Reliable Lithium-MnO_2 batteries for ATEX applications

The first ATEX certified
high power primary lithium cells in the world market

developed by FRIEMANN & WOLF

ATEX / IECEx Certified Cells
M20 EX SV / M52 EX SV

saft

Lithium-MnO_2 batteries

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ATEX / IECEx certified cells manufactured by FRIEMANN & WOLF, a company of the Saft Group

For ***more than 25 years***, FRIEMANN & WOLF has been one of the ***world-leading manufacturers of spiral design Li-MnO_2 cells and batteries***, which were formerly marketed under the FRIWO brand name and brought into the core brand of Saft as "M range" cells and batteries in November 2014.

Based on our long experience with the Li-MnO_2 technology, the product range has been extended to ***include C- and D-size cells certified for use in potentially explosive atmospheres*** since 2012.

The cells have a spiral electrode design and are currently ***the world´s only high power lithium cells to be rated T4 according to IEC 60079-0 at ambient temperatures of up to +72 °C***. This makes them ideally suited for applications requiring safe, reliable high-power performance in potentially explosive atmospheres such as

- Smart gas meters (also with built-in GPRS communications)
- Gas or oil tank level monitoring
- Tracking systems for dangerous goods
- Leak detection
- Portable gas detectors
- Pipeline inspection
- Applications in the chemical industry (data loggers, wireless automation etc.)

The cells have been ***certified according to ATEX / IECEx*** by a notified body, which guarantees their ***full and continued compliance*** with the ***IEC/EN 60079-0*** (Explosive atmospheres – Part 0: General requirements) and ***60079-11*** (Explosive atmospheres – Part 11: Equipment protection by intrinsic safety „i") standards.

This is assured by regular audits of our production facility and quality assurance system based on ***IEC/EN 80079-34***.

Why bother qualifying and repeatedly testing cells for your ATEX / IECEx device at your own responsibility and expense if FRIEMANN & WOLF has already done this work for you?

Technical Data

Cell type	**M20 EX SV**			**M52 EX SV**		
Size	D			C		
Nominal voltage	3.0 V			3.0 V		
Rated capacity	12.4 Ah (at 150 mA)			5.6 Ah (at 60 mA)		
Max. recommended continuous discharge current	3.5 A [1]			2.0 A [1]		
Max. recommended pulse current	8.0 A [1]			4.0 A [1]		
Weight	115 g			58 g		
Operating temperature	-40 °C to +72 °C [2]			-40 °C to +72 °C [2]		
Storage temperature	-55 °C to +90 °C [3]			-55 °C to +90 °C [3]		
Approved according to	IEC 60079-0, IEC 60079-11 UL 1642, File MH 12609 VG 96915 Part 2 and Part 154			IEC 60079-0, IEC 60079-11 UL 1642, File MH 12609		
Transport according to	UN 3090 and 3091			UN 3090 and 3091		
ATEX/IECEx-relevant properties						
Cell-Marking	Ex II 2G			Ex II 2G		
EC-Type Examination Certificate-No.	BVS 12 ATEX E 026 U			BVS 13 ATEX E 035 U		
IECEx Certificate No.	*(expected in June 2015)*			IECEx BVS 13.0053 U		
Typical behavior during short circuit at 3 mΩ and an ambient temp. of	20 °C	40 °C	70 °C	20 °C	40 °C	70 °C
Max. short-circuit current	57 A	64 A	85 A	54 A	57 A	70 A
Min. inner cell resistance	45 mΩ	41 mΩ	35 mΩ	54 mΩ	49 mΩ	42 mΩ
Max. cell temperature	107 °C	112 °C	118 °C	104 °C	109 °C	113 °C
Temperature class	T4			T4		

Certified tab configurations:

- Plus-tab and minus-tab in C- or Z-configuration, with or without minus-endcap
- Only plus-tab with minus-endcap
- Endcaps on both sides

Safety First !

Throughout the long history of the company, ***the safety of its products has always been first priority*** at FRIEMANN & WOLF, having started as a manufacturer of safety lamps for mining in 1884. Also regarding the design of our Li-MnO_2 cells, no compromise has been made regarding their safety, leading to a cell design that is absolutely safe even under the most adverse conditions such as forced discharge and cell reversal.

Also in other respects, ***Li-MnO_2 cells manufactured by FRIEMANN & WOLF fully comply with and even exceed the safety standards defined in IEC 60086-4.*** This includes their ability to withstand high or low pressure, extreme temperature cycling, shock, impact, free fall, vibration, external short circuit, abnormal charging, and thermal abuse. In addition, our cells and batteries meet the safety requirements of military standards and even the strictest reliability and safety requirements of the space agencies.

[1] Limitation of the max. current to a lower level, e.g. by a series resistor, may be necessary depending on the electrical properties of the device and the desired level of protection (ia,ib,ic) and explosion group (IIA,IIB,IIC).
[2] To maintain cell heating to safe limits. Battery packs may imply lower level of max. current and may request specific thermal protection.
[3] Long time storage at high temperatures may affect the performance.

Lithium-MnO_2 batteries

General Features of „M range“ Li-MnO_2 Cells and Batteries

The constantly growing market for remotely controlled devices such as smart meters as well as safety devices such as emergency beacons leads to an increasing demand for small, lightweight and high-performance batteries with a long lifetime. These requirements can only be met with primary lithium cells and batteries, which provide a higher energy density compared to conventional technologies such as alkaline batteries. Among the different primary lithium technologies, the lithium-manganese dioxide (Li-MnO_2) system with a spiral electrode design combines the advantages of low self-discharge and capability for high current and power in a single cell. This makes spiral-design Li-MnO_2 cells the system of choice for applications with a low average consumption, but temporary demands for high current pulses even after long stand-by periods.

[4] At room temperature.

The most important features of Saft´s “M range” Li-MnO_2 cells, which are manufactured by FRIEMANN & WOLF, include:

- Spiral design for high current and power capability
- High energy density (320 Wh/kg [4])
- Low self-discharge (< 1.5 % in the first year, ca. 0.5 % / year from the second year [4])
- Superior resistance to corrosion due to stainless steel can and end caps
- Very low magnetic signature
- Hermetically sealed with glass-to-metal seal and laser welding
- No „voltage delay“ even at high currents due to low passivation [4]
- No influence of orientation on capacity and performance
- No internal cell pressure [4]
- Safety vent at cell bottom
- Safety “shut-down” separator
- Manufactured in Germany

About FRIEMANN & WOLF

FRIEMANN & WOLF Batterietechnik GmbH is a company of Saft Groupe S.A. (Euronext: SAFT) since 2003 and combines the flexibility and dedication of a medium-sized company with the network and resources of a globally active corporate group. As a manufacturer of innovative Li-MnO_2 cells and custom-made batteries, FRIEMANN & WOLF has set high standards regarding quality, optimum reliability and perfect safety being the main criteria, as well as its exemplary customer service, which goes well beyond usual standards. All Li-MnO_2 cells of Saft´s “M range” are manufactured in FRIEMANN & WOLF´s production facility located in Büdingen (Germany) on state-of-the-art fully automatic production lines. FRIEMANN & WOLF is committed to the world class philosophy. The management system is certified according to DIN EN ISO 9001 and DIN EN ISO 14001.

For more information about our cells and batteries for use in potentially explosive atmospheres, as well as information about standard cells and batteries of the “M range”, please do not hesitate to contact us by phone or e-mail, or visit our website.

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How to find us
FRIWO is located in Büdingen; approximately 35 km northeast of Frankfurt/Main.