

# Lithium Ion Battery Safety: For internal and external vaporizers

First, it's important to make a distinction: e-cigarettes do not explode; lithium ion batteries (which are often used in vape mods) can explode if they are not handled safely. Lithium ion batteries are high powered, and fast draining. This means that they output a large amount of power in a short amount of time, which makes it the most commonly used battery for vaping. Some examples of lithium batteries include, but are not limited to, 18650, 26650, 20700, 21700, as well as different capacities, or mAh. Internal batteries also use rechargeable lithium batteries. They usually come stacked together in a protective casing found inside the mod. It is not recommended to change these batteries yourself.



You may have some concerns regarding the safety of your new vaping device. Whether using an internal or external battery, there will be care and maintenance required to ensure that the batteries will be safe to use. In light of the recent horror stories about vape battery explosions that can be seen all over the media, we think that it's important to discuss what you should and shouldn't do in order to keep your vape battery safe.

## **Will my e-cigarette explode?**

Not if you make sure that your device and batteries are safe. There are a few ways to ensure lithium ion battery safety:

- Handle your mod with care. The protection around these LiPo batteries is little more than an aluminum foil case, meaning a knock can cause serious damage. If you drop your mod, place it in a sealed metal container immediately, in case the internal batteries vent, then take them to be recycled as soon as possible.
- Don't cut corners. Never purchase your devices or batteries second hand, even if you are sure that the quality is acceptable.
- Use the correct coils. Most mods have a limit to what kind of ohms coil they can use. Most coils will have a brand etching that tells you the resistance (ohm) and the proper wattage for the coil.
- Store safely. Never leave your mod resting on a pillow or flammable material. For extra safety, it's recommended to unscrew the tank from the mod if leaving it overnight. Avoid leaving it in direct sunlight, such as on a windowsill or car dashboard, as it could heat your device to a dangerous level.

**WARNING: Batteries are NOT to be left where they can come into contact with any conductive material, such as: Coins, keys, pens, other batteries, anything metal. Metal that comes into contact with the positive or negative sides of the battery could cause the battery to short. More importantly, it could cause the battery to overheat, resulting in immediate combustion. Please properly store all loose batteries.**

- Store batteries in a plastic or silicone battery case, never in a purse, bag, pocket, etc..
  - Touching conductive materials (like loose change) to their positive contacts can short and damage them
  - Damaged/torn battery wraps will expose their negative contacts, making them dangerous to handle
  - Inserting your batteries upside down may cause a hard short
- Use the correct charging cable. If your device charges using a USB cable, make sure the power output match your mod. If your charger has a higher voltage than your battery, you could overheat the battery or short the device. The best option is to use the cable you got with your product.
- Check how your mod charges. Some box mods offer pass through charging, where you can use your device while simultaneously charging via USB. However, some mods use the mini USB port solely for hardware updates meaning the batteries must be removed and recharged using an external charger. Make sure you know how your mod works, or you could be in for a very long wait.

- Don't overcharge. Most mods do not have a shut off feature to stop charging the batteries when they are at full capacity. For this reason, it is not recommended to charge external batteries through the mod.
  - Charge your batteries safely. Always charge them on the lowest setting to put the least stress on your batteries, and never leave them unattended. As soon as they are at full power remove them from the charger, otherwise you risk battery failure.
    - **DO NOT** charge your device overnight. Doing this could result in the battery overheating and combusting.
- Dispose of dead batteries safely. As with all kinds of batteries, once the batteries have reached the end of their natural life they should be wrapped in a non-conductive material, such as electrical tape, and put in a dedicated recycling bin. These can be found in most supermarkets.
- Use the correct batteries. It's crucial to do some research and find out what are the recommended batteries for your specific mod. There are many types of battery, including ICR, IMR and LiPo (Lithium Polymer). Whatever you decide upon, **you should NEVER combine different types of battery in the same device.**
- Never exceed the amps of your battery. This is a fundamental rule of battery safety. Take the discharge rate (the amps) of your battery, then divide your voltage level by coil resistance (ohms) and make sure you never exceed your battery's amp rating. (See chart below)

### Vaping Power Chart 2.0

		Volts																				
		3.00	3.20	3.40	3.70	4.00	4.20	4.50	4.75	5.00	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00
Resistance in Ohms	1.20	7.50	8.53	9.63	11.41	13.33	14.70	16.88	18.80	20.83	22.97	25.21	27.55	30.00	32.55	35.21	37.97	40.83	43.80	46.88	50.05	53.33
	1.30	6.92	7.88	8.89	10.53	12.31	13.57	15.58	17.36	19.23	21.20	23.27	25.43	27.69	30.05	32.50	35.05	37.69	40.43	43.27	46.20	49.23
	1.50	6.00	6.83	7.71	9.13	10.67	11.76	13.50	15.04	16.67	18.38	20.17	22.04	24.00	26.04	28.17	30.38	32.67	35.04	37.50	40.04	42.67
	1.80	5.00	5.69	6.42	7.61	8.89	9.80	11.25	12.53	13.89	15.31	16.81	18.37	20.00	21.70	23.47	25.31	27.22	29.20	31.25	33.37	35.56
	2.00	4.50	5.12	5.78	6.85	8.00	8.82	10.13	11.28	12.50	13.78	15.13	16.53	18.00	19.53	21.13	22.78	24.50	26.28	28.13	30.03	32.00
	2.20	4.09	4.65	5.25	6.22	7.27	8.02	9.20	10.26	11.36	12.53	13.75	15.03	16.36	17.76	19.20	20.71	22.27	23.89	25.57	27.30	29.09
	2.40	3.75	4.27	4.82	5.70	6.67	7.35	8.44	9.40	10.42	11.48	12.60	13.78	15.00	16.28	17.60	18.98	20.42	21.90	23.44	25.03	26.67
	2.80	3.21	3.66	4.13	4.89	5.71	6.30	7.23	8.06	8.93	9.84	10.80	11.81	12.86	13.95	15.09	16.27	17.50	18.77	20.09	21.45	22.86
	3.00	3.00	3.41	3.85	4.56	5.33	5.88	6.75	7.52	8.33	9.19	10.08	11.02	12.00	13.02	14.08	15.19	16.33	17.52	18.75	20.02	21.33
	3.20	2.81	3.20	3.61	4.28	5.00	5.51	6.33	7.05	7.81	8.61	9.45	10.33	11.25	12.21	13.20	14.24	15.31	16.43	17.58	18.77	20.00
	3.50	2.57	2.93	3.30	3.91	4.57	5.04	5.79	6.45	7.14	7.88	8.64	9.45	10.29	11.16	12.07	13.02	14.00	15.02	16.07	17.16	18.29
	4.00	2.25	2.56	2.89	3.42	4.00	4.41	5.06	5.64	6.25	6.89	7.56	8.27	9.00	9.77	10.56	11.39	12.25	13.14	14.06	15.02	16.00
	4.50	2.00	2.28	2.57	3.04	3.56	3.92	4.50	5.01	5.56	6.13	6.72	7.35	8.00	8.68	9.39	10.13	10.89	11.68	12.50	13.35	14.22
5.00	1.80	2.05	2.31	2.74	3.20	3.53	4.05	4.51	5.00	5.51	6.05	6.61	7.20	7.81	8.45	9.11	9.80	10.51	11.25	12.01	12.80	
5.50	1.64	1.86	2.10	2.49	2.91	3.21	3.68	4.10	4.55	5.01	5.50	6.01	6.55	7.10	7.68	8.28	8.91	9.56	10.23	10.92	11.64	
6.00	1.50	1.71	1.93	2.28	2.67	2.94	3.38	3.76	4.17	4.59	5.04	5.51	6.00	6.51	7.04	7.59	8.17	8.76	9.38	10.01	10.67	
6.50	1.38	1.58	1.78	2.11	2.46	2.71	3.12	3.47	3.85	4.24	4.65	5.09	5.54	6.01	6.50	7.01	7.54	8.09	8.65	9.24	9.85	

Key
TOO HOT, burnout pretty much certain
Too hot, higher is risking coil burnout
Too warm, some juices may fry
Just right
A little cool, vapor production is lessened
Too cool, very little vapor production
Cold, for all intents not functional

Power is measured in watts, calculated by  $V^2/R$

Basically, stay out of red because it's dangerous, stay out of blue because it's useless. Stay in green you should be fine, stay outside and you may or may not like the result.

If needed you can get a more precise calculation at [www.ohmslawcalculator.com](http://www.ohmslawcalculator.com)

[www.reddit.com/r/electronic\\_cigarette](http://www.reddit.com/r/electronic_cigarette)

## Mech mods

**Warning:** You should not be using a mechanical mod without doing proper research, or without using the proper tools, such as an ohm reader. Failure to follow proper procedure could result in combustion or serious injury.

- Make sure the air holes work. These holes allow gases to escape the mod if the battery is compromised. You can check they are working by removing the batteries and blowing into the mod from the connection end. It is vital that they are working in case anything goes wrong.
- Check the charge of your batteries. If you run the batteries too low for too long, the lifespan will reduce and eventually fail. Be sure to check the voltage often and recharge any batteries with a resting voltage of below 3.7v.
- Use caution when building coils. Always check the resistance of the coil on an ohm meter before using them on your mechanical mod. If the build is shorting out, your battery is at serious risk of damage or catching fire. The resistance of the coil can vary, so use the figure given plus or minus 0.2 ohms.
- Make sure the firing button can be locked. If you fire your mod for too long, it can overheat and potentially burst. The last thing you need is your mod firing in your pocket. All good mechanical mods have this external safety feature, use it.