



Similar to the illustration,
equipment is optional.

grid | power FNC

Fibre Nickel Cadmium

Battery systems
for stationary applications

Power is our passion ...

You are looking at the results of 90 years' work. 90 years of passion for innovative solutions for stationary power supplies – 90 years of German engineering skill and the aim of never being satisfied with what we have already achieved.

This is only possible thanks to the employees, who continuously support us along this path. Together with our business partners, we have continued to push the limits forwards and ensure that the impossibilities of yesterday have now become a jointly achieved reality.

Only through our partnership with you, we are able to create the perfect symbiosis of economically optimised solutions and state-of-the-art technological products.

With our structure of nearly 2000 employees at more than 20 locations around the world, we are always close to you and keep our finger on the pulse of pioneering innovations. Flexibility in the design of your projects and extremely reliable products are our every day aims. With highly available local service we have ensured a thorough understanding of your special challenges for decades.

If you expect more than just a product but a competent partner who is always at your side, HOPPECKE is the right choice for you.





Stationary power supplies

The HOPPECKE FNC-Technology.

In 1983, HOPPECKE presented a nickel-cadmium battery, that is still unique today: the fibre structure technology, in short FNC-Technology. The dense three-dimensional woven structure is extremely porous. Through this 90 % of the volume of the fibre electrodes can be filled with the active material. This metallised polypropylene woven fibre structure was originally designed for such demanding applications as aviation and aerospace as well as electric and hybrid vehicles. The key features compared to other technologies:

- Discharge and charge allow high to very high currents
- It requires only a small nominal capacity for high currents
- Simultaneously, the volume and weight savings are significant

Reduce your costs by using the FNC-Technology!

The FNC fibre structure electrodes have a conductive nickel matrix. It is filled with the active material using a specially developed process. No additives such as graphite or iron are used. Throughout the entire operating-life of the batteries, there is no formation of carbonate in the electrolyte. The consequence: the electrodes do not age. In contrary to conventional nickel-cadmium batteries, electrolyte replacement throughout the entire operating-life of the batteries is not necessary.

The FNC advantages at a glance

- Advanced battery technology for high demands
- Long service life and life-cycles, even under extreme temperature conditions
- Wide product range in the area of high energy density or of high power density for optimal adjustment of the battery to the customers' needs
- Fulfils the highest demands for shock and vibration resistance

The FNC cells can be operated reliably with the standard electrolyte in a temperature range from -25 °C to +60 °C. Using a special electrolyte, temperatures of even -50 °C are possible.

Typical areas of application:

- Power plants and transformer plants
- Emergency power supply
- Telecommunication systems
- Signal and control systems
- Starting emergency power units



Maximum safety

Universally applicable!

Whenever maximum battery capacity is required, the fibre structure nickel-cadmium technology (FNC) is the optimal solution. Their electrochemical advantages ensure uninterrupted, safe operation: without the danger of a complete power failure or the risk of sudden battery failure. With the highest security for all applications, when the reliable operation of a system is essential.

Four FNC battery types: For your individual application

HOPPECKE offers you four FNC battery types with different performance classes. They cover all applications:

X-Types

X-types have ultra-thin electrodes. They provide a very high short-term output. Typical applications: starting of engines and UPS systems.

H-Types

H-types are specialised for applications with discharge times of 30 minutes and higher required capacity. Typical applications: starting of engines, UPS systems and switchboards.

M-Types

M-types are designed for varying load requirements or mixed loads for discharge times from 30 minutes to 2 hours. Typical applications: emergency power supplies and switchboards.

L-Types

L-types are designed for general discharge characteristic curves with varying requirements, or for mixed loads. Discharge with high and low current density. Typical applications: emergency power supplies, switchboards and energy storage.

All applications at a glance	X-Types	H-Types	M-Types	L-Types
Starting of engines	x	x		
UPS	x	x	x	x
Switchboards		x	x	x
Emergency power supply			x	x
Energy storage				x

x = Standard application



Advantages that pay off

- world-wide!

Service life up to 25 years

The FNC-Technology has the advantage that the electrolyte does not corrode the fibre structure plate. This increases the service life of the cells significantly.

Minimum maintenance required and capable of high currents

The FNC electrode structure has an active fibre length of more than 300 m³ per cm and a free volume of 90 % for the active material. The advantages: lower internal resistance, longer service intervals and high current capability.

Lower operating costs

The graphite-free FNC electrodes consist of pure active material without additives. During the entire service life of the battery, therefore, no change of the electrolyte is necessary. This significantly reduces the operating costs and protects the environment.

High cycle life

The high elasticity of the conductive material not only ensures a long service life, but also an excellent cycle life (over 3,000 cycles under EN-60623).

Robust against external influences

A big advantage is its excellent resistance against electrical and mechanical abuse.

Wide operating temperature range

HOPPECKE FNC-Cells can be operated reliably in a temperature range from -25 °C to +60 °C. Using a special electrolyte, temperatures of even -50 °C are possible.

Easy maintenance in stationary applications

In addition to the easy to open hinged lid plugs, the translucent polypropylene containers also make servicing easier for stationary use: they allow an easy check and correction of the electrolyte level.

No sudden failure

The decrease in capacity towards the end of service life is slow and gradual, without the danger of sudden failure of the battery.

Long shelf-life

Long shelf-life without loss of performance after putting into service.

Our contribution to environmental protection: our own recycling concept

HOPPECKE Battery Systems makes a contribution in accordance with the EU guidelines for responsible handling of industrial batteries by meeting the recycling quota. We guarantee our customers that they can return spent nickel-cadmium batteries - regardless of the technology, the manufacturer or age of the batteries. For this we have developed and implemented our own recycling concept.





Security in every detail

The high-quality parts and components

Electrodes

The positive and negative electrodes of the FNC batteries consist of a nickel fibre structure with graphite-free active material. The special feature of the three-dimensional matrix, made from a nickel/fibre composite material, is its high elasticity: mechanical stresses and volume changes during charging/discharging are entirely absorbed by the electrodes. All HOPPECKE FNC cell electrodes are manufactured exclusively at the German site in Brilon, which is certified according to ISO 9001, ISO 14001, IRIS and ISO/TS 22163 (IRIS Rev.03), OHSAS 18001 and ISO 50001.

Separators

The positive electrodes are covered by microporous separators. They separate the electrodes properly from each other and warrant a low internal resistance, which corresponds to the given operational demand levels.

Electrolyte

The electrolyte is made from diluted potassium hydroxide with a density of 1.19 kg/l at 20 °C. HOPPECKE delivers the cells filled and charged. Optionally, the cells can also be supplied in filled and dry preloaded, or unfilled and dry preloaded condition. In the case of unfilled cells, the electrolyte is packed separately and ready to fill or supplied as a dry electrolyte.

Container

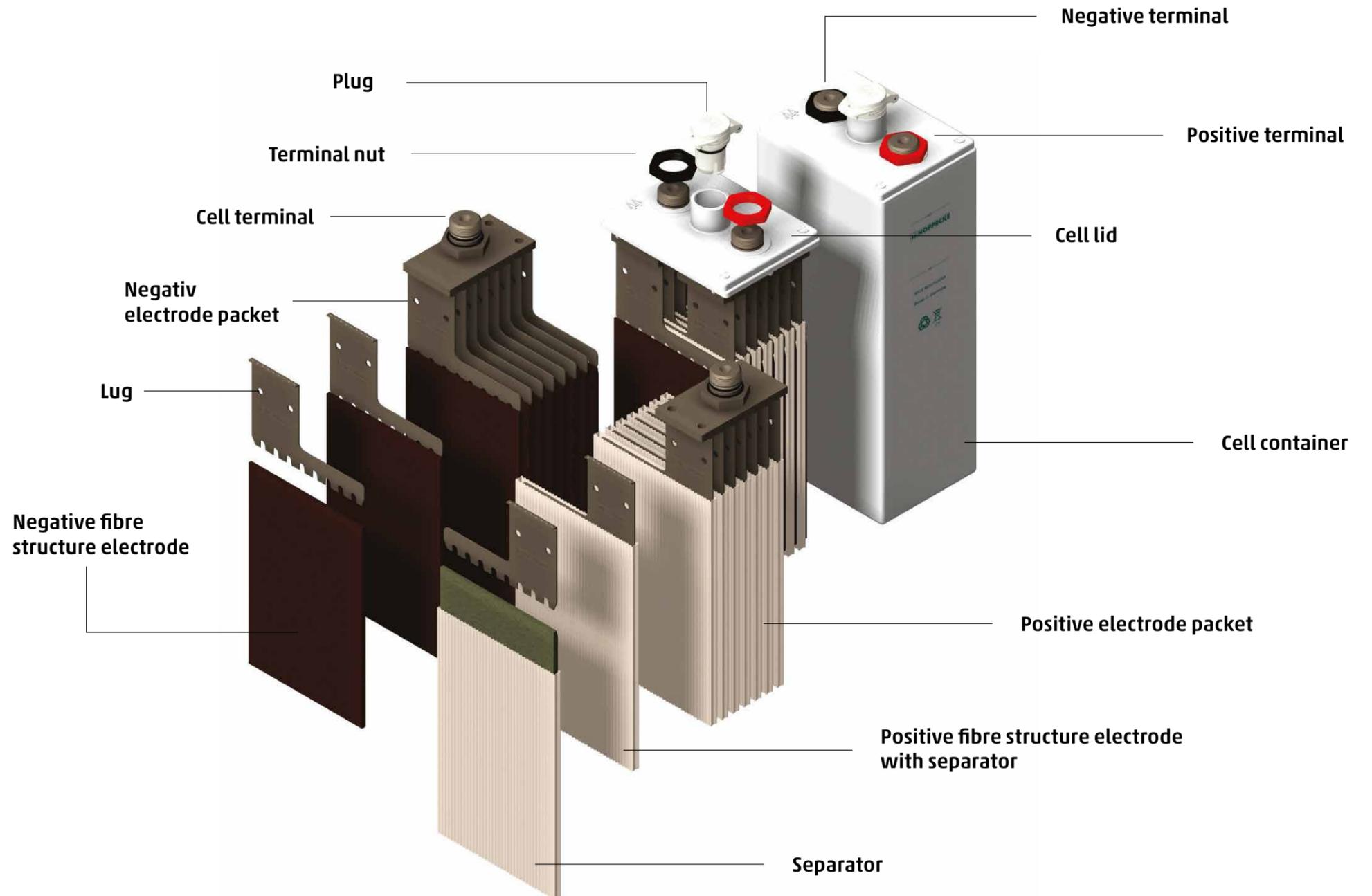
The battery container is made of robust, translucent polypropylene, which facilitates the checking of the electrolyte levels. Flame retardant material variants are also available on request. The containers and lids are welded together, ensuring that no gas or electrolyte can leak out. Double o-rings ensure good sealing at the terminal feedthroughs.

Vent Plug

The hinged lid vent plugs and re-ignition protection make it easy to refill the cell. Furthermore, they protect the battery from external re-ignition.

Connectors

The connectors are made of nickel-plated copper with extremely low resistance. For fitting they are simply screwed onto the cells. Insulated connectors are provided on request.





Operational and technical characteristics

Operating instructions

- Operating temperature range -25 °C to +60 °C (with special electrolyte up to -50 °C)
- Floating charge: 1.40 to 1.45 V/cell
- Boost charge: 1.50 to 1.60 V/cell
- Recharge time to 90 % of the available capacity: less than 5 hours at normal boost charge
- Typical recharge current 0.1 x C5 to 0.4 x C5 (Higher charge currents of up to 2.5 x C5 - details available on request)
- Cell container and lid made of translucent polypropylene
- Container and lid seal: welded shut
- Terminal: nickel plated steel
- Electrode design: contact lug out of nickel-plated steel welded to the fibre structure electrode
- Electrolyte: potassium hydroxide (density 1.19 kg/l at 20 °C)
- Microporous separators
- Designed and tested in accordance with IEC EN 60623

Technical characteristics

Nominal capacity

The nominal capacity of the nickel-cadmium battery is given in ampere-hours (Ah). It denotes the amount of electricity at +20 °C, which can be removed from the battery after a full charge with a 5-hour discharge to 1.0 V /cell.

Cell voltage

The nominal voltage for nickel-cadmium batteries is 1.2 V, which corresponds to the average voltage during discharge at the rated current 0.2 C5.

Internal resistance and short circuit current

The internal resistance of a cell depends on the temperature and state of charge. The short circuit current of a battery can be determined from the internal resistance. The short circuit current of a fully charged FNC battery is between the 10-fold (L-types) and the 40-fold (X-types) of the rated capacity in ampere.

Ambient temperature and output

The ambient temperature affects the performance of a battery. The temperature therefore must be considered when designing a battery system. At low temperatures the available capacity is reduced. Charging at very high temperatures reduces the degree of charging efficiency.

Self-discharge

If stored without charging all the cells are subjected to a self-discharge, which rises sharply at high temperatures. During the first weeks the self-discharge is relatively high and slows down over the storage period.

Capacities, dimensions and weights

Performance L

Model	Capacity C ₅ (Ah)	Length (mm)	Width (mm)	Height (mm)	Weight of cell with electrolyte (kg)	Weight of cell without electrolyte (kg)	Filling capacity (l)
FNC 35 L	35	39	122	250	1.70	1.25	0.38
FNC 50 L	50	47	122	250	2.15	1.60	0.46
FNC 70 L	70	58	122	250	2.60	1.95	0.55
FNC 45 L	45	47	122	309	2.50	1.50	0.84
FNC 66 L	66	47	122	309	2.65	1.90	0.63
FNC 90 L	90	72	122	309	3.85	2.45	1.18
FNC 110 L	110	72	122	309	4.10	2.90	1.01
FNC 132 L	132	92	122	309	5.15	3.30	1.55
FNC 154 L	154	92	122	309	5.40	3.80	1.34
FNC 176 L	176	115	122	309	6.40	4.30	1.76
FNC 198 L	198	115	122	309	6.50	4.90	1.34
FNC 222 L	222	92	194	309	8.50	5.85	2.23
FNC 259 L	259	92	194	309	8.80	6.50	1.93
FNC 296 L	296	115	194	309	10.60	7.30	2.77
FNC 333 L	333	115	194	309	11.00	8.00	2.52
FNC 370 L	370	115	194	309	11.10	8.50	2.18
FNC 407 L	407	155	198	309	14.10	10.10	3.36
FNC 444 L	444	155	198	309	14.50	10.80	3.11
FNC 481 L	481	155	198	309	14.80	11.50	2.77
FNC 518 L	518	155	198	309	15.20	12.10	2.61
FNC 560 L	560	157	158	405	16.90	12.85	3.40
FNC 605 L	605	202	209	405	24.20	15.70	7.50
FNC 660 L	660	202	209	405	24.70	16.70	7.06
FNC 715 L	715	202	209	405	25.20	17.60	6.71
FNC 770 L	770	202	209	405	25.80	18.70	6.26
FNC 825 L	825	202	209	405	26.30	19.60	5.91
FNC 880 L	880	202	209	405	26.80	20.60	5.47
FNC 935 L	935	238	209	405	30.50	22.00	7.5
FNC 990 L	990	238	209	405	31.00	23.00	7.06
FNC 1045 L	1045	238	209	405	31.50	24.00	6.62
FNC 1100 L	1100	238	209	405	32.10	25.00	6.26

Performance M

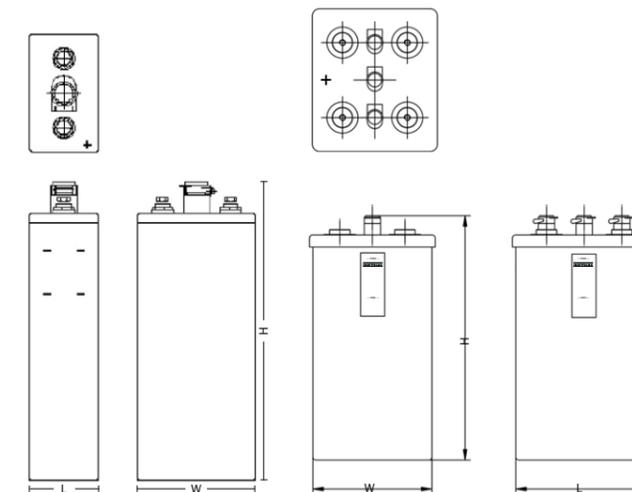
Model	Capacity C ₅ (Ah)	Length (mm)	Width (mm)	Height (mm)	Weight of cell with electrolyte (kg)	Weight of cell without electrolyte (kg)	Filling capacity (l)
FNC 40 M	40	47	122	309	2.60	1.60	0.84
FNC 60 M	60	47	122	309	2.80	2.15	0.55
FNC 80 M	80	72	122	309	3.95	2.70	1.05
FNC 100 M	100	72	122	309	4.15	3.10	0.88
FNC 120 M	120	92	122	309	5.35	3.65	1.43
FNC 140 M	140	92	122	309	5.60	4.15	1.22
FNC 160 M	160	115	122	309	6.65	4.75	1.60
FNC 180 M	180	115	122	309	6.90	5.20	1.43
FNC 200 M	200	92	194	309	8.70	6.25	2.06
FNC 235 M	235	92	194	309	8.85	6.75	1.76
FNC 265 M	265	115	194	309	10.50	8.00	2.10
FNC 300 M	300	115	194	309	11.20	8.90	1.93
FNC 340 M	340	157	158	405	15.05	9.60	4.58
FNC 375 M	375	157	158	405	15.55	10.40	4.33
FNC 415 M	415	157	158	405	16.05	11.20	4.08
FNC 450 M	450	157	158	405	16.55	12.00	3.82

Performance H

Model	Capacity C ₅ (Ah)	Length (mm)	Width (mm)	Height (mm)	Weight of cell with electrolyte (kg)	Weight of cell without electrolyte (kg)	Filling capacity (l)
FNC 35 H	35	47	122	309	2.60	1.70	0.76
FNC 46 H	46	47	122	309	2.80	2.00	0.67
FNC 58 H	58	72	122	309	3.95	2.55	1.18
FNC 69 H	69	72	122	309	4.15	2.85	1.09
FNC 80 H	80	72	122	309	4.30	3.20	0.92
FNC 93 H	93	92	122	309	5.40	3.70	1.43
FNC 104 H	104	92	122	309	5.55	3.95	1.34
FNC 115 H	115	115	122	309	6.60	4.45	1.81
FNC 125 H	125	115	122	309	6.90	4.95	1.64
FNC 135 H	135	115	122	309	7.05	5.25	1.51
FNC 140 H	140	92	194	309	8.45	5.70	2.31
FNC 160 H	160	92	194	309	8.75	6.25	2.10
FNC 180 H	180	92	194	309	9.00	6.75	1.89
FNC 200 H	200	115	194	309	10.85	7.50	2.82
FNC 220 H	220	115	194	309	11.10	8.05	2.56
FNC 240 H	240	115	194	309	11.45	8.55	2.44

Performance X

Model	Capacity C ₅ (Ah)	Length (mm)	Width (mm)	Height (mm)	Weight of cell with electrolyte (kg)	Weight of cell without electrolyte (kg)	Filling capacity (l)
FNC 28 X	28	47	122	250	2.50	1.90	0.50
FNC 47 X	47	72	122	250	3.70	2.90	0.67
FNC 66 X	66	92	122	250	5.00	3.90	0.92
FNC 85 X	85	115	122	250	6.20	4.80	1.18
FNC 39 X	39	47	122	309	2.95	2.20	0.63
FNC 65 X	65	72	122	309	4.55	3.40	0.97
FNC 91 X	91	92	122	309	6.00	4.60	1.18
FNC 117 X	117	115	122	309	7.50	5.70	1.51
FNC 130 X	130	92	194	309	9.00	6.40	2.18
FNC 142 X	142	92	194	309	9.30	6.85	2.06
FNC 153 X	153	92	194	309	9.55	7.30	1.89
FNC 165 X	165	115	194	309	11.20	7.95	2.73
FNC 177 X	177	115	194	309	11.50	8.40	2.61
FNC 189 X	189	115	194	309	11.75	8.80	2.48
FNC 200 X	200	115	194	309	12.10	9.30	2.35



Technical changes reserved.

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rail | Nickel-Cadmium

Powerful batteries for
rail applications

Reach your destination safely with HOPPECKE

Safety and reliability in rail transport even under extreme conditions. Be on the safe side with proven nickel-cadmium technology. Extreme environmental and operating conditions are challenging the railway industry to guarantee full

functional availability, even under adverse temperature conditions, to ensure safe travel at all times. NiCd technology has the reliability, fail safe performance and robustness to provide exactly what is essential for rail vehicles under extreme outdoor conditions. Their wide range of operating temperatures allows nickel-cadmium batteries remain safe to use even under extremely cold as well as hot outside temperatures, so that emergency power supply is assured at all times. Based on years of experience, HOPPECKE has been able to develop and continuously improve to provide you with the solution you need. We equip your rail vehicles that they are absolutely safe in emergency power operation and maximum performance is guaranteed when starting diesel engines or given additional requirements. HOPPECKE enables you to always rely on your rolling stock safely reaching its destination.

CERTIFICATIONS

Quality, safety and environment

All our NiCd batteries meet the necessary requirements of the relevant standards, such as IEC60623 and IEC61373.

Temperature behaviour

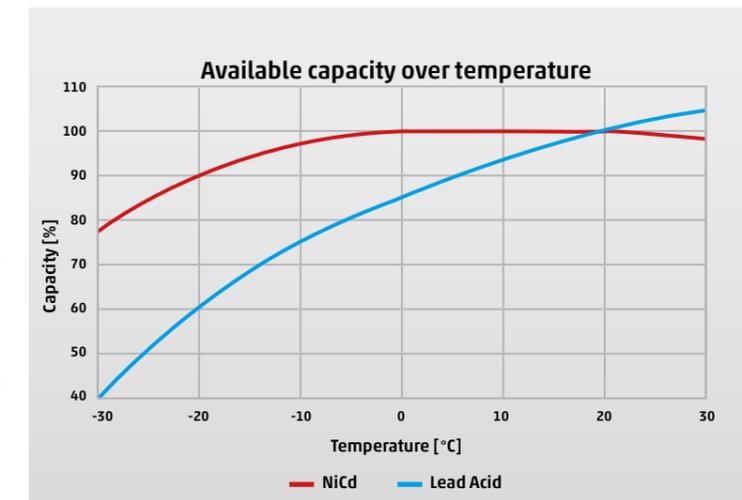
Their electrochemistry allows NiCd batteries to offer excellent temperature characteristics. Even at extremely low temperatures, they still supply energy reliably. Since the electrolyte does not participate in the battery's reaction and only acts as an ion conductor, it's density does not change with the state of charge. So there is no risk of freezing even when stored in low charge conditions. These are features that make this technology indispensable, especially for applications under very cold climatic conditions. Also at high temperatures, the technology performs well. Battery ageing does not increase disproportionately and long service lives are possible even under warm ambient conditions.

Service life

NiCd cells are not subject to many ageing effects, such as corrosion. So they also achieve very high calendar service lives in practice. An operating life of over 15 years is common even in tough rolling stock applications. This saves the user many inconvenient and expensive battery changes. NiCd batteries are also ahead in terms of cycle stability. HOPPECKE FNC technology in particular is unique here and excels with well over 3000 achievable standard cycles.

Unbeatable robustness

NiCd technology is a very robust and reliable technology in everyday use. It can also easily cope with occasional mishandling such as overcharging. Even storage in an uncharged condition is not a problem. Error patterns such as thermal runaway and sudden failure do not occur. A guarantee for safe operation, even if the conditions are sometimes not optimal.



Fibre structure technology (FNC)

rail | power FNC

Fibre-nickel-cadmium technology (FNC) is a technology developed by HOPPECKE, which particularly convinces by its reliable and universal use in the railway industry. FNC technology is flexible and available in a wide range of capacity and performance classes. FNC batteries can be used for a very long time, which reduces replacement costs to a minimum.



Tried and tested for a long time.

In service for over 35 years.

Developed by your energy experts at HOPPECKE.

The basis of fibre structure technology is a metallised fibre fleece. This results in a three-dimensional, highly porous, yet highly conductive electrical structure in which the active mass is placed via a special process. The firm mechanical bonding of the active mass and high flexibility of the electrode result in the extreme resistance and service life for which FNC technology has been known for decades. No other NiCd technology on the market allows a comparably high number of discharge cycles!

Varying the initial thickness of the fleece makes it possible to produce electrodes of different thicknesses and enables batteries to be manufactured over a wide range from energy-optimised L and M types to performance-oriented H and X types. At the same time, the rest of the battery design is also adaptable. This enables us to respond to very specific customer requirements when necessary. FNC batteries are available with different casing materials (PP, PP-V0, PES) to meet the differing global requirements regarding fire protection.



Metallised fibres under a scanning electron microscope

FNC batteries – optimised for use as an on-board battery:

- ▶ In regional trains
- ▶ In high-speed trains
- ▶ In locomotives
- ▶ In metros
- ▶ In trams/light rail vehicles

Your benefits rail | power FNC

- ▶ Very high cycle stability
- ▶ Very variable and flexible
- ▶ Wide operating temperature range
- ▶ Long-proven reliability

High-temperature fibre structure technology (FNC)

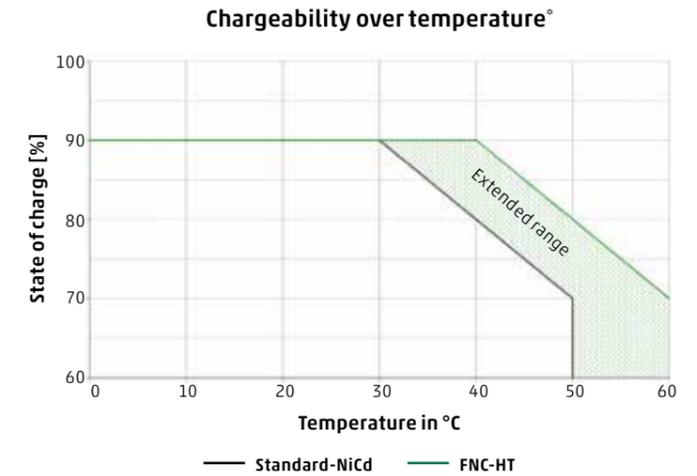
rail | power FNC-HT

When used in certain regions of the world („hot countries“), NiCd batteries are required to operate at permanently high ambient temperatures. Under these conditions conventional batteries suffer from accelerated ageing, poor charge acceptance and premature degradation of capacity. Due to this, batteries for high temperature application had to be significantly oversized, until now. By using FNC-HT batteries, this oversizing can be kept to a minimum, with direct advantages in terms of weight, installation space and costs. At the same time, the maintenance effort can be reduced compared to conventional batteries and the service life is extended.



**Optimum performance
while others break into a sweat.**

With the FNC-HT series the proven FNC technology has been specially adapted for use under permanently hot climatic conditions. Proven design features have been retained and experiences gained from many successful warm applications could be incorporated. The already good temperature resistance of the HOPPECKE FNC batteries has been further improved by the use of a special electrolyte, which shifts the range of operation to significantly higher temperatures.



*Example: Exact sizing factors have to be selected acc. the project-specific conditions in consultation with HOPPECKE.

Examples of hot countries with projects already realised by HOPPECKE:



FNC-HT Technologie – a hot solution for:

- ▶ Permanently warm applications
- ▶ Large temperature loads
- ▶ Continuous tunnel operation

Your benefits rail | power FNC-HT

- ▶ Extended temperature range
- ▶ Less oversizing
- ▶ Longer service life
- ▶ Reduced maintenance effort

Sinter/PBE technology

rail | power HNCS

You need high performance within seconds in an emergency case? HOPPECKE offers you exactly the solution you need with its powerful and compact batteries in sinter/PBE technology. These batteries have a compact and lightweight design and offer high performance while saving up to 30 % space compared to comparable batteries. Our low-maintenance batteries deliver excellent performance even under extreme temperature conditions. Their space and weight savings offer more room for passengers and thus provide more payload without neglecting comfort or safety.

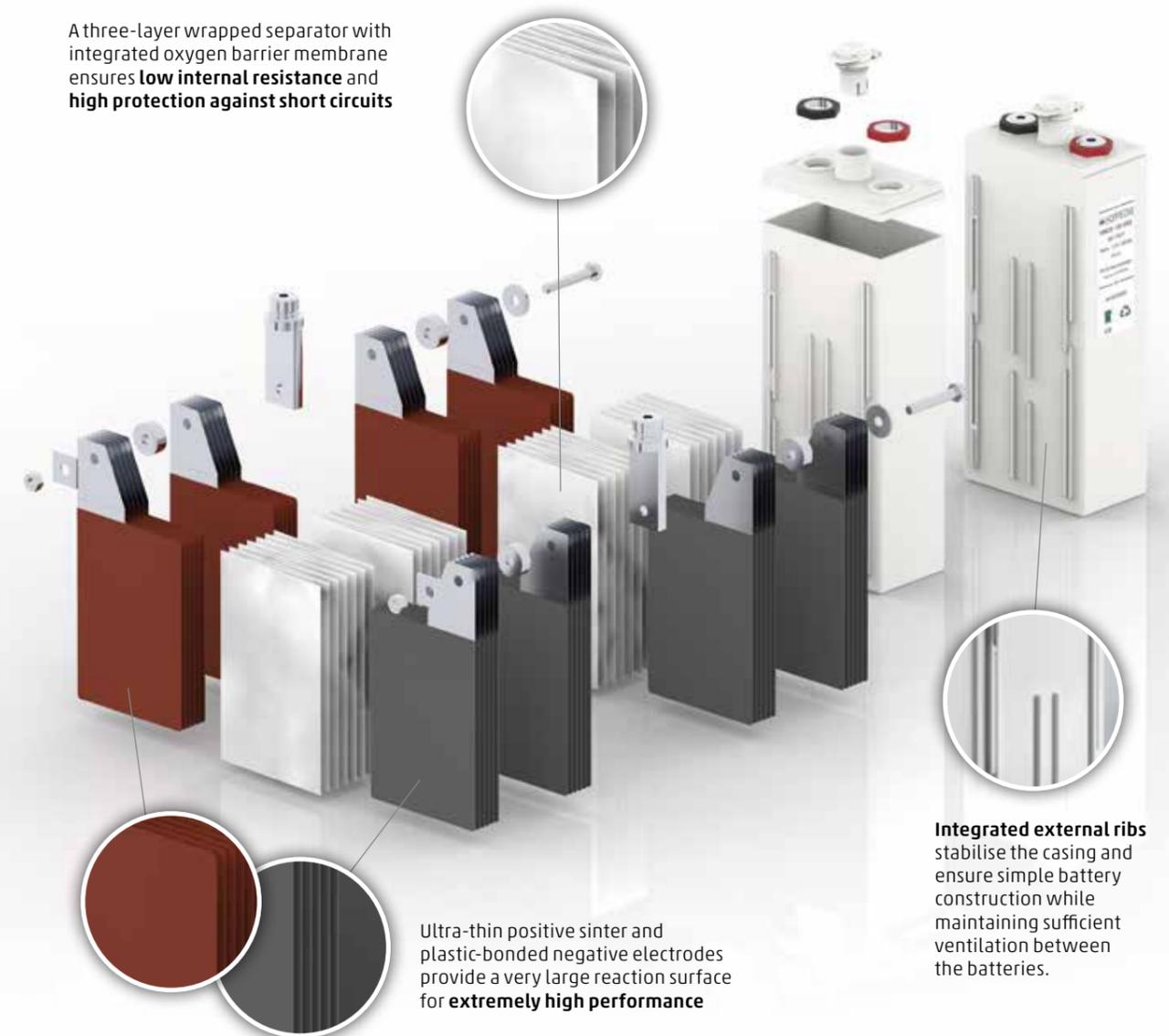
**Top support from our engineers
in each project phase.**



With HNCS cells, HOPPECKE is adopting the sinter/ PBE technology established on the market for many years and taking it to a new level. The single cells use very thin sintered electrodes on the positive side and plastic-bonded electrodes on the negative side.

These are combined with a very thin but very resistant separator to produce compact NiCd batteries with high energy and power density coupled with high reliability in energy storage.

A three-layer wrapped separator with integrated oxygen barrier membrane ensures **low internal resistance** and **high protection against short circuits**



Ultra-thin positive sinter and plastic-bonded negative electrodes provide a very large reaction surface for **extremely high performance**

Integrated external ribs stabilise the casing and ensure simple battery construction while maintaining sufficient ventilation between the batteries.

Sinter technology is used mainly in:

- ▶ Applications with very high power requirements, e. g. emergency traction
- ▶ Trams and high-speed trains to supply electromagnetic rail brakes
- ▶ All other high performance applications

Your benefits rail | power HNCS

- ▶ Extreme power
- ▶ High energy density
- ▶ Greater payload possible due to lower weight
- ▶ Wide operating temperature range
- ▶ Low maintenance

Technical data

rail | power HNCS

	C ₅ [Ah]	Length** [mm]	Width [mm]	Height [mm]	Weight [kg]
HNCS 130 XR2	130	77	122	309	5.05
HNCS 165 XR2	165	97	122	309	6.40
HNCS 190 XR2	190	97	122	309	6.65
HNCS 230 XR2	230	309	122	120	8.35

** including external ribs

rail | power FNC-HT H

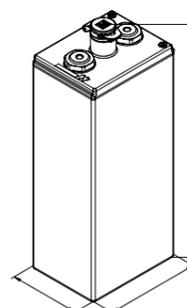
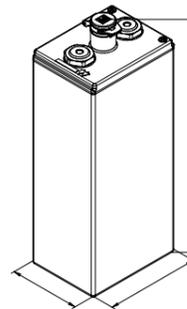
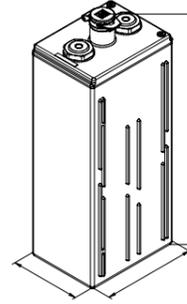
	C ₅ [Ah]	Length* [mm]	Width [mm]	Height [mm]	Weight [kg]
FNC-HT 38 HR2	38	122	39	309	2.30
FNC-HT 50 HR2	50	122	47	309	2.80
FNC-HT 65 HR2	65	122	58	309	3.40
FNC-HT 75 HR2	75	122	72	309	4.15
FNC-HT 90 HR2	90	122	72	309	4.30
FNC-HT 105 HR2	105	122	92	309	5.40
FNC-HT 115 HR2	115	122	92	309	5.60
FNC-HT 125 HR2	125	122	115	309	6.65
FNC-HT 140 HR2	140	122	115	309	6.95
FNC-HT 150 HR2	150	122	115	309	7.10
FNC-HT 155 HR3	155	194	92	309	8.45
FNC-HT 160 HR3	160	194	92	309	8.75
FNC-HT 175 HR3	175	194	92	309	8.75
FNC-HT 180 HR3	180	194	92	309	9.00
FNC-HT 195 HR3	195	194	92	309	9.05
FNC-HT 200 HR3	200	194	115	309	10.85
FNC-HT 220 HR3	220	194	115	309	10.90
FNC-HT 240 HR3	240	194	115	309	11.15
FNC-HT 265 HR3	265	194	115	309	11.50

* Dimensions apply to PP casing material. Other materials may deviate.

rail | power FNC-HT M

	C ₅ [Ah]	Length* [mm]	Width [mm]	Height [mm]	Weight [kg]
FNC-HT 40 MR2	40	122	39	309	2.20
FNC-HT 60 MR2	60	122	47	309	2.80
FNC-HT 85 MR2	85	122	58	309	3.35
FNC-HT 105 MR2	105	122	72	309	4.20
FNC-HT 125 MR2	125	122	92	309	5.40
FNC-HT 145 MR2	145	122	92	309	5.65
FNC-HT 165 MR2	165	122	115	309	6.75
FNC-HT 190 MR2	190	122	115	309	7.00
FNC-HT 210 MR3	210	194	92	309	8.85
FNC-HT 225 MR3	225	194	92	309	8.85
FNC-HT 245 MR3	245	194	92	309	9.00
FNC-HT 250 MR3	250	194	115	309	10.50
FNC-HT 280 MR3	280	194	115	309	10.70
FNC-HT 285 MR3	285	194	115	309	11.20
FNC-HT 320 MR3	320	194	115	309	11.45

* Dimensions apply to PP casing material. Other materials may deviate.



rail | power FNC X

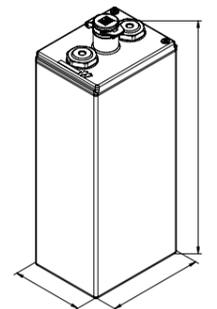
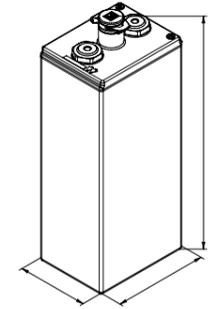
	C ₅ [Ah]	Length* [mm]	Width* [mm]	Height* [mm]	Weight [kg]
FNC 25 XR2	25	39	122	309	2.40
FNC 40 XR2	40	47	122	309	2.95
FNC 45 XR2	45	58	122	309	3.60
FNC 65 XR2	65	72	122	309	4.55
FNC 90 XR2	90	92	122	309	6.00
FNC 115 XR2	115	115	122	309	7.50
FNC 130 XR3	130	92	194	309	9.00
FNC 140 XR3	140	92	194	309	9.30
FNC 155 XR3	155	92	194	309	9.55
FNC 165 XR3	165	115	194	309	11.20
FNC 175 XR3	175	115	194	309	11.50
FNC 190 XR3	190	115	194	309	11.75
FNC 200 XR3	200	115	194	309	12.10

* Dimensions apply to PP casing material. Other materials may deviate.

rail | power FNC H

	C ₅ [Ah]	Length* [mm]	Width* [mm]	Height* [mm]	Weight [kg]
FNC 35 HR2	35	39	122	309	2.30
FNC 38 HR2	38	39	122	309	2.30
FNC 45 HR2	45	47	122	309	2.80
FNC 50 HR2	50	47	122	309	2.80
FNC 58 HR2	58	58	122	309	3.40
FNC 65 HR2	65	58	122	309	3.40
FNC 70 HR2	70	72	122	309	4.15
FNC 75 HR2	75	72	122	309	4.15
FNC 80 HR2	80	72	122	309	4.30
FNC 90 HR2	90	72	122	309	4.30
FNC 95 HR2	95	92	122	309	5.40
FNC 105 HR2	105	92	122	309	5.40
FNC 115 HR2	115	92	122	309	5.60
FNC 125 HR2	125	115	122	309	6.65
FNC 140 HR2	140	115	122	309	6.95
FNC 150 HR2	150	115	122	309	7.10
FNC 140 HR3	140	92	194	309	8.45
FNC 155 HR3	155	92	194	309	8.45
FNC 160 HR3	160	92	194	309	8.75
FNC 175 HR3	175	92	194	309	8.75
FNC 180 HR3	180	92	194	309	9.00
FNC 195 HR3	195	92	194	309	9.05
FNC 200 HR3	200	115	194	309	10.85
FNC 220 HR3	220	115	194	309	10.90
FNC 240 HR3	240	115	194	309	11.15
FNC 265 HR3	265	115	194	309	11.50

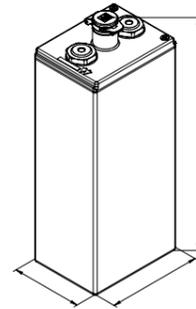
* Dimensions apply to PP casing material. Other materials may deviate.



Technical data

rail | power FNC M

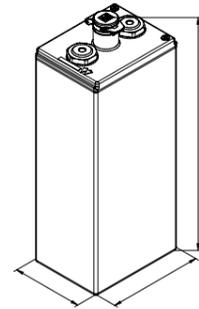
	C ₂₀ [Ah]	Length** [mm]	Width** [mm]	Height** [mm]	Weight [kg]
FNC 40 MR2	40	39	122	309	2.20
FNC 45 MR2	45	39	122	309	2.20
FNC 60 MR2	60	47	122	309	2.80
FNC 65 MR2	65	47	122	309	2.80
FNC 80 MR2	80	58	122	309	3.35
FNC 90 MR2	90	58	122	309	3.35
FNC 100 MR2	100	72	122	309	4.15
FNC 110 MR2	110	72	122	309	4.20
FNC 120 MR2	120	92	122	309	5.35
FNC 130 MR2	130	92	122	309	5.40
FNC 140 MR2	140	92	122	309	5.60
FNC 155 MR2	155	92	122	309	5.65
FNC 160 MR2	160	115	122	309	6.65
FNC 175 MR2	175	115	122	309	6.75
FNC 180 MR2	180	115	122	309	6.90
FNC 200 MR2	200	115	122	309	7.00
FNC 200 MR3	200	92	194	309	8.70
FNC 220 MR3	220	92	194	309	8.85
FNC 235 MR3	235	92	194	309	8.85
FNC 260 MR3	260	92	194	309	9.00
FNC 265 MR3	265	115	194	309	10.50
FNC 295 MR3	295	115	194	309	10.70
FNC 300 MR3	300	115	194	309	11.20
FNC 335 MR3	335	115	194	309	11.45
FNC 150 MR4	150	77	157.5	405	7.70
FNC 160 MR4	160	77	157.5	405	7.75
FNC 185 MR4	185	77	157.5	405	7.80
FNC 200 MR4	200	77	157.5	405	7.90
FNC 225 MR4	225	109	157.5	405	10.35
FNC 240 MR4	240	109	157.5	405	10.50
FNC 265 MR4	265	109	157.5	405	10.90
FNC 280 MR4	280	109	157.5	405	11.10
FNC 300 MR4	300	109	157.5	405	11.65
FNC 320 MR4	320	109	157.5	405	11.85
FNC 340 MR4	340	125	157.5	405	13.10
FNC 360 MR4	360	125	157.5	405	13.30
FNC 375 MR4	375	125	157.5	405	13.55
FNC 400 MR4	400	125	157.5	405	13.80
FNC 415 MR4	415	157	157.5	405	16.05
FNC 440 MR4	440	157	157.5	405	16.25
FNC 450 MR4	450	157	157.5	405	16.55
FNC 480 MR4	480	157	157.5	405	16.85
FNC 490 MR4	490	157	157.5	405	17.10



** Dimensions apply to PP casing material. Other materials may deviate.

rail | power FNC L

	C ₂₀ [Ah]	Length** [mm]	Width** [mm]	Height** [mm]	Weight [kg]
FNC 40 LR2	40	39	122	309	2.15
FNC 45 LR2	45	39	122	309	2.15
FNC 60 LR2	60	47	122	309	2.65
FNC 65 LR2	65	47	122	309	2.65
FNC 80 LR2	80	58	122	309	3.25
FNC 90 LR2	90	58	122	309	3.25
FNC 100 LR2	100	72	122	309	4.10
FNC 110 LR2	110	72	122	309	4.10
FNC 120 LR2	120	72	122	309	4.25
FNC 130 LR2	130	72	122	309	4.25
FNC 140 LR2	140	92	122	309	5.35
FNC 155 LR2	155	92	122	309	5.40
FNC 160 LR2	160	92	122	309	5.50
FNC 175 LR2	175	92	122	309	5.55
FNC 180 LR2	180	115	122	309	6.40
FNC 200 LR2	200	115	122	309	6.45
FNC 220 LR2	220	115	122	309	6.80
FNC 200 LR3	200	92	194	309	8.45
FNC 220 LR3	220	92	194	309	8.50
FNC 235 LR3	235	92	194	309	8.75
FNC 260 LR3	260	92	194	309	8.80
FNC 265 LR3	265	92	194	309	8.90
FNC 295 LR3	295	92	194	309	8.95
FNC 300 LR3	300	115	194	309	10.90
FNC 335 LR3	335	115	194	309	11.00
FNC 370 LR3	370	115	194	309	11.10
FNC 150 LR4	150	77	157.5	405	7.35
FNC 160 LR4	160	77	157.5	405	7.40
FNC 185 LR4	185	77	157.5	405	7.60
FNC 200 LR4	200	77	157.5	405	7.65
FNC 225 LR4	225	77	157.5	405	7.80
FNC 240 LR4	240	109	157.5	405	10.35
FNC 265 LR4	265	109	157.5	405	10.80
FNC 280 LR4	280	109	157.5	405	10.90
FNC 300 LR4	300	109	157.5	405	11.10
FNC 320 LR4	320	109	157.5	405	11.20
FNC 340 LR4	340	109	157.5	405	11.40
FNC 360 LR4	360	109	157.5	405	11.55
FNC 375 LR4	375	125	157.5	405	12.55
FNC 400 LR4	400	125	157.5	405	12.70
FNC 415 LR4	415	125	157.5	405	12.90
FNC 440 LR4	440	125	157.5	405	13.05
FNC 450 LR4	450	157	157.5	405	15.90
FNC 480 LR4	480	157	157.5	405	16.10
FNC 490 LR4	490	157	157.5	405	16.30
FNC 520 LR4	520	157	157.5	405	16.50
FNC 525 LR4	525	157	157.5	405	16.70
FNC 560 LR4	560	157	157.5	405	16.90



** Dimensions apply to PP casing material. Other materials may deviate.

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