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grid | power FNC-VR

Valve regulated
Fibre Nickel Cadmium Batteries

grid | power FNC-VR

The extremely low-maintenance grid | power FNC-VR battery is developed in line with the HOPPECKE proven fibre matrix plate technology. The addition of the special recombinant technology of this battery to the fibre plate design gives exceptional reliability in critical applications. Therefore, the grid | power FNC-VR provides superior performance to other valve regulated Nickel Cadmium technologies.

The grid | power FNC-VR battery was developed for applications where the system must be completely reliable with minimal maintenance. Typical applications are:

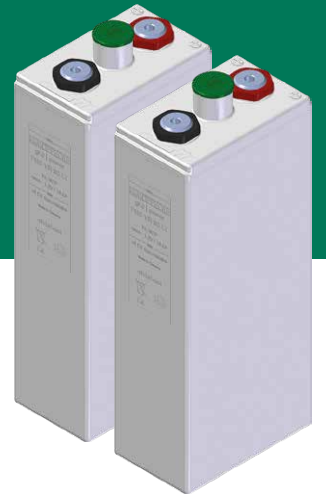
- UPS systems
- Telecommunications systems
- Power stations and substations
- Safety lighting

Extremely low maintenance

- The incorporation of a low-pressure valve and a flame arresting vent with the grid | power FNC-VR technology, recombines oxygen and hydrogen gasses inside the cell with up to 90% efficiency.
- The grid | power FNC-VR cell technology with liquid electrolyte has significant advantages over other valve regulated battery systems in which only minimal electrolyte reserves are available.
 - Large electrolyte reserve to protect against dry out in the case of a charger failure.
 - No tendency to thermal runaway. Therefore, the grid | power FNC-VR can be used in a large temperature range.
- No water addition or filling is required over a period of 20 years when operated on float charge at 20°C.

Product advantages

Fibre Nickel Cadmium (FNC®) technology provides the best solution for long reliable battery life with minimal maintenance.



Technical data

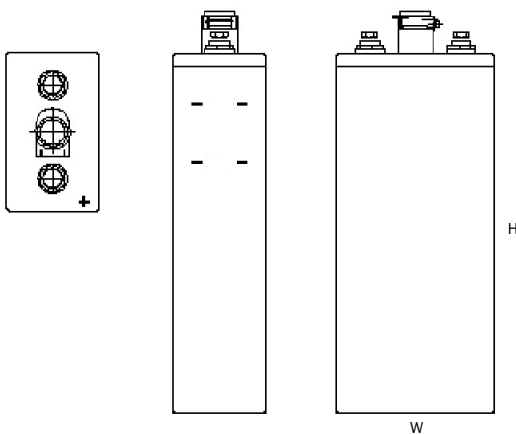
- Operating temperature range: -50°C to +60°C
- Float Charge: 1.40 to 1.45 V/cell
- Boost Charge: 1.50 to 1.70 V/cell
- Water maintenance period 1.40 V/cell: 20 years at 20°C
- Recharge time to 90% available capacity: 7 - 8 hours at normal boost charge voltage
- Low pressure valve
- Cell jar/lid: Translucent Polypropylene, optional opaque flame retardant polypropylene, UL-94 V0
- Jar/Lid seal: Welded, leak proof
- Terminals: Nickel plated steel
- Electrode design: Nickel plated steel tab welded to the fiber structure
- Electrolyte: KOH density = 1.190 kg/l



Capacities, dimensions and weights

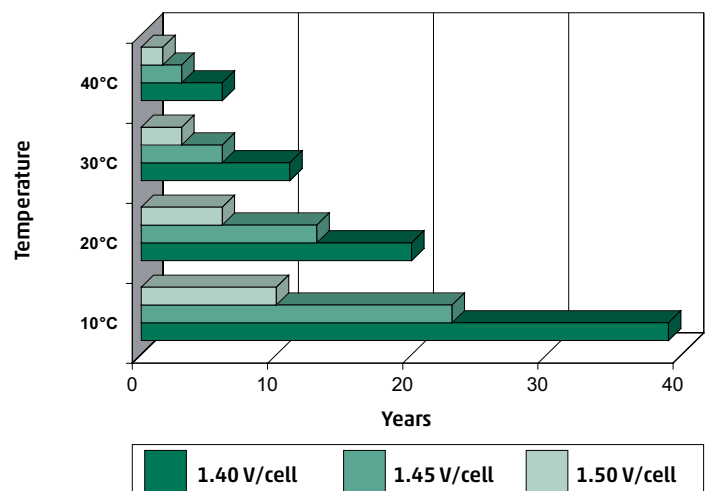
Type	Capacity C_5 (Ah)	Length (mm)	Width (mm)	Height (mm)	Cell weight with electrolyte (kg)	Cell weight without electrolyte (kg)	Electrolyte quantity (l)
FNC® VR 40 M	40	47	122	299	2.60	1.60	0.84
FNC® VR 60 M	60	47	122	299	2.80	2.20	0.50
FNC® VR 80 M	80	72	122	299	4.00	2.70	1.09
FNC® VR 100 M	100	72	122	299	4.20	3.10	0.92
FNC® VR 120 M	120	92	122	299	5.40	3.70	1.43
FNC® VR 140 M	140	92	122	299	5.60	4.20	1.18
FNC® VR 160 M	160	115	122	299	6.70	4.80	1.60
FNC® VR 180 M	180	115	122	299	6.90	5.20	1.43
FNC® VR 200 M	200	92	194	299	8.70	6.30	2.02
FNC® VR 235 M	235	92	194	299	8.90	6.80	1.76
FNC® VR 265 M	265	115	194	299	10.50	8.00	2.10
FNC® VR 300 M	300	115	194	299	11.20	8.90	1.93
FNC® VR 333 M	333	155	198	299	13.80	9.70	3.45
FNC® VR 367 M	367	155	198	299	14.20	10.40	3.19
FNC® VR 400 M	400	155	198	299	14.60	11.10	2.94
FNC® VR 433 M	433	155	198	299	14.90	11.90	2.52

Type	Capacity C_5 (Ah)	Length (mm)	Width (mm)	Height (mm)	Cell weight with electrolyte (kg)	Cell weight without electrolyte (kg)	Electrolyte quantity (l)
FNC® VR 45 L	45	47	122	299	2.50	1.50	0.84
FNC® VR 66 L	66	47	122	299	2.70	1.90	0.76
FNC® VR 90 L	90	72	122	299	3.90	2.50	0.59
FNC® VR 110 L	110	72	122	299	4.10	2.90	1.01
FNC® VR 132 L	132	92	122	299	5.20	3.30	1.51
FNC® VR 154 L	154	92	122	299	5.40	3.70	1.43
FNC® VR 176 L	176	115	122	299	6.40	4.30	1.76
FNC® VR 198 L	198	115	122	299	6.90	5.20	1.43
FNC® VR 222 L	222	92	194	299	8.50	5.80	2.27
FNC® VR 259 L	259	92	194	299	8.80	6.40	2.02
FNC® VR 296 L	296	115	194	299	10.60	7.30	2.77
FNC® VR 333 L	333	115	194	299	10.90	7.90	2.52
FNC® VR 370 L	370	115	194	299	11.20	8.80	2.02
FNC® VR 407 L	407	155	198	299	14.10	10.10	3.36
FNC® VR 444 L	444	155	198	299	14.50	10.80	3.11
FNC® VR 481 L	481	155	198	299	14.80	11.50	2.77
FNC® VR 518 L	518	155	198	299	15.20	12.10	2.61



Maintenance Interval for grid | power FNC-VR - L-types

Years at temperature & charge voltage



Battery Information Sheet

Based on Regulation (EC) No. 453/2010

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SECTION 1: Identification

1.1 Product

Industrial Nickel - Cadmium cells, modules or battery systems
(Rechargeable alkaline cells, vented or with partial gas recombination)

Commercial product name

FNC X(R), FNC H(R), FNC M(R), FNC L(R), FNC- A X(R), FNC- A H(R), FNC- C, FNC- R ; FNC-T, FNC-VR, trac.FNC and other cells in plastic containers

Correct packaging designation

BATTERIES, WET, FILLED WITH ALKALI

IEC designation

KX, KH, KM, KL conforming to DIN IEC 60623

KGX, KGH conforming to DIN IEC 62259

SECTION 2: Hazards identification

The information below is intended for repeated and prolonged contact with the battery contents in an occupational setting. The below information is useful in case of accident or incident, but it is very unlikely to apply to normal product use. However, this product information sheet contains valuable information critical to the safe handling and proper use of this product. This product information sheet should be retained and available for employees and other users of this product.

There are no hazards or risks when the battery is used correctly and in accordance with the operating instructions, and is installed and brought into operation as directed in the instructions.

Always be aware of the risk of fire, explosion, or burns. If the ventilation requirements of the operating instructions were not observed, detonating gas may accumulate in the battery cabinet or battery room as a result of overcharging of the battery. An explosion may occur if this gas is ignited by a spark, open flame or hot surface.

Do not short circuit the (+) and (-) terminals.

Do not disassemble or modify the battery.

Do not solder on a battery directly without any safety precautions. Keep fire or open flame away from the battery.

Battery systems with voltages > 60volts should always be kept in restricted access area. Only authorized people aware of high voltage hazards and trained to work on such systems are allowed to enter the battery area.

In normal use, the only chemical risk is due to the caustic effect of the electrolyte. Suitable precautions must therefore be taken when filling and emptying the battery cells. The specific materials of the electrodes are dangerous only if released due to destruction of the battery (physical damage, fire).

SECTION 3: Composition and information on ingredients

Component	Formula	CAS Number	EINECS Number	Content (wt.%)
Nickel hydroxide	Ni(OH) ₂	12054-48-7	235-008-5	10 - 19
Cadmium hydroxide Cadmium	Cd(OH) ₂ Cd	21041-95-2 7440-43-9	244-168-5 231-152-8	15 - 21
Cobalt hydroxide	Co(OH) ₂	21041-93-0	244-166-4	0 - 3
Potassium hydroxide solution	KOH	1310-58-3	215-181-3	26 - 40
Lithium hydroxide	LiOH	1310-65-2	215-183-4	0 - 1
Nickel	Ni	7440-02-0	231-111-4	10 - 18
Iron	Fe	7439-89-6	231-096-4	17 - 25
Copper	Cu	7440-50-8	231-159-6	0 - 6
Plastics	N/A	N/A	N/A	3 - 8

Note: The accurate composition depends on the type of cell and of the state of charge of the cell

SECTION 4: First aid measures

First aid measures are not anticipated under normal use and conditions. In the case of contact with electrolyte first aid measures are mandatory.

Eye contact with electrolyte

Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice or attention.

Skin contact with electrolyte

Wash off immediately with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Call a poison center or physician if you feel unwell. If skin irritation or rash occurs, get medical advice or attention.

Inhalation

Remove to fresh air. Seek immediate medical attention/advice.

Ingestion

Do not induce vomiting. Call a physician or poison control center immediately.

SECTION 5: Firefighting measures

5.1 Extinguishing agents

Use extinguishing agents which are appropriate to local circumstances and the surrounding environment.

5.2 Special risks during fire- fighting

The cells may become overheated due to an external heat source or an internal short-circuit, and may generate potassium hydroxide mist and/or hydrogen gas. In the case of fire, vapors containing cadmium, nickel and iron may occur.

5.3. Special protective equipment

As in any fire, wear self-contained breathing apparatus and protective clothing.

SECTION 6: Accidental release measures

Personal Precautions

Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

Environmental Precautions

Prevent from entering into soil, ditches, sewers, waterways and/or groundwater.

See Section 12, Ecological Information.

See Section 13: Disposal consideration

SECTION 7: Handling and storage

Advice on Safe Handling

- Handle in accordance with good industrial hygiene and safety practice. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
- Avoid contact with skin, eyes or clothing. Use personal protection recommended in Section 8. Contaminated work clothing should not be allowed out of the workplace.
- Wash face, hands, and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe dust/fume/gas/mist/vapors/spray.
- Handle batteries carefully to avoid damaging the case.
- Do not allow metallic articles to contact the battery terminals during handling.
- Avoid contact with the internal components of the battery cell.

Storage Conditions

- Keep container tightly closed and store in a cool, dry and well-ventilated place. Do not expose the cells to direct sun radiation.
- Protect from moisture. Prevent condensation on cells or battery terminals.
- Store away from heat, sparks, flame.
- Store away from incompatible materials.
- Elevated temperatures may result in reduced battery life. Accidental short circuit will bring high temperature elevation to the battery as well as shorten the battery life. Be sure to avoid prolonged short circuit since the heat generated can burn skin and even rupture the battery cell case. Metal covered tables or belts used for the assembly of batteries into devices can be the source of short circuits; apply insulating material to assembly work surfaces.
- Batteries packaged in bulk containers should not be shaken.

Soldering/Welding

- If soldering or welding to the case is required consult our Technical Department for proper precautions to prevent seal damage or external short circuit.

Charging:

- These batteries are designed for recharging. A loss of voltage and capacity of the battery due to self- discharge during prolonged storage is unavoidable. Charge battery before use. Observe the specified charge rate since higher rates can cause a rise in internal gas pressure which may result in damaging heat generation or cell rupture and/or venting. Every battery comes with a detailed manual. Please read the instructions prior to doing any work on the battery.

SECTION 8: Exposure controls/personal protection

Individual protection measures, such as personal protective equipment

Eye/Face Protection

Not needed under normal conditions. If handling damaged or broken batteries use tight fitting protective goggles or face shield.

Skin and Body Protection

Not needed under normal conditions. If battery the case is damaged use rubber or plastic gloves.

Respiratory Protection

Not required under normal conditions. If battery is overcharged and concentrations of components are known to exceed the exposure limit in working environment use of approved respiratory protection.

General hygiene considerations

Handle batteries carefully to avoid damaging the case. Do not allow metallic articles to contact the battery terminals during handling. Avoid contact with the internal components of the battery. For detailed handling instructions see battery manual.

SECTION 9: Physical and chemical properties

The Nickel – Cadmium cell or battery described in this Battery Information Sheet is a manufactured article and does not expose the user to hazardous substances when used in accordance with supplier specifications.

Physical State	Solid Article
Appearance	Battery; physical form and color as supplied

See manual for further instructions on battery use.

SECTION 10: Stability and reactivity

Reactivity

Not reactive under normal conditions.

Chemical Stability

The cells and battery systems are stable under the recommended storage conditions.

Possibility of Hazardous Reactions

There are no hazardous reactions under normal processing.

Hazardous Polymerization

Hazardous polymerization does not occur.

Materials to Avoid

Do not fill the cells with any acidic electrolyte, for e.g. sulfuric acid from lead-acid-batteries.

Conditions to Avoid

Exposure to temperatures above 70 °C can cause evaporation of the liquid content of the potassium hydroxide electrolyte.

Potential exposure to cadmium fumes during fire. See Section 7, Handling and storage.

SECTION 11: Toxicological information

If the cells or the battery system is mechanically or thermally abused, toxic and hazardous internal components may be exposed.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Cadmium 7440-43-9	2330 mg/kg (Rat)	-	0,0008 – 0,066 mg/l/4h (Rat)
Nickel 7440-02-0	> 9000 mg/kg (Rat)	-	-
Nickel hydroxide 12054-48-7	1520 mg/kg (Rat)	> 2000 mg/kg (Rat)	1,2 mg/l/4h (Rat)
Potassium hydroxide 1310-58-3	365 mg/kg (Rat)	-	-

SECTION 12: Ecological information

There is no ecological harm when batteries are used correctly and recycled after end of useful life. See Section 13, Disposal consideration.

Released electrolyte: The sharp rise of pH – value may cause harmful impact on fish, plankton and other aquatic organisms.

SECTION 13: Disposal considerations

13.1 Disposal

NiCd cells may not be disposed of with domestic refuse.

Used batteries which are not sent for recycling are to be disposed of as special waste, observing all relevant regulations.

13.1 Recycling

Used NiCd batteries are recyclable economic goods and must be delivered for recycling.

Hoppecke has a “closed loop” recycling system for NiCd batteries. Your local HOPPECKE representative will be pleased to assist you in dealing with battery disposal.

NiCd – batteries must be collected separately from other waste and recycled.

In Europe the management of recycling must be performed according to the directive 2006/66/EC as well as its transposition into each European Union’s Member State.

SECTION 14: Transport information

14.1 United Nations (UN)

UN 2795

UN N°	NAME	RAIL, ROAD (ADR, RID)				SEA (IMDG)					AIR (IATA)			
		CL	Code	Packing group	Labelling	CL	Risk	EmS	Packing group	Labeling	CL	Risk	Packing group	Labelling
2795	BATTERIES, WET, FILLED WITH ALKALI Electric storage	8	C 11	---	None	8	***	F-A S-B	---	8	8			8

14.2 International agreement

Air: IATA

Sea: IMDG

Land: ADR (road) or RID (rail)

Note:

Road transport in Europe of new or used cells and batteries with classification UN 2795, Class 8 is not restricted according to ADR special provision 598, providing that requirements of this special provision are met.

SECTION 15: Regulatory Information



Product marking (EU)

Cd

SECTION 16: Other Information

None

Note:

According to REACH Regulation (EC) No 1907/2006, Article 31, *Requirements for safety data sheets*, batteries are ARTICLES and are not covered by legal requirements to generate and supply a material safety data sheet. This Battery Information Sheet is provided solely as information document for the purpose of assisting our customers.

The information contained in this battery information sheet has been compiled according to the best of our knowledge and belief. It is based on sources of information regarded as reliable at the time of compilation and is to this extent accurate and reliable at the time of writing. However, no guarantee is given for the accuracy, reliability or completeness of the information obtained.

The present information relates to the material specified in this Battery Information Sheet. It is however not applicable to the use of this material in combination with other materials or processes. It is the responsibility of the user to ensure that the information is suitable and complete for his special application.

HOPPECKE Batterie Systeme accept no responsibility whatsoever for any kind of loss or damage which may occur directly, indirectly or by accident through use of this information or as a consequence of use, nor do we give any guarantee against patent infringement.

Further information is available from the contact sources given above.

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