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# Premium Solutions Bicycle Battery Charging

- **LaadLocker**
- **VeloVolt<sup>®</sup>**
- **VeloVolt<sup>®</sup> AQUA**

# Lithium-ion - Fire hazards

- Popularity e-bikes/speed pedelecs
- Lithium-ion batteries: high energy density
- Sensitive to overcharging/too deep discharging – **thermal runaway**
- Chemical decomposition reaction, not a metal fire
- Unpredictable, difficult to stop
- Rapid spread of fire due to bursting load cells
- Toxic smoke (hydrogen fluoride, lithium hydroxide)



# Regulation

## New regulations

- Stricter guidelines from the government
- Higher demands from insurance companies
- Expected ban on unprotected charging via wall-sockets
- Compartmentalization becomes the norm!!



# Fire extinguishing solutions

## Options:

- Traditional fire extinguisher
- Carbon Dioxide
- Heptafluoropropane
- Low expansion foam
- Aerosol
- Water Immersion

*Extinguishing with water sprinklers from above is not a good extinguisher and might even be dangerous (explosive situations).*

## Independent expert studies<sup>1</sup> recommend:

- ***Integrated smoke detection***
- Fire extinguisher: ***water immersion***

<sup>1)</sup> Expert study: IMO; International Maritime Organization

# Battery Fire Control Success Criteria

- **Detection** (smoke detection)
- **Alerting** (acoustic, visual, text message)
- **Suppression** (aerosol, water immersion)
- **Isolation** (compartmentalization, stonewool isolation)
- **Removal** (compact, mobile)

# LaadLocker

- Modular (stackable modules per 4 compartments)
- Stainless steel
- Function: storage and/or charging
- Placement: floor or wall-mounting (*LMS4*)
- Capacity *LMS4*: 4x charging or 15x storage
- Capacity *LMS8*: 8x charging or 30x storage
- Digital pincode locks (private mode/public mode)
- Optionally: charging timer

- **Detection** (recommendation: placement external smoke detector above LaadLocker)
- **Alerting** (external smoke detector)
- **Suppression** (compartmentalization)
- **Isolation** (compartmentalization)
- **Removal** (compact, mobile)\*

*\*) optionally available: mobile device*



# VeloVolt®

- Modular (stackable modules per 4 compartments)
- Function: storage and/or charging
- Placement: floor
- Capacity: 8x charging or 30x storage
- Spring closing door
- Automatic shutdown ventilation *and* charging current
- Heat resistant seals
- Emergency power supply

- **Detection** (**integrated smoke detector**)
- **Alerting** (optical and acoustic alarm, integrated electronic fire control panel, *optionally*; text message alarm)
- **Suppression** (optionally: aerosol extinguisher)
- **Isolation** (compartmentalization, rock wool isolation, fire proof seals, automatic shutdown ventilation/charging current)
- **Removal** (compact, mobile)\*

*\*) optionally available: mobile device*

**VeloVolt®**  
Secure battery charging locker





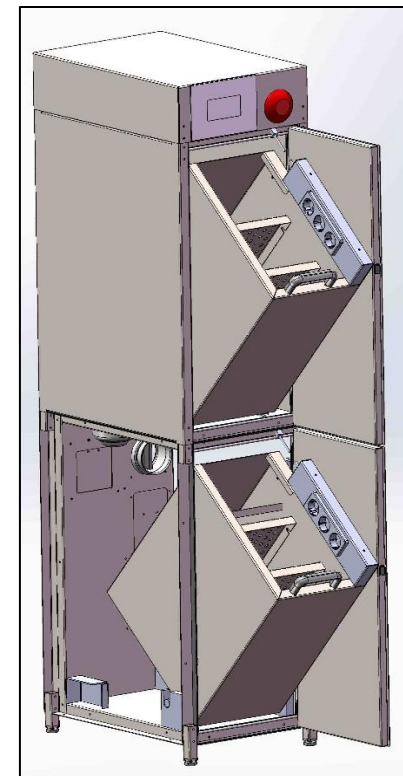
# VeloVolt® AQUA

- Function: storage and/or charging
- Placement: floor
- Capacity: 6x charging and 12x storage
- Rotating waterproof containers
- Spring closing door
- Automatic shutdown ventilation *and* charging current
- Automatic water immersion system
- Heat resistant seals
- Emergency power supply

- **Detection** (*integrated smoke detector*)
- **Alerting** (optical and acoustic alarm, integrated electronic fire control panel, *optionally*; text message alarm)
- **Suppression** (*water immersion*)
- **Isolation** (compartmentalization, rock wool isolation, fire proof seals, automatic shutdown ventilation/charging current)
- **Removal** (compact, mobile)\*

*\*) optionally available: mobile device*

**VeloVolt** AQUA  
Secure battery charging locker



# Battery Fire Control Success Criteria

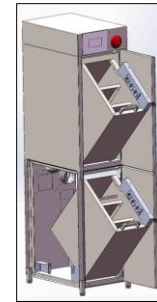
**LaadLocker**



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- **Detection**
- **Alerting**
- **Suppression**
- **Isolation**
- **Removal**



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