



EXPAND YOUR BATTERIES LIFETIME!



EXPANDERS



# EXPANDER MIXES FOR AUTOMOTIVE AND INDUSTRIAL BATTERIES

With modern battery design it is not enough to improve the positive active material performance only, it is quite clear that the negative active material also has to meet new requirements.

Since mid 2011 PENOX GmbH has been developing new types of Expander mix offering advantages in terms of current availability under different states of discharge and reducing the softening of negative active material (NAM) during use.

In combination with TBLs+® our Expander mixes can improve the lifetime performance of negative plates without any loss of cold cranking performance.

## WHY USE PENOX EXPANDERS?

### Reduced Expander quantity in the recipe:

- › our selection of raw materials
- › higher degree of homogeneity than standard "batch mixes"

### Technical Performance:

- › cold cranking and charge acceptance improvements, increased lifetime performance.

### Service:


- › addition of fibres to the Expander mix
- › smaller trial batch sizes possible
- › tailor-made Expander mixes
- › local European production site (short delivery times, increased delivery reliability/security)

## ADVANTAGES

- › Formation of a porous (sponge-like) structure of the NAM during charging operations
- › Adjustment of pore sizes to support acid exchange during high current charge situations
- › Increase of service life due to stable crystalline/sponge structures during discharge/charge operations
- › Low water consumption given by the use of pure materials

## WHICH PENOX EXPANDER TYPE?

### PENOX GmbH offers 6 standard types of Expander Mix

<b>PE110</b>	developed for Automotive standard SLI
<b>PE110 HCA</b>	premium Expander for High Charge Acceptance 
<b>PE210</b>	developed for Automotive EFB, AGM and Gel
<b>PE300 &amp; PE310</b>	developed for Stationary Flooded and Gel
<b>PE410</b>	developed for Traction Flooded and Gel

Beside these standard types PENOX GmbH can produce tailor-made Expander Mixes that meet 100% of the customer requirements.

One bag for one paste batch for easy handling at the customer site.

# DECREASE YOUR COST INCREASE YOUR PERFORMANCE

## SAVINGS WITH PENOX EXPANDERS

- › **Reduced quantity of Expander per paste batch (only 1%)**
- › More constant battery quality
- › Reduction of labour/administrative costs
- › Clean working environment or area
- › Savings of time and transport cost
- › Optimized homogeneity of the paste (no deviation coming from manual addition of single compounds)
- › Technical support can be offered

## INNOVATIONS

### NEW PRODUCT DEVELOPMENT CENTRE

- › Based in Germany
- › State -of-the-art equipment
- › Operational since mid 2017
- › Development of functional additives for batteries
- › Enhanced material testing

### NEW PACKAGING SOLUTION

- › Dust-free handling
- › Bag completely dissolved in the paste mix
- › Bags are water-soluble
- › Battery performance is not affected by the bag material
- › No more waste of bags
- › All expander components are incorporated to the paste mix to 100%

## DESCRIPTION

PENOX produces all Expander mixes using high performance raw materials only.

PENOX Expanders are homogenous mixes of powder materials which are used by battery producers to improve the performance of their negative active material. They are easily added to the paste mix, particularly when using our water-soluble bags.

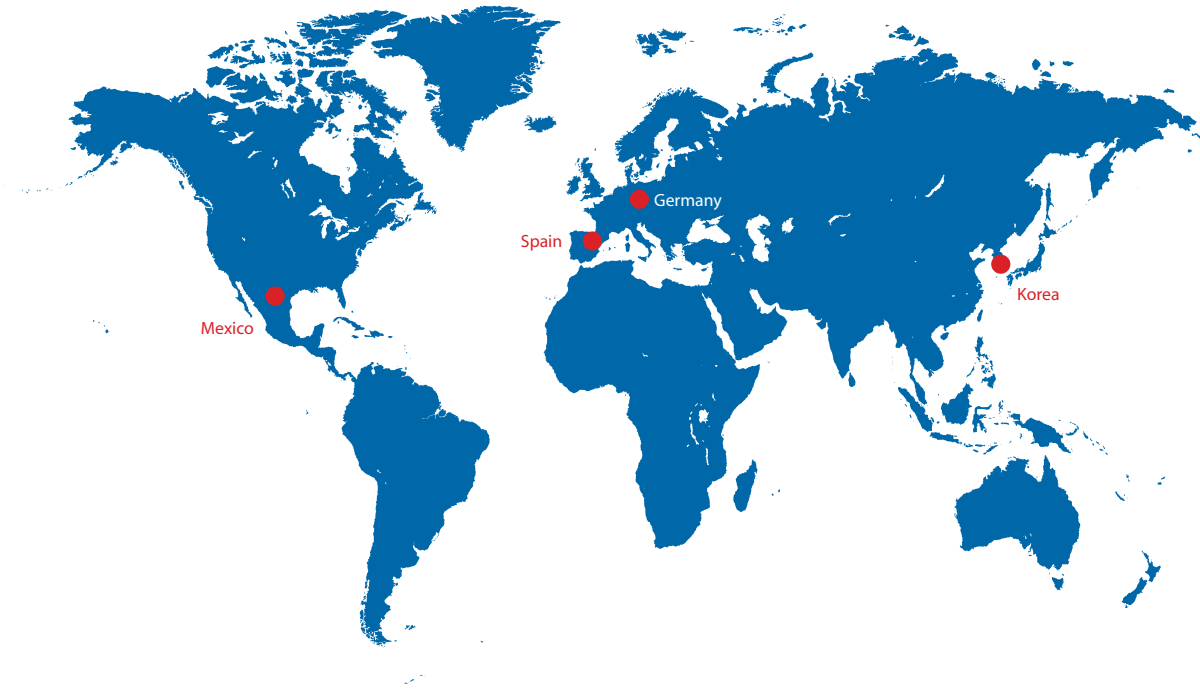
Each single component of a PENOX Expander mix is of high purity to minimise water losses and to avoid any negative effects on the lifetime performance of the batteries.

## TECHNICAL DATA

Type	Application	Ash Content %	Iron Content %
PE110 Automotive	SLI	45 - 50	< 0.05
PE110HCA Automotive		51 - 55	< 0.05
PE210 Automotive	AGM, EFB, Gel	65 - 70	< 0.05
PE300 Stationary	Flooded and Gel	83 - 85	< 0.05
PE310 Stationary		78 - 80	< 0.05
PE410 Traction		71 - 73	< 0.05

All tests are carried out using DIN ISO methods.

# PENOX EXPERTISE ALL AROUND THE WORLD



For more information on our products and services for the battery producer, please visit our updated website:

[www.penoxgroup.com](http://www.penoxgroup.com)

## **PENOX GROUP GMBH**

Headquarters & Sales  
Frankfurter Strasse 20  
D-65760 Eschborn  
Germany

Phone: +49 61 96 969 39 90

E-Mail: [sales@penoxgroup.com](mailto:sales@penoxgroup.com)

## **PENOX GMBH**

Factory  
Gothaer Strasse 39  
D-99885 Ohrdruf  
Germany

## **PENOX Korea**

37F, ASEM Tower, 517,  
Yeongdong-daero,  
Gangnam-gu, Seoul  
Korea

Phone: +82-2-6001-3871

E-Mail: [syha@penoxgroup.com](mailto:syha@penoxgroup.com)

## **PENOX Mexico SA de CV**

Avenida Parque Industrial  
M-66750 Dr Gonzalez  
Mexico

Phone: +52 81 8394 0696

E-Mail: [fgarza@penoxmexico.com](mailto:fgarza@penoxmexico.com)