	33,0	29,5	15,3
Y200-12	979,0	724,0	578,4	491,4	423,0	97,4	340,0	313,5	281,0	234,0	139,1	101,5	66,6	44,0	39,2	20,4

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,70V at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	898,2	670,4	540,6	459,3	395,3	91,9	320,8	295,8	267,6	222,9	132,5	97,6	64,0	42,3	38,1	19,8
Y38-12I	170,4	127,3	102,8	87,4	75,1	66,6	60,9	55,9	51,0	42,3	25,2	18,6	12,2	8,0	7,3	3,7
Y60-12	269,3	202,2	161,3	138,2	118,5	104,5	95,8	92,3	80,9	66,4	39,9	29,0	19,0	12,8	11,6	5,9
Y65-12I	291,7	219,4	174,6	149,8	128,4	113,2	103,8	100,6	87,5	71,9	43,2	31,6	20,6	13,9	12,6	6,4
Y100-12	448,6	335,2	270,1	229,9	197,2	175,5	160,4	147,6	134,3	111,4	66,6	48,9	32,1	21,2	19,2	9,9
Y120-12	538,5	402,1	324,8	275,8	236,9	210,4	206,1	177,4	161,1	133,5	79,7	58,7	384,6	252,7	230,2	119,4
Y150-12	673,4	502,8	405,3	344,6	296,3	133,7	240,6	221,7	201,0	167,1	99,5	73,3	48,1	31,7	28,6	14,9
Y200-12	898,2	670,4	540,6	459,3	395,3	91,9	320,8	295,8	267,6	222,9	132,5	97,6	64,0	42,3	38,1	19,8

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,75V at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	934,7	704,7	561,9	472,5	404,7	361,0	327,4	302,9	273,0	230,0	135,4	97,4	65,3	43,3	39,1	20,1
Y38-12I	178,0	134,3	107,5	90,0	77,6	68,4	62,5	57,6	51,9	43,7	25,8	18,5	12,4	8,2	7,5	3,8
Y60-12I	281,5	211,5	169,8	142,2	123,1	108,4	99,3	91,3	82,3	69,2	40,7	29,5	19,6	13,1	12,0	6,0
Y65-12I	305,0	229,0	184,0	154,1	133,5	117,5	107,7	99,0	89,2	75,0	44,1	32,0	21,3	14,2	13,1	6,5
Y100-12	469,3	353,3	282,1	234,5	203,7	180,0	164,4	151,5	136,9	115,0	68,0	48,8	32,7	21,7	19,6	10,0
Y120-12	563,0	424,0	337,5	283,0	244,0	215,5	197,0	181,8	163,5	138,0	81,4	58,4	39,1	25,9	23,5	12,1
Y150-12	702,0	529,0	422,0	353,5	304,2	270,0	245,9	227,2	204,9	172,5	101,7	73,1	49,0	32,5	29,4	15,1
Y200-12	934,7	704,7	561,9	472,5	404,7	361,0	327,4	302,9	273,0	230,0	135,4	97,4	65,3	43,3	39,1	20,1

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,75V at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	857,5	652,5	525,1	441,6	378,2	340,6	308,9	285,8	260,0	219,0	129,0	93,7	62,8	41,6	38,0	19,5
Y38-12I	163,3	124,4	100,5	84,1	72,5	64,5	59,0	54,3	49,4	41,6	24,6	17,8	11,9	7,9	7,2	3,7
Y60-12I	258,3	195,8	158,7	132,9	115,0	102,3	93,7	86,1	78,4	65,9	38,8	28,4	18,9	12,5	11,7	5,8
Y65-12I	279,8	212,0	172,0	144,0	124,8	110,8	101,6	93,4	85,0	71,4	42,0	30,8	20,4	13,6	12,7	6,3
Y100-12	430,6	327,1	263,6	219,2	190,4	169,8	155,1	142,9	130,4	109,5	64,8	46,9	31,4	20,9	19,0	9,7
Y120-12	516,5	392,6	315,4	264,5	228,0	203,3	185,8	171,5	155,7	131,4	77,5	56,2	37,6	24,9	22,8	11,7
Y150-12	644,0	489,8	394,4	330,4	284,3	254,7	232,0	214,3	195,1	164,3	96,9	70,3	47,1	31,3	28,5	14,6
Y200-12	857,5	652,5	525,1	441,6	378,2	340,6	308,9	285,8	260,0	219,0	129,0	93,7	62,8	41,6	38,0	19,5

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,80V at 25°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	900,0	678,0	512,0	456,0	393,0	356,0	314,3	291,8	265,2	218,0	132,2	95,5	62,9	42,9	39,6	20,0
Y38-12I	171,0	129,0	97,5	86,5	74,8	67,6	59,9	55,6	50,5	40,4	25,1	18,2	12,0	8,2	7,5	3,8
Y60-12I	239,0	203,0	153,0	135,0	117,5	106,5	95,8	89,1	80,6	65,7	39,4	28,9	19,1	12,5	11,6	6,1
Y65-12I	272,0	220,0	166,0	147,0	127,5	115,5	103,2	95,9	86,9	71,0	42,8	31,2	20,6	13,7	12,7	6,5
Y100-12	450,0	340,0	256,0	228,0	197,0	178,0	157,7	146,2	132,8	109,0	66,2	47,9	31,5	21,5	19,8	10,0
Y120-12	531,0	407,0	307,0	273,0	236,0	213,5	189,4	175,8	159,5	130,8	79,3	57,5	37,8	25,6	23,7	12,0
Y150-12	675,0	509,0	384,0	342,0	295,0	267,0	236,0	219,0	199,0	163,5	99,2	71,7	47,2	32,2	29,7	15,0
Y200-12	900,0	678,0	512,0	456,0	393,0	356,0	314,3	291,8	265,2	218,0	132,2	95,5	62,9	42,9	39,6	20,0

YUCEL RANGE Discharge power (W) per cell for final voltage of 1,80V at 20°C

Type	5min	10min	15min	20min	25min	30min	35min	40min	45min	1h	2h	3h	5h	8h	10h	20h
Y200-6	825,7	627,8	478,5	426,2	367,3	335,8	296,5	275,3	252,6	207,6	125,9	91,8	60,5	41,3	38,4	19,4
Y38-12I	156,9	119,4	91,1	80,8	69,9	63,8	56,5	52,5	48,1	38,5	23,9	17,5	11,5	7,8	7,3	3,7
Y60-12I	219,3	188,0	143,0	126,2	109,8	100,5	90,4	84,1	76,8	62,6	37,5	27,8	18,4	12,0	11,3	5,9
Y65-12I	249,5	203,7	155,1	137,4	119,2	109,0	97,4	90,5	82,8	67,6	40,8	30,0	19,8	13,2	12,3	6,3
Y100-12	412,8	314,8	239,3	213,1	184,1	167,9	148,8	137,9	126,5	103,8	63,0	46,1	30,3	20,7	19,2	9,7
Y120-12	487,2	376,9	286,9	255,1	220,6	201,4	178,7	165,8	151,9	124,6	75,5	55,3	36,3	24,6	23,0	11,7
Y150-12	619,3	471,3	358,9	319,6	275,7	251,9	222,6	206,6	189,5	155,7	94,5	68,9	45,4	31,0	28,8	14,6
Y200-12	825,7	627,8	478,5	426,2	367,3	335,8	296,5	275,3	252,6	207,6	125,9	91,8	60,5	41,3	38,4	19,4

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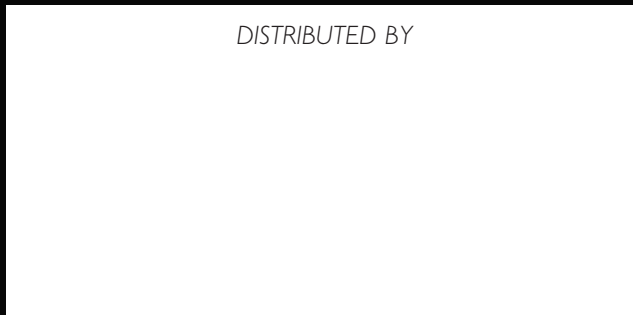
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