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mAh to Wh Battery Chart

Milliamp-hours to watt-hours for phone cells, power banks and battery packs, with airline limits

For: Travellers, drone and camera users, makers, e-bike and solar users

allunitconversions.com/mah-to-wh-chart
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KEY RELATIONSHIP	FORMULA	REVERSE	WORKED EXAMPLE
Energy (Wh) = charge (Ah) × nominal voltage (V)	Wh = mAh × V ÷ 1000	mAh = Wh × 1000 ÷ V	A 20,000 mAh power bank at 3.7 V = 74 Wh (under the 100 Wh airline limit)

Wh to 1 decimal place. Use the nominal cell voltage printed on the battery (3.6 V, 3.7 V or 3.85 V for most lithium-ion cells).

Phone cells and power banks: mAh to Wh

mAh	Wh at 3.6 V	Wh at 3.7 V	Wh at 3.85 V	mAh	Wh at 3.6 V	Wh at 3.7 V	Wh at 3.85 V
1,000	3.6	3.7	3.9	**10,000**	36.0	37.0	38.5
2,000	7.2	7.4	7.7	**12,000**	43.2	44.4	46.2
2,500	9.0	9.3	9.6	**15,000**	54.0	55.5	57.8
3,000	10.8	11.1	11.6	**20,000**	72.0	74.0	77.0
3,500	12.6	13.0	13.5	**25,000**	90.0	92.5	96.3
4,000	14.4	14.8	15.4	**26,800**	96.5	99.2	103.2
4,500	16.2	16.7	17.3	**27,000**	97.2	99.9	104.0
5,000	18.0	18.5	19.3	**30,000**	108.0	111.0	115.5
6,000	21.6	22.2	23.1	**40,000**	144.0	148.0	154.0
8,000	28.8	29.6	30.8	**50,000**	180.0	185.0	192.5

Airline category at 3.7 V

Categories by watt-hour rating; the rules for each category are in the table below.

mAh at 3.7 V	Wh	Category
10,000	37.0	Up to 100 Wh
20,000	74.0	Up to 100 Wh
25,000	92.5	Up to 100 Wh
26,800	99.2	Up to 100 Wh
27,000	99.9	Up to 100 Wh
30,000	111.0	100–160 Wh
40,000	148.0	100–160 Wh
43,000	159.1	100–160 Wh
45,000	166.5	Over 160 Wh

Battery packs: Ah to Wh

Ah	7.4 V	11.1 V	12 V	12.8 V	14.8 V	24 V	36 V	48 V
1	7.4	11.1	12	12.8	14.8	24	36	48
2	14.8	22.2	24	25.6	29.6	48	72	96
2.5	18.5	27.8	30	32	37	60	90	120
3	22.2	33.3	36	38.4	44.4	72	108	144
4	29.6	44.4	48	51.2	59.2	96	144	192
5	37	55.5	60	64	74	120	180	240

Ah	7.4 V	11.1 V	12 V	12.8 V	14.8 V	24 V	36 V	48 V
6	44.4	66.6	72	76.8	88.8	144	216	288
7	51.8	77.7	84	89.6	103.6	168	252	336
9	66.6	99.9	108	115.2	133.2	216	324	432
10	74	111	120	128	148	240	360	480
12	88.8	133.2	144	153.6	177.6	288	432	576
18	133.2	199.8	216	230.4	266.4	432	648	864
20	148	222	240	256	296	480	720	960
35	259	388.5	420	448	518	840	1,260	1,680
50	370	555	600	640	740	1,200	1,800	2,400
100	740	1,110	1,200	1,280	1,480	2,400	3,600	4,800
200	1,480	2,220	2,400	2,560	2,960	4,800	7,200	9,600

Watt-hours to mAh

Wh	mAh at 3.6 V	mAh at 3.7 V	mAh at 3.85 V
5	1,389	1,351	1,299
10	2,778	2,703	2,597
20	5,556	5,405	5,195
27	7,500	7,297	7,013
37	10,278	10,000	9,610
50	13,889	13,514	12,987
60	16,667	16,216	15,584

Wh	mAh at 3.6 V	mAh at 3.7 V	mAh at 3.85 V
74	20,556	20,000	19,221
90	25,000	24,324	23,377
99	27,500	26,757	25,714
100	27,778	27,027	25,974
120	33,333	32,432	31,169
160	44,444	43,243	41,558

Lithium batteries in passenger baggage (ICAO and IATA, 2026)

Power banks must not be recharged on board, and should not be used to charge devices in flight. Many airlines are stricter (for example one power bank only). Check your airline before you fly.

Rating	Item	Carry-on	Checked	Airline approval
Up to 100 Wh	In a device (phone, laptop, camera)	Yes	Yes, switched fully off	No
Up to 100 Wh	Spare battery	Yes, terminals protected	No	No
Up to 100 Wh	Power bank	Yes, at most 2 per person	No	No
100–160 Wh	In a device	Yes	Yes	Yes
100–160 Wh	Spare battery	Yes, at most 2	No	Yes
100–160 Wh	Power bank	Only with approval until 31 Dec 2026; not allowed from 1 Jan 2027	No	Yes
Over 160 Wh	Any	No: cargo only, under the Dangerous Goods Regulations	No	—

Useful battery formulas

To find	Formula	Example
Watt-hours	Wh = mAh × V ÷ 1000	5,000 mAh × 3.85 V ÷ 1000 = 19.25 Wh
Milliamp-hours	mAh = Wh × 1000 ÷ V	99 Wh × 1000 ÷ 3.7 V = 26,757 mAh
Runtime	hours ≈ Wh × efficiency ÷ load (W)	100 Wh × 0.85 ÷ 20 W = 4.25 h
Power-bank output at 5 V	mAh(5 V) ≈ mAh × 3.7 ÷ 5 × efficiency	20,000 mAh × 3.7 ÷ 5 × 0.85 = 12,580 mAh
Charge time	hours ≈ Ah ÷ charge current (A) × 1.2	5 Ah ÷ 2 A × 1.2 = 3 h

Sources and method

- **ICAO Doc 9284 Technical Instructions 2025–2026, Addendum No. 1 (27 March 2026)** — Power banks: carry-on only, at most two per person, not recharged on board
- **IATA, Changes Regarding Power Banks: guidance for operators (31 March 2026)** — Passenger table for lithium batteries; 100–160 Wh power-bank approval not carried into the 68th edition DGR (1 January 2027) (www.iata.org/en/programs/cargo/dgr/lithium-batteries/)

Watt-hours are calculated from Wh = mAh × V ÷ 1000; airline rules are summarised from the ICAO addendum and IATA guidance listed, current at the edition date. Interactive version, corrections and more charts: **allunitconversions.com/mah-to-wh-chart**