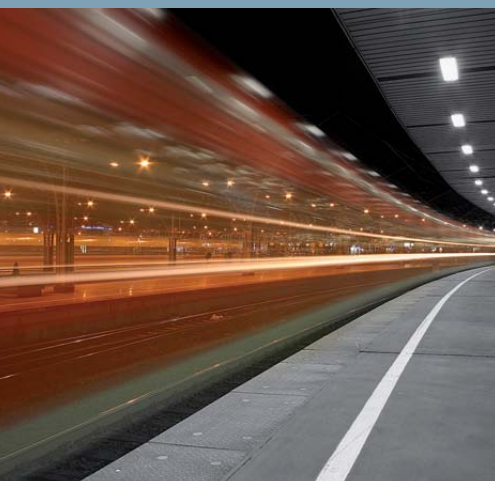


Railway Cell Brochure

Structured Overview
of the new HOPPECKE
cell type nomenclature



Motive Power Systems
Reserve Power Systems
Special Power Systems
Service



Simplified system
for easy navigation

IRIS
Certification

 **HOPPECKE**
POWER FROM INNOVATION

Railway Cells

Unparalleled Worldwide – FNC® technology

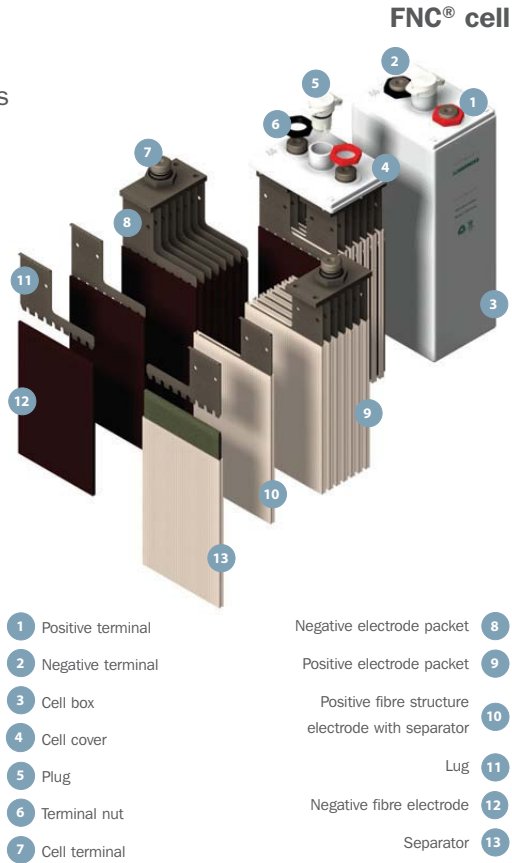
Since 1983 HOPPECKE Batterie Systeme has shipped more than 1 million FNC® cells to railway clients around the world. This success is based on the many benefits of FNC® technology compared to energy storage systems.

- High cycle stability
- No electrolyte changes
- Low water consumption
- Large maintenance intervals reduce follow-up costs

HOPPECKE Electrodes “Made in Germany”

All electrodes used in HOPPECKE FNC® cells for rail applications are manufactured exclusively at the ISO 9001, ISO 14001, IRIS and EN 15085 certified location in Brilon, Germany.

FNC® batteries can be cycled more than 3000 times. This makes them more powerful than any other NiCd technology exceeding the UIC 854 R directive by a wide margin. Since FNC® electrodes can operate without a graphite additive there is no need to change the electrolyte – for the product’s entire life! FNC® cells recombine into water, a large part of the oxygen and hydrogen gasses which are generated during use. This also results in FNC® requiring less maintenance than NiCd cells, which recombine only a little, if at all. Maintenance intervals can extend up to 2 years – depending on the charging voltage setting, ambient temperature and cycle frequency.



Performance

HOPPECKE FNC® technology is available in cells type XR, HR, MR and LR.

- X** = extra high discharge current
- H** = high discharge current
- M** = medium discharge current
- L** = low extractable discharge current per DIN EN 60623 and BS 6260

FNC® cells containing the index “R” and for use in rail applications feature an electrode material optimised for cyclic operation.

HOPPECKE **XR** types are used for diesel starter and emergency brake, i.e. for high to very high currents equal to up to 20 times the cells’ capacity rating.

HR types are suitable for diesel starter as well as for emergency systems

MR and **LR** types are designed for auxiliary circuits and emergency systems with a discharge time of 45 to 60 minutes. If a small diesel is to be started when the main load is simultaneously required for the emergency system, **MR** types may also be used in these exceptional cases also.

New cell type nomenclature

This provides a structured overview for the selection of Hoppecke FNC® cells for the various rail vehicle applications.

Standard Series

Series	Applications
FNC®	<p>Standard FNC® line of products for all applications</p> <ul style="list-style-type: none"> ■ can be used universally in the railway sector ■ available in performance classes L, M, H and X (available with and without automatic filling system)
FNC® -A	<p>Advanced FNC® line of products with internal recombination, extended service cycles and lower charging voltages</p> <ul style="list-style-type: none"> ■ can be used in the high-current range and for starting applications ■ available in performance classes H and X ■ with all of the benefits of FNC® technology <p>plus:</p> <ul style="list-style-type: none"> ■ improved charge acceptance ■ higher energy density ■ lower water consumption ■ extended maintenance intervals ■ extended usable life ■ compact and sturdy design ■ great mechanical stability of all electrochemically active component parts ■ high level of reliability for the entire system ■ much longer service life even under the hardest operating conditions
FNC® -C	<p>Compact FNC® line of products with energy density for use where space is restricted and charging voltages lower</p> <ul style="list-style-type: none"> ■ for all train and mass transport applications calling for maximum performance and capacity ■ available in performance class M ■ offering all of the benefits of FNC®-A technology <p>plus:</p> <ul style="list-style-type: none"> ■ energy density boosted once again at minimum weight
rail.power	<p>Unrivalled battery technology (vlies.tec® VRLA battery)</p> <ul style="list-style-type: none"> ■ can be used universally in the railway sector ■ available as monobloc battery with 6 V or 12 V ■ guaranteed high cycle life time ■ maximum performance ■ electrolyte is fixed in an AGM vlies material for nearly maintenance free operation ■ high safety

Railway Cells

Example: **FNC® 200 LR2**

Syntax and meaning:

FNC®	200	L	R	2
Series	Capacity (Ah)	Performance	Rail	Format

Series and capacity:

The series types denote their ratings

Performance:

LR, MR, HR, XR

for rail application

Formats:

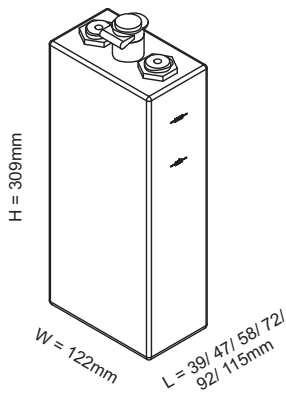
Three standard formats are available

2 = width 122 mm, height 309 mm

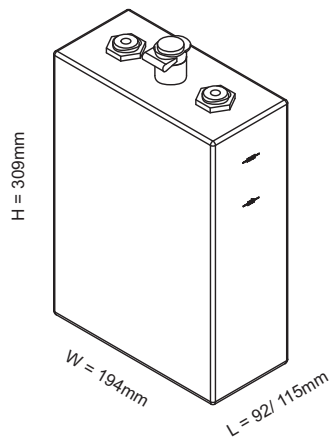
3 = width 194 mm, height 309 mm

4 = width 158 mm, height 405 mm

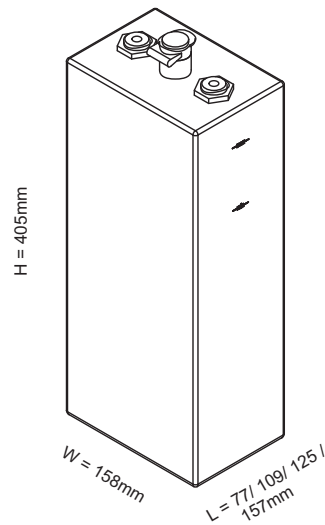
Format 2



Format 3



Format 4



All dimensions refer to our standard casing material PP.

Cells also available in flame retardant plastic (UL94-V0, NF F 16101/ -102 J3/F2).*

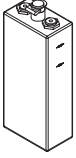
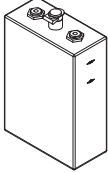
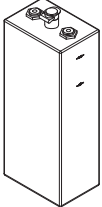
Other materials available upon request.

*Measurements and weights may deviate slightly from the standard PP.

Railway Cells

FNC® Series Overview

Performance L

	Type	Capacity (Ah)	Format	Dimension*/length (mm)	Weight* with electrolyte (kg)
 <p>Dimensions: Width 122 mm Height 309 mm Length see chart</p>	FNC® 40 LR 2	40	2	39	2.15
	FNC® 45 LR 2	45	2	39	2.15
	FNC® 60 LR 2	60	2	47	2.65
	FNC® 65 LR 2	65	2	47	2.65
	FNC® 80 LR 2	80	2	58	3.25
	FNC® 90 LR 2	90	2	58	3.25
	FNC® 100 LR 2	100	2	72	4.10
	FNC® 110 LR 2	110	2	72	4.10
	FNC® 120 LR 2	120	2	72	4.25
	FNC® 130 LR 2	130	2	72	4.25
	FNC® 140 LR 2	140	2	92	5.35
	FNC® 155 LR 2	155	2	92	5.40
	FNC® 160 LR 2	160	2	92	5.50
	FNC® 175 LR 2	175	2	92	5.55
	FNC® 180 LR 2	180	2	115	6.40
FNC® 200 LR 2	200	2	115	6.45	
FNC® 220 LR 2	220	2	115	6.80	
 <p>Dimensions: Width 194 mm Height 309 mm Length see table</p>	FNC® 200 LR 3	200	3	92	8.45
	FNC® 220 LR 3	220	3	92	8.50
	FNC® 235 LR 3	235	3	92	8.75
	FNC® 260 LR 3	260	3	92	8.80
	FNC® 265 LR 3	265	3	92	8.90
	FNC® 295 LR 3	295	3	92	8.95
	FNC® 300 LR 3	300	3	115	10.90
	FNC® 335 LR 3	335	3	115	11.00
	FNC® 370 LR 3	370	3	115	11.10
 <p>Dimensions: Width 158 mm Height 405 mm Length see table</p>	FNC® 150 LR 4	150	4	77	7.35
	FNC® 160 LR 4	160	4	77	7.40
	FNC® 185 LR 4	185	4	77	7.60
	FNC® 200 LR 4	200	4	77	7.65
	FNC® 225 LR 4	225	4	77	7.80
	FNC® 240 LR 4	240	4	109	10.35
	FNC® 265 LR 4	265	4	109	10.80
	FNC® 280 LR 4	280	4	109	10.90
	FNC® 300 LR 4	300	4	109	11.10

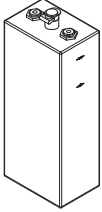
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* Dimensions and weight refer to our standard casing material PP

Railway Cells

FNC® Series Overview

Performance L

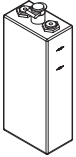
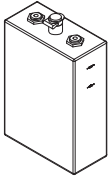
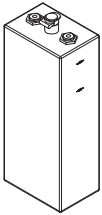
	Type	Capacity (Ah)	Format	Dimension* / length (mm)	Weight* with electrolyte (kg)
 <p>Dimensions: Width 158 mm Height 405 mm Length see table</p>	FNC® 320 LR 4	320	4	109	11.20
	FNC® 340 LR 4	340	4	109	11.40
	FNC® 360 LR 4	360	4	109	11.55
	FNC® 375 LR 4	375	4	125	12.55
	FNC® 400 LR 4	400	4	125	12.70
	FNC® 415 LR 4	415	4	125	12.90
	FNC® 440 LR 4	440	4	125	13.05
	FNC® 450 LR 4	450	4	157	15.90
	FNC® 480 LR 4	480	4	157	16.10
	FNC® 490 LR 4	490	4	157	16.30
	FNC® 520 LR 4	520	4	157	16.50
	FNC® 525 LR 4	525	4	157	16.70
	FNC® 560 LR 4	560	4	157	16.90

* Dimensions and weight refer to our standard casing material PP

Railway Cells

FNC® Series Overview

Performance M

	Type	Capacity (Ah)	Format	Dimension*/length (mm)	Weight* with electrolyte (kg)
 <p>Dimensions: Width 122 mm Height 309 mm Length see table</p>	FNC® 40 MR 2	40	2	39	2.20
	FNC® 45 MR 2	45	2	39	2.20
	FNC® 60 MR 2	60	2	47	2.80
	FNC® 65 MR 2	65	2	47	2.80
	FNC® 80 MR 2	80	2	58	3.35
	FNC® 90 MR 2	90	2	58	3.35
	FNC® 100 MR 2	100	2	72	4.15
	FNC® 110 MR 2	110	2	72	4.20
	FNC® 120 MR 2	120	2	92	5.35
	FNC® 130 MR 2	130	2	92	5.40
	FNC® 140 MR 2	140	2	92	5.60
	FNC® 155 MR 2	155	2	92	5.65
	FNC® 160 MR 2	160	2	115	6.65
	FNC® 175 MR 2	175	2	115	6.75
FNC® 180 MR 2	180	2	115	6.90	
FNC® 200 MR 2	200	2	115	7.00	
 <p>Dimensions: Width 194 mm Height 309 mm Length see table</p>	FNC® 200 MR 3	200	3	92	8.70
	FNC® 220 MR 3	220	3	92	8.85
	FNC® 235 MR 3	235	3	92	8.85
	FNC® 260 MR 3	260	3	92	9.00
	FNC® 265 MR 3	265	3	115	10.50
	FNC® 295 MR 3	295	3	115	10.70
	FNC® 300 MR 3	300	3	115	11.20
	FNC® 335 MR 3	335	3	115	11.45
 <p>Dimensions: Width 158 mm Height 405 mm Length see table</p>	FNC® 150 MR 4	150	4	77	7.70
	FNC® 160 MR 4	160	4	77	7.75
	FNC® 185 MR 4	185	4	77	7.80
	FNC® 200 MR 4	200	4	77	7.90
	FNC® 225 MR 4	225	4	109	10.35
	FNC® 240 MR 4	240	4	109	10.50
	FNC® 265 MR 4	265	4	109	10.90
	FNC® 280 MR 4	280	4	109	11.10
	FNC® 300 MR 4	300	4	109	11.65
	FNC® 320 MR 4	320	4	109	11.85
	FNC® 340 MR 4	340	4	125	13.10
	FNC® 360 MR 4	360	4	125	13.30

Continued

* Dimensions and weight refer to our standard casing material PP

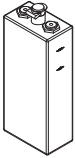
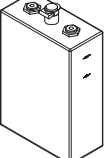
Railway Cells

FNC® Series Overview

Performance M

	Type	Capacity (Ah)	Format	Dimension* / length (mm)	Weight* with electrolyte (kg)
Dimensions: Width 158 mm Height 405 mm Length see table	FNC® 375 MR 4	375	4	125	13.55
	FNC® 400 MR 4	400	4	125	13.80
	FNC® 415 MR 4	415	4	157	16.05
	FNC® 440 MR 4	440	4	157	16.25
	FNC® 450 MR 4	450	4	157	16.55
	FNC® 480 MR 4	480	4	157	16.85
	FNC® 490 MR 4	490	4	157	17.10

Performance H

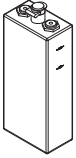
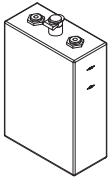
	Type	Capacity (Ah)	Format	Dimension* / length (mm)	Weight* with electrolyte (kg)
 Dimensions: Width 122 mm Height 309 mm Length see table	FNC® 35 HR 2	35	2	39	2.30
	FNC® 38 HR 2	38	2	39	2.30
	FNC® 45 HR 2	45	2	47	2.80
	FNC® 50 HR 2	50	2	47	2.80
	FNC® 58 HR 2	58	2	58	3.40
	FNC® 65 HR 2	65	2	58	3.40
	FNC® 70 HR 2	70	2	72	4.15
	FNC® 75 HR 2	75	2	72	4.15
	FNC® 80 HR 2	80	2	72	4.30
	FNC® 90 HR 2	90	2	72	4.30
	FNC® 95 HR 2	95	2	92	5.40
	FNC® 105 HR 2	105	2	92	5.40
	FNC® 115 HR 2	115	2	92	5.60
	FNC® 125 HR 2	125	2	115	6.65
	FNC® 140 HR 2	140	2	115	6.95
FNC® 150 HR 2	150	2	115	7.10	
 Dimensions: Width 194 mm Height 309 mm Length see table	FNC® 140 HR 3	140	3	92	8.45
	FNC® 155 HR 3	155	3	92	8.45
	FNC® 160 HR 3	160	3	92	8.75
	FNC® 175 HR 3	175	3	92	8.75
	FNC® 180 HR 3	180	3	92	9.00
	FNC® 195 HR 3	195	3	92	9.05
	FNC® 200 HR 3	200	3	115	10.85
	FNC® 220 HR 3	220	3	115	10.90
	FNC® 240 HR 3	240	3	115	11.15
	FNC® 265 HR 3	265	3	115	11.50

* Dimensions and weight refer to our standard casing material PP

Railway Cells

FNC® Series Overview

Performance X


	Type	Capacity (Ah)	Format	Dimension*/length (mm)	Weight* with electrolyte (kg)
 <p>Dimensions: Width 122 mm Height 309 mm Length see table</p>	FNC® 25 XR 2	25	2	39	2.40
	FNC® 40 XR 4	40	2	47	2.95
	FNC® 45 XR 2	45	2	58	3.60
	FNC® 65 XR 2	65	2	72	4.55
	FNC® 90 XR 2	90	2	92	6.00
	FNC® 115 XR 2	115	2	115	7.50
 <p>Dimensions: Width 194 mm Height 309 mm Length see table</p>	FNC® 130 XR 3	130	3	92	9.00
	FNC® 140 XR 3	140	3	92	9.30
	FNC® 155 XR 3	155	3	92	9.55
	FNC® 165 XR 3	165	3	115	11.20
	FNC® 175 XR 3	175	3	115	11.50
	FNC® 190 XR 3	190	3	115	11.75
	FNC® 200 XR 3	200	3	115	12.10

* Dimensions and weight refer to our standard casing material PP


Railway Cells

FNC® -A Series Overview

Performance H

	Type	Capacity (Ah)	Format	Dimension* / length (mm)	Weight* with electrolyte (kg)
 <p>Dimensions: Width 122 mm Height 309 mm Length see table</p>	FNC® -A 38 HR 2	38	2	39	2.60
	FNC® -A 50 HR 2	50	2	47	3.00
	FNC® -A 63 HR 2	63	2	47	3.30
	FNC® -A 75 HR 2	75	2	58	4.10
	FNC® -A 90 HR 2	90	2	72	4.70
	FNC® -A 100 HR 2	100	2	72	5.00
	FNC® -A 115 HR 2	115	2	92	5.80
	FNC® -A 125 HR 2	125	2	92	6.00
	FNC® -A 140 HR 2	140	2	92	6.20
	FNC® -A 150 HR 2	150	2	115	7.40
	FNC® -A 165 HR 2	165	2	115	7.60
	FNC® -A 175 HR 2	175	2	115	7.90
FNC® -A 190 HR 2	190	2	115	8.10	

Performance X

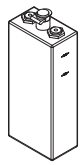
	Type	Capacity (Ah)	Format	Dimension* / length (mm)	Weight* with electrolyte (kg)
 <p>Dimensions: Width 122 mm Height 309 mm Length see table</p>	FNC® -A 32 XR 2	32	2	39	3.15
	FNC® -A 48 XR 2	48	2	47	3.50
	FNC® -A 65 XR 2	65	2	58	4.30
	FNC® -A 80 XR 2	80	2	72	5.25
	FNC® -A 95 XR 2	95	2	92	6.40
	FNC® -A 110 XR 2	110	2	92	6.75
	FNC® -A 125 XR 2	125	2	92	7.10
	FNC® -A 140 XR 2	140	2	115	8.40
	FNC® -A 150 XR 2	150	2	115	8.55
	FNC® -A 160 XR 2	160	2	115	8.70
	FNC® -A 170 XR 2	170	2	115	8.90

* Dimensions and weight refer to our standard casing material PP

Railway Cells

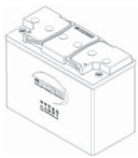
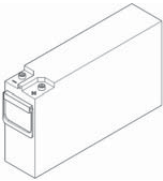
FNC® -C Series Overview

Performance M

	Type	Capacity (Ah)	Format	Dimension*/length (mm)	Weight* with electrolyte (kg)
 <p>Dimensions: Width 122 mm Height 309 mm Length see table</p>	FNC® -C 80 MR 2	80	2	47	3.40
	FNC® -C 105 MR 2	105	2	58	4.30
	FNC® -C 125 MR 2	125	2	72	5.10
	FNC® -C 175 MR 2	175	2	92	6.60
	FNC® -C 220 MR 2	220	2	115	8.20

* Dimensions and weight refer to our standard casing material PP

rail.power Series Overview

	Type	Capacity (Ah)	Dimensions			Weight* with electrolyte (kg)
			Length (mm)	Width (mm)	Height (mm)	
	rail.power 12V 58 Ah	58	267	177	190	23.00
	rail.power 12V 78 Ah	78	342	177	190	28.00
	rail.power 12V 115 Ah	115	344	170	275	46.00
	rail.power 12V 100 Ah	100	541	125	217	41.00
	rail.power 12V 130 Ah	130	541	125	302	58.50
	rail.power 12V 150 Ah	150	541	125	302	58.50
	rail.power 6V 170 Ah	170	242	170	275	32.00
	rail.power 6V 220 Ah	220	308	170	275	41.00



Motive Power Systems



Reserve Power Systems



Special Power Systems



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