

A plant room with two central battery cabinets and their fire-rated circuits leaving along the wall.

NLC ACADEMY · EPISODE 32

Size for old age. Cool the room.

Worked lead-acid example: 5 kW for 3 h needs 125 Ah at the 3 h rate, not a naive 77, which selects 200 Ah blocs. At 40 °C a 10-year design life falls to about 2.5 years.

START WITH THE WORD

In a tender, the word is CPS or LPS



1. EN 50171:2021 has no term "central battery system". Clause 3.18 defines a **CPS**, a central safety power supply system "with any rated power output". [1]

2. Clause 3.19 defines an **LPS**: output limited to 500 W for 3 h, or 1500 W for 1 h. Both limbs are 1500 Wh, yet 1000 W for 1.5 h meets neither. [1]

EN 50171 defines no size class above LPS. Catalogue kW bands, small, medium or campus, are vendor convention, not the standard.

WHO OWNS WHAT

Four standards, four jobs, and the monthly test is not EN 50171's

EN 1838:2024
the light
illuminance on the route
the 1 h minimum

IEC 60598-2-22
the luminaire
maintained or not
its rated supply

EN 50171:2021
the central unit
modes and changeover
charger and alarms

EN 50172:2024
the installation
daily to 5-year tests
the logbook

battery room — **EN IEC 62485-2, lithium 62485-5**

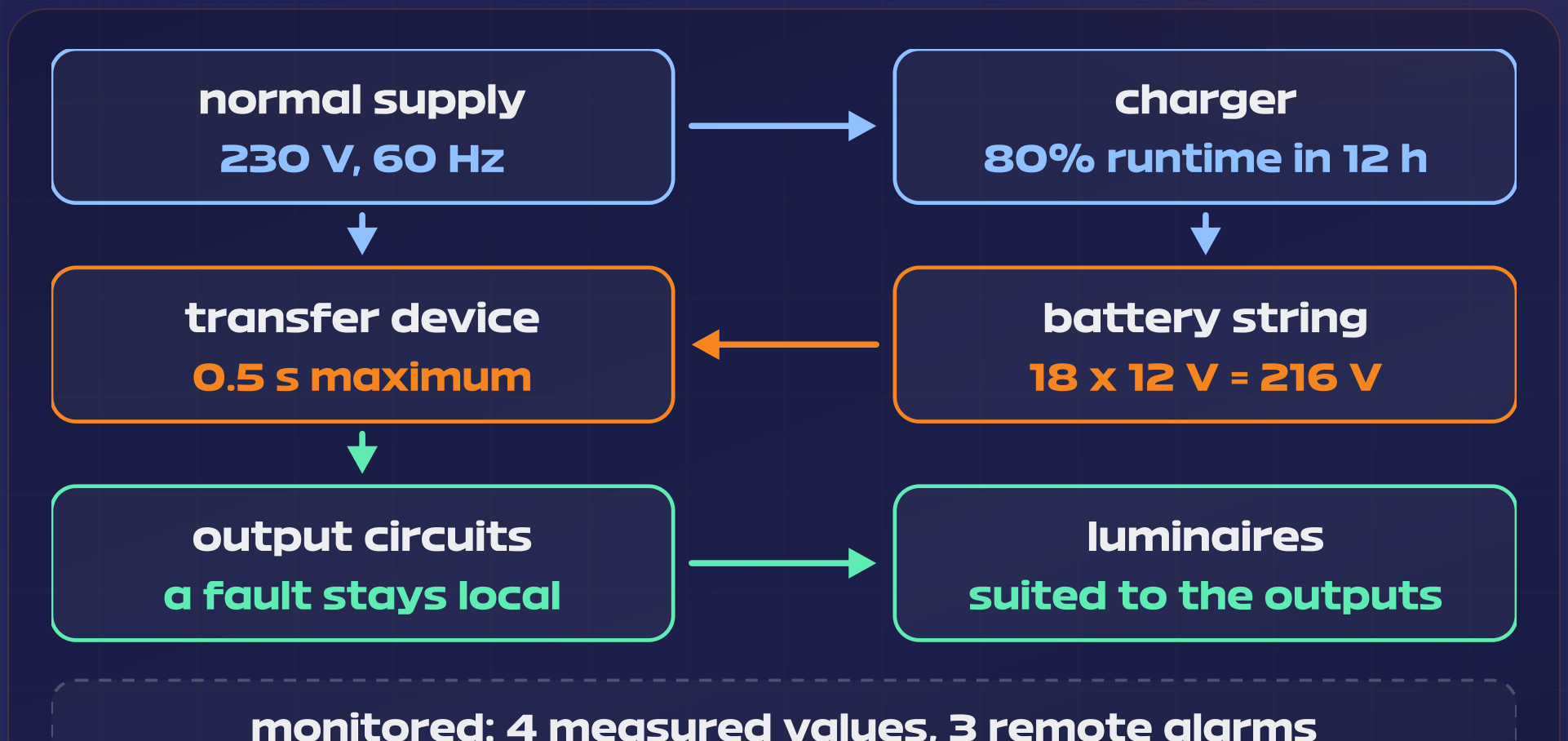
1 EN 50172:2024 draws the line itself: EN 1838 carries the light, EN 50172 the installation, its tests and its logbook, EN 50171 the central unit, IEC 60598-2-22 the luminaire. [2][3]

2 EN 50171's test clauses are titled "Test systems" and "Information on recurring test": equipment and manufacturer information. It sets no interval for the owner. [1]

Cite the current editions: EN 50172:2024 replaced the 2004 edition, and EN 1838:2024 replaced 2013. [2][3]

THE SYSTEM ON ONE PAGE

The whole system in six blocks



1. Direct-DC systems feed the circuits at 216 V DC in emergency, so luminaires must accept the AC normal supply and that DC. Central inverter systems give AC in both states. Match the luminaire to the actual outputs. [1][9]

2. Clause 6.6.8: a failure in one output circuit shall not take down any other. The monitor measures 4 values and gives remote contacts for ready, on battery and fault. [1]

A battery room may hold one string, several strings or independent systems. What multiplies is downstream: circuits, cable and sub-distribution.

SIX MODES, NOT ONE

Clause 4 defines six operating modes

changeover — 0.5 s response at most

- **4.2** changeover mode
- **4.4** changeover, central switching of the load
- **4.5** changeover, partial switching of the load
- **4.6** non-maintained changeover mode

without interruption — no response time

- **4.3** mode without interruption
- **4.7** without interruption, central switching — new, 2021

transfer: mains under 0.85 of rated for over 0.5 s

1. Changeover modes answer within 0.5 s. In a mode without interruption the battery already carries the load, so there is no response time at all. [1]
2. Transfer starts when mains stays below 0.85 of rated voltage for longer than 0.5 s. A switchback delay of at least 1 min can be added. [1]

Name the mode by its clause. "CBS, maintained" describes a luminaire, not one of the six.

WHAT A SUBMITTAL MUST CARRY

Five EN 50171 numbers, asked for by clause

Changeover time

4.1, changeover modes only. Transfer begins below 0.85 of rated voltage lasting over 0.5 s, clause 6.5.1. [1]

≤ 0.5 s

Output voltage

6.6.2, central inverters, 20 to 100% load for the whole discharge. ±10% is allowed for 5 s on a load step. [1]

± 6%

Recharge

6.3.3, of the specified operating time. 10 A per 100 Ah is the reference charging current. [1]

80% in 12 h

Inverter overload

6.6.3, continuously, for the whole rated operating time. [1]

120%

Deep discharge

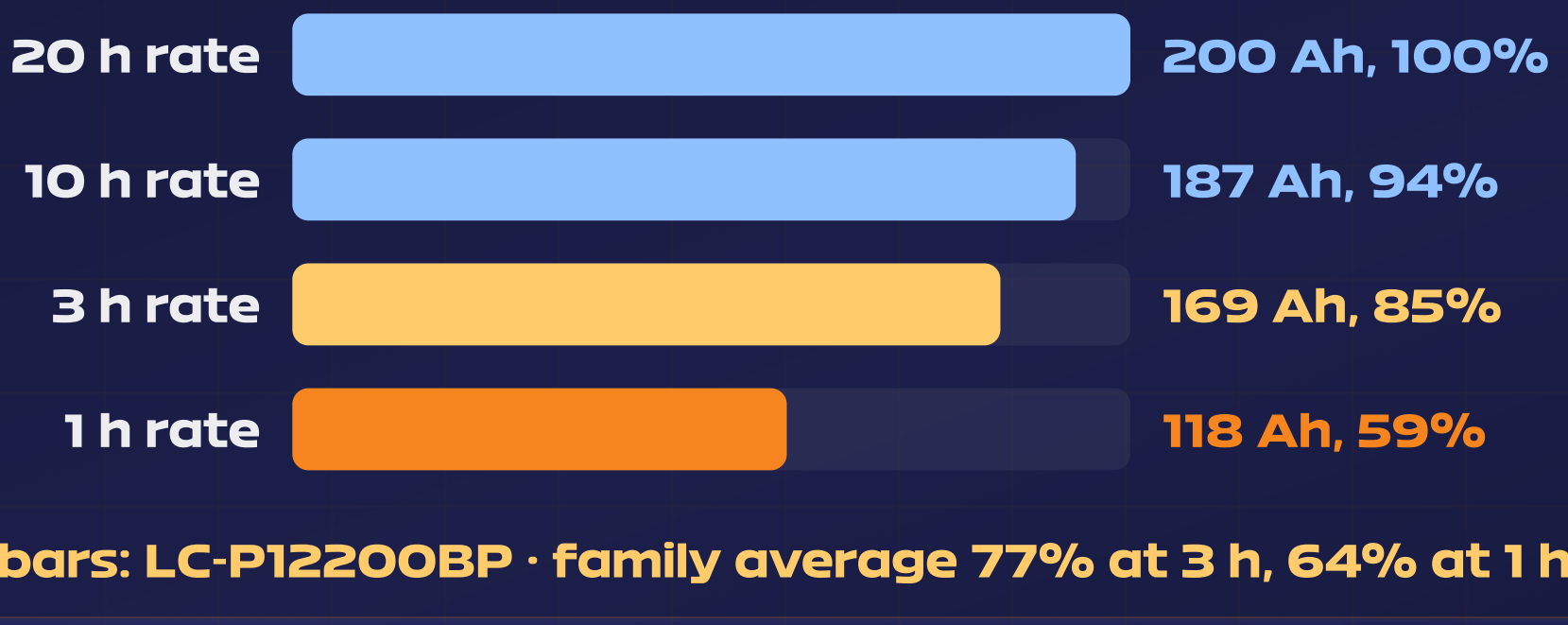
6.7, at most 0.2 A per 100 Ah after cut-off, and reset by hand only. After a long outage, someone has to re-arm it. [1]

manual reset

EN 50171 leaves the duration to the enquiry, 5.2 e). Europe's 1 h floor is EN 1838's (EN 50172:2024, 4.2); the SBC provisions cited in EP31 set at least 90 min for new buildings. [1][2][13]

THE RATE DISCOUNT

A 200 Ah battery is a 118 Ah battery for one hour



bars: LC-P12200BP · family average 77% at 3 h, 64% at 1 h

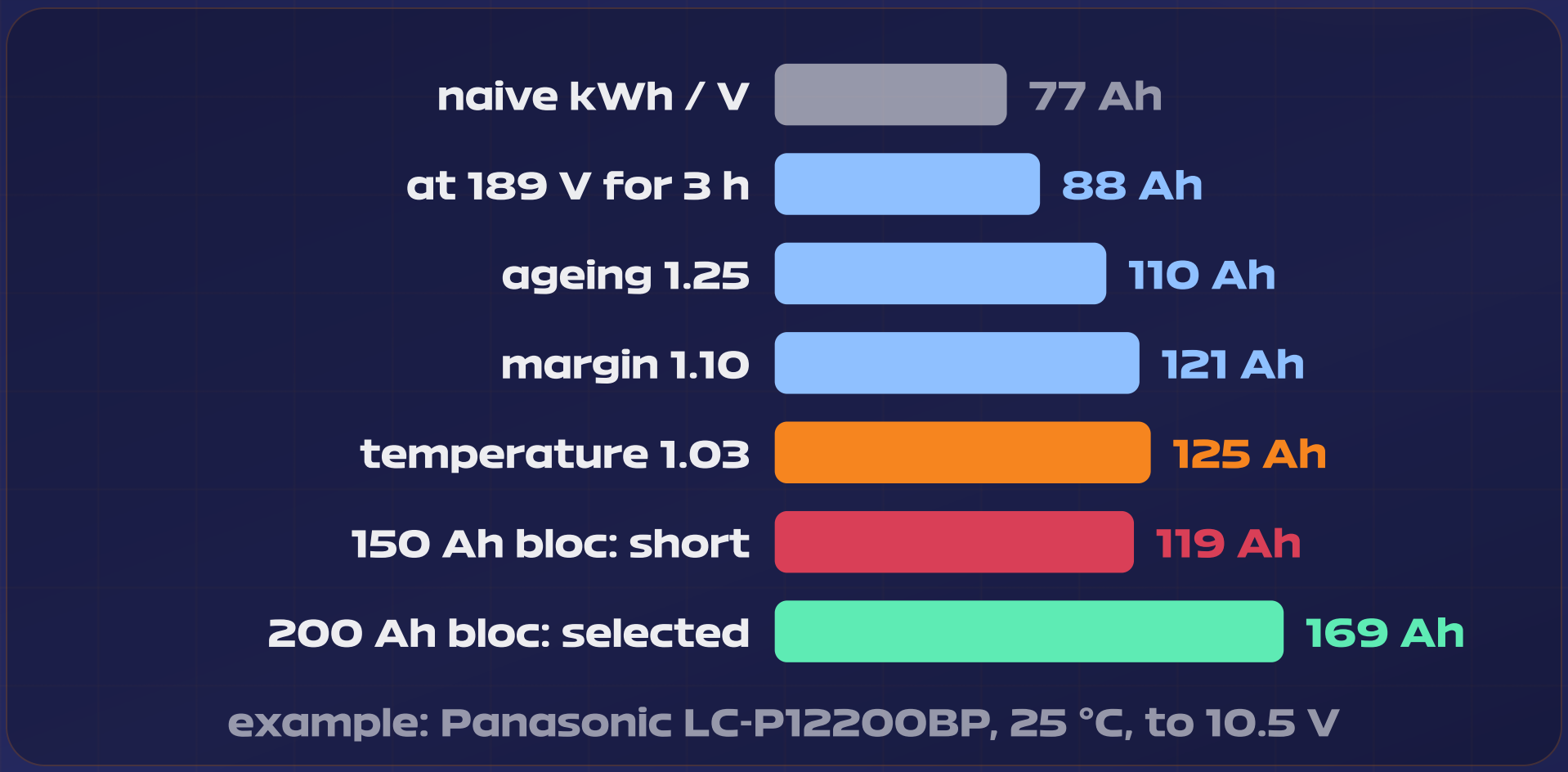
1. Panasonic publishes 200, 187, 169 and 118 Ah at the 20, 10, 3 and 1 hour rates for one stationary bloc at 25 °C. A 1 to 3 h emergency duty sits at the discounted end of that table. [5]

2. IEEE 485 does not use Peukert. It reads the maker's constant-current table at a stated final voltage, section by section through the duty. [4]

A capacity quoted without its discharge rate and its cut-off voltage is not a number anyone can size from.

SIZE FOR THE LAST DAY

One worked example: 125 Ah at the 3 h rate, so a 200 Ah bloc



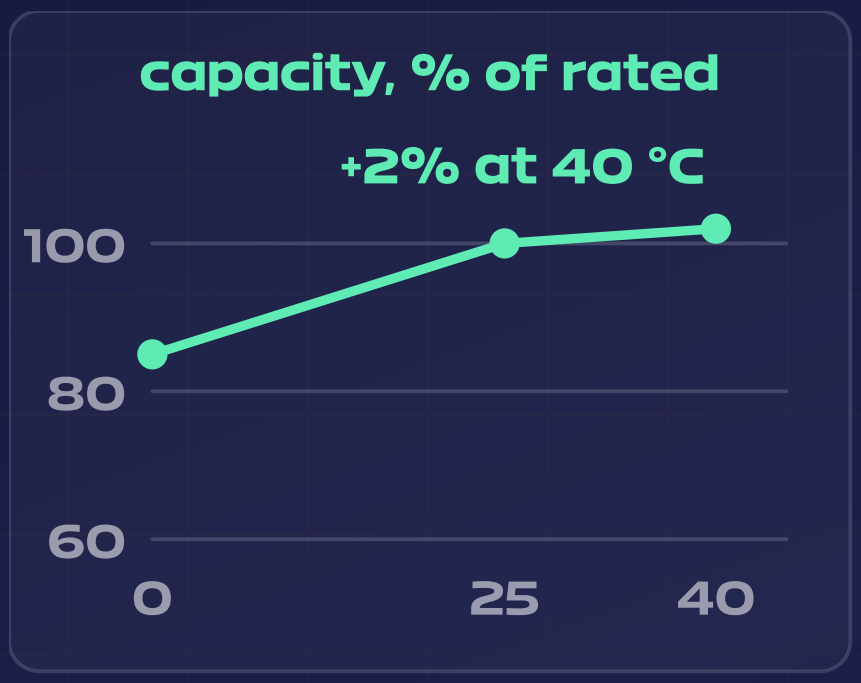
1. Assumed: 5 kW AC for 3 h, 90% inverter, 108 cells to 1.75 V/cell (189 V), where current peaks. Then ageing 1.25 (IEEE 485, 6.3.4), margin 1.10, and 1.03 for a 20 °C minimum room. [4][5]

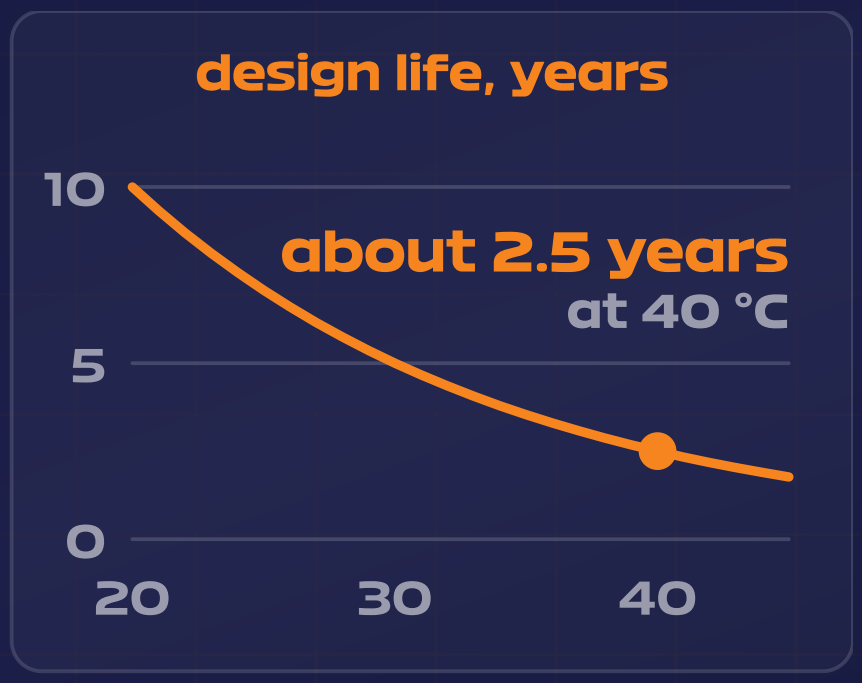
2. Panasonic LC-P12200BP, 25 °C, to 10.5 V: 169 Ah at 3 h covers 125; the 150 Ah bloc gives 119 and falls short. Table values are averages: buy on guaranteed data. [5]

IEEE 485 sizes stationary lead-acid only. Work the duty in sections: a first minute of simultaneous starts can set the size. [4]

THE ROOM, PART ONE: HEAT

Heat can hide capacity loss while it spends the life





heat can hide capacity loss while it spends the life

1. Warm cells read high: this bloc gives 102% of rated capacity at 40 °C. Meanwhile ageing speeds up, so a hot or aged battery can still fail its duration test. [5]
2. EUROBAT halves life per 10 K above 20 °C, so a 10-year design life (20 °C) is about 2.5 years at 40 °C: an estimate, not a guarantee. Service life is what the site actually gets. [5]

EN 50171 assumes a moderate climate, Class 3K3, unless the enquiry says otherwise under 5.2 h). In a Saudi plant room, say otherwise. [1]

THE ROOM, PART TWO: AIR

VRLA on float needs little air. The charging mode sizes the vent

24	x	0.00042	x	5	=	0.05
4% H_2 limit		m^3 H_2 per Ah		safety factor		the constant

108 cells of 200 Ah: hydrogen airflow

on float		1.08 m³/h, 30 cm²
on boost		8.64 m³/h, 242 cm²

size the openings for the highest charging mode

1. On float the selected 108 cells of 200 Ah need about 1.1 m³/h, 30 cm² of free area per inlet and outlet. Boost at 2.40 V/cell gives eight times the gas: 242 cm². [6][15]
2. Free area assumes natural flow: openings on opposite walls, or 2 m apart on one wall. Interlock any fan with the charger or an alarm. Exhaust outdoors only. [15]

EN IEC 62485-2: $Q = 0.05 \times n \times I_{gas} \times C \times 10^{-3}$ m³/h. For VRLA, I_{gas} is 1 mA/Ah on float, 8 mA/Ah on boost.

THE ROOM, PART THREE: THE UNIT

Rate the unit for the room, not just the battery



The cabinets tolerate the room. Their batteries do not.

30 °C
Teknoware TKT75-78
rated ambient 10 to 30 °C, IP31

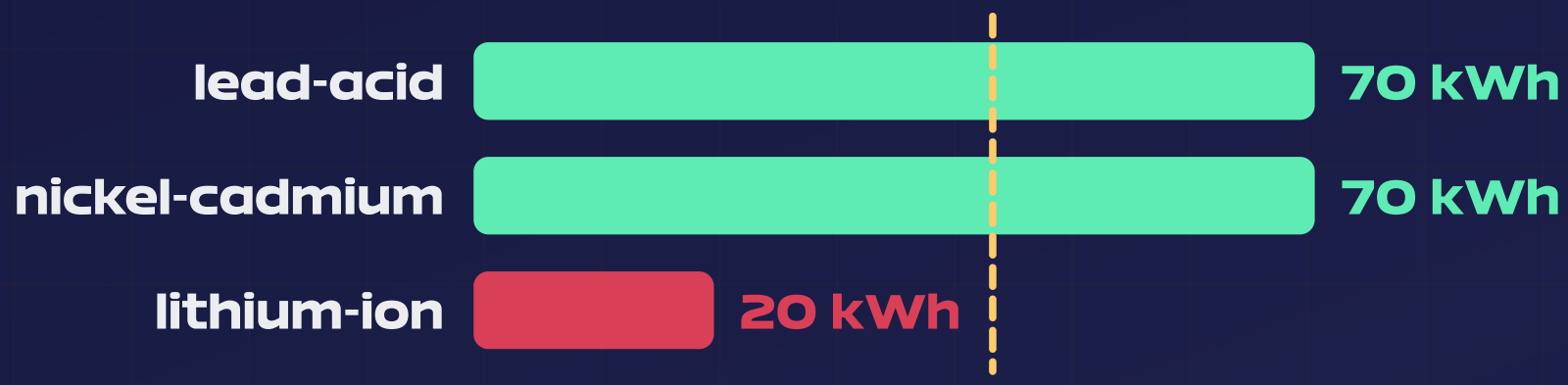
50 °C
Teknoware TKT65
10 to 50 °C: check model by model

20-25 °C
the battery
life quoted at 20 °C; charge 0 to 40 °C (Panasonic)

Storage recharge is maker-specific: Teknoware asks 12 h every 6 months; Panasonic every 12, 9 or 6 months for storage below 20, 20 to 30 and 30 to 40 °C. [5][9]

LITHIUM

Lithium changes the standards, not the need for a room



small LFP luminaire pack, not a central bank

8 years
case up to 25 °C

6 years
case up to 35 °C

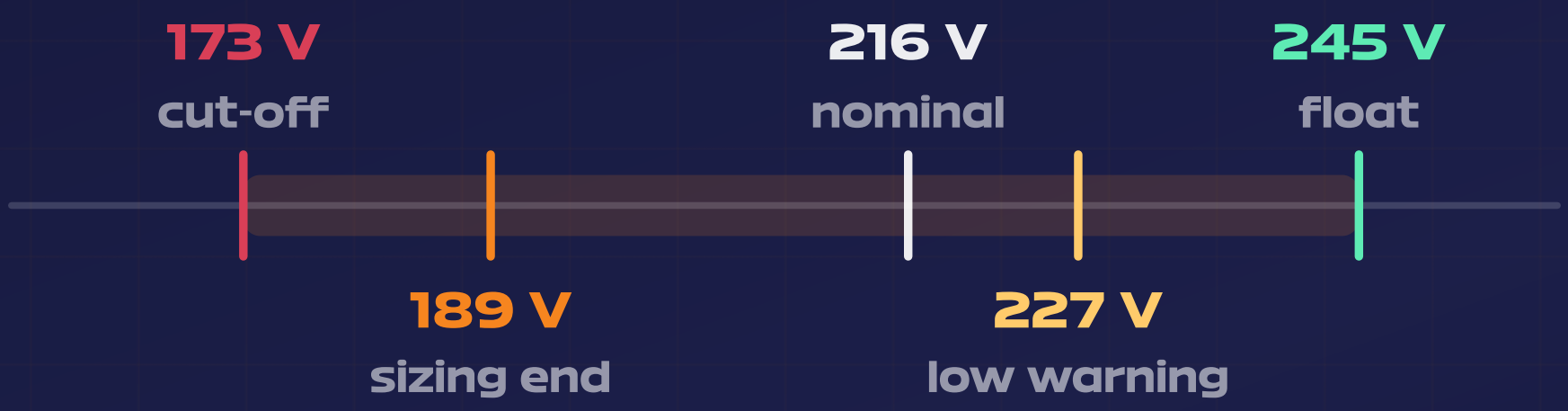
4 years
case up to 45 °C

1. IEEE 485 is lead-acid only; size lithium from the maker's data within BMS limits. Safety: IEC 62619 (battery), EN IEC 62485-5 (installation), not Part 2. [4][6][14]
2. US context, not a verified Saudi rule: IFC 2021 sets nameplate thresholds, 20 kWh lithium-ion, 70 lead-acid, and asks for UL 9540 listing. This 43 kWh bank sits between. [7]

A small LFP luminaire pack is rated 8 years at a 25 °C case, 4 at 45 °C. That does not transfer to a central bank: ask for the bank's own curve. [8]

THE CIRCUIT

Size to 189 V. The unit cuts off at 173 V



sized to stay above 189 V for the rated 3 h cut-off and warning: Teknoware TKT75-78 defaults

1. 189 V is this example's sizing end point, 1.75 V/cell, held through the rated 3 h at end of life. 173 V is the deep-discharge cut-off of Teknoware's TKT75-78 (227 V warns): no usable duration below 189. [1][9]
2. Circuit integrity is IEC 60331, a cable still working at 830 °C. IEC 60332-1-2 only tests flame spread. A fire-rated cable is only as good as its supports. [10]

Ask for the last luminaire's DC input range. Its minimum must sit below 189 V less the cable drop; its maximum above the float, about 245 V, wherever the mode connects it to a charging string.

THE TEST REGIME

EN 50172:2024 requires a daily check for central systems

daily
7.4.2
status indicators

monthly
7.4.3
every luminaire

annual
7.4.4
duration + checks

5-yearly
7.4.5
illuminance

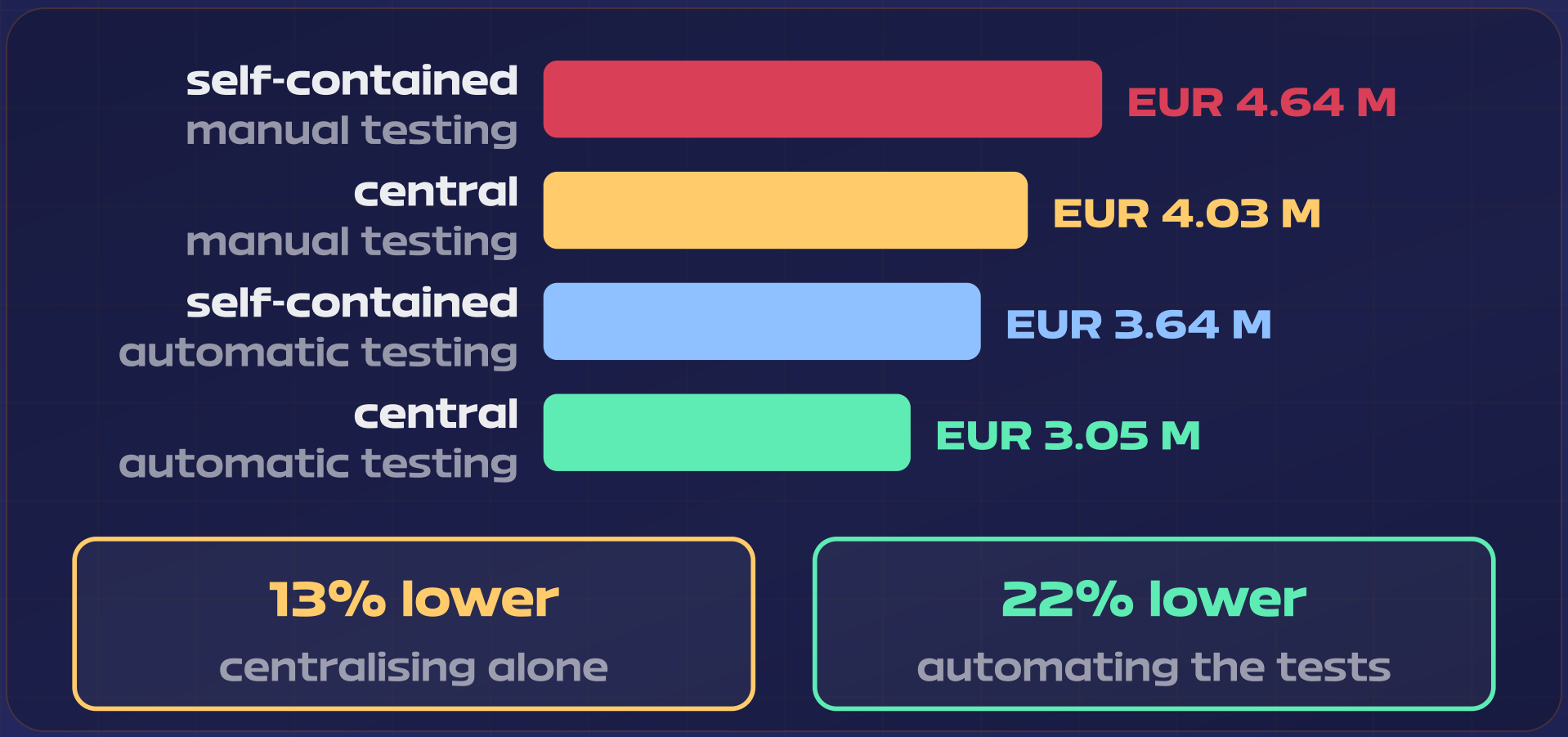
7.4.1 also cites 7.4.6: the printed text ends at 7.4.5

1. Annual, 7.4.4, repeats 7.3 b) to f): full-duration test of every luminaire and sign, CPS monitors, dirt and damage, rest and inhibit modes, sign visibility. IEC 62034 automation leaves the visual checks to a person. [2][12]
2. 7.4.1 calls up 7.4.2 to 7.4.6, but the published text ends at 7.4.5 and the BSI edition lists no corrigendum: an apparent cross-reference error. Do not assume an extra test. [2]

7.4.1: run duration tests before a low-risk period where possible, or make temporary arrangements until recharged. NOTE 1: about 12 h to reach 80% of the duration. [2]

ONE CASE STUDY

One offshore case study: automate the tests first



13% lower
centralising alone

22% lower
automating the tests

1. BorWin5 offshore platform, 1800 luminaires, 30 years: central with manual testing cost 13% less than self-contained; self-contained with automatic testing 22% less. One site, not a rule. [11]

2. Manual test labour ran EUR 86,400 a year against EUR 20,250 for batteries. Central cost 3.5% more to install. Read the structure, not the euros. [11]

Its 10,800 luminaire batteries against 20 central batteries are not like-for-like units. Compare end-of-life cost instead: EUR 62,359 against EUR 12,948. [11]

THE CLAUSE TO WRITE

Five lines a tender can check

CENTRAL SAFETY POWER SUPPLY, SPECIFICATION

a. A CPS to EN 50171:2021, mode named by clause, 230 V, 60 Hz, rated operating time not less than 90 min (SBC Section 1008).
b. Lead-acid sized to IEEE 485-2020 on the offered battery's guaranteed data, stated V/cell and minimum temperature, ageing 1.25, margin ≥ 1.10. Lithium: maker's data, IEC 62619.
c. Design life declared at 20 °C, battery room held at 20 to 25 °C, CPS unit rated for the room's maximum ambient.
d. Luminaires rated for the actual normal and emergency outputs, from end-of-discharge voltage less drop up to float, on IEC 60331 circuits.
e. Ventilation for the highest charging mode, EN IEC 62485-2 or EN IEC 62485-5; tests to EN 50172:2024 7.4.

1. Every line names a document, a quantity and a unit. None of them can be answered with an adjective.
2. Line c is the one most often left out. It decides how close a 10-year design life gets to ten years in service.

SOURCES

Where every number in this deck comes from

[1] EN 50171:2021, clauses 3.12, 3.18, 3.19, 4, 5.2, 6.3 to 6.8
[2] EN 50172:2024, cl. 4.2, 7.3, 7.4.1 to 7.4.5 (no 7.4.6 printed)
[3] EN 1838:2024; IEC 60598-2-22:2021, clauses 22.3.5 to 22.3.9
[4] IEEE 485-2020 (lead-acid only), 6.3.4; US DoD TSEWG TP-4
[5] EUROBAT VRLA guide, 2022; Panasonic VRLA Handbook, 2021
[6] EN IEC 62485-2:2018 (lead-acid); EN IEC 62485-5:2021 (Li-ion)
[7] IFC 2021 Table 1207.1.1 and 1207.3.1: US model code
[8] Tridonic data sheet 10/26-EM140-13, sec. 8.5 (small pack)
[9] Teknoware VOT115E R1.22 (2022), p.14; VOT34 Rev 1.81
[10] IEC 60331-2:2018; IEC 60332-1-2; EN 50577:2015; BS 8519:2020
[11] Garcia Rodriguez et al., J. Mar. Sci. Eng. 13:1614, 2025
[12] IEC 62034:2012, automatic test systems for emergency lighting
[13] SBC 201/801 Section 1008, as quoted by Civil Defense (EP31)
[14] IEC 62619:2022; IEEE 1679.1 evaluates lithium, does not size
[15] HOPPECKE VRLA manual 7140203153 V1.4, ch. 5 and 11

The sizing, airflow, life and cost figures are recomputed from the cited tables, not copied. The full list is on the article page.

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