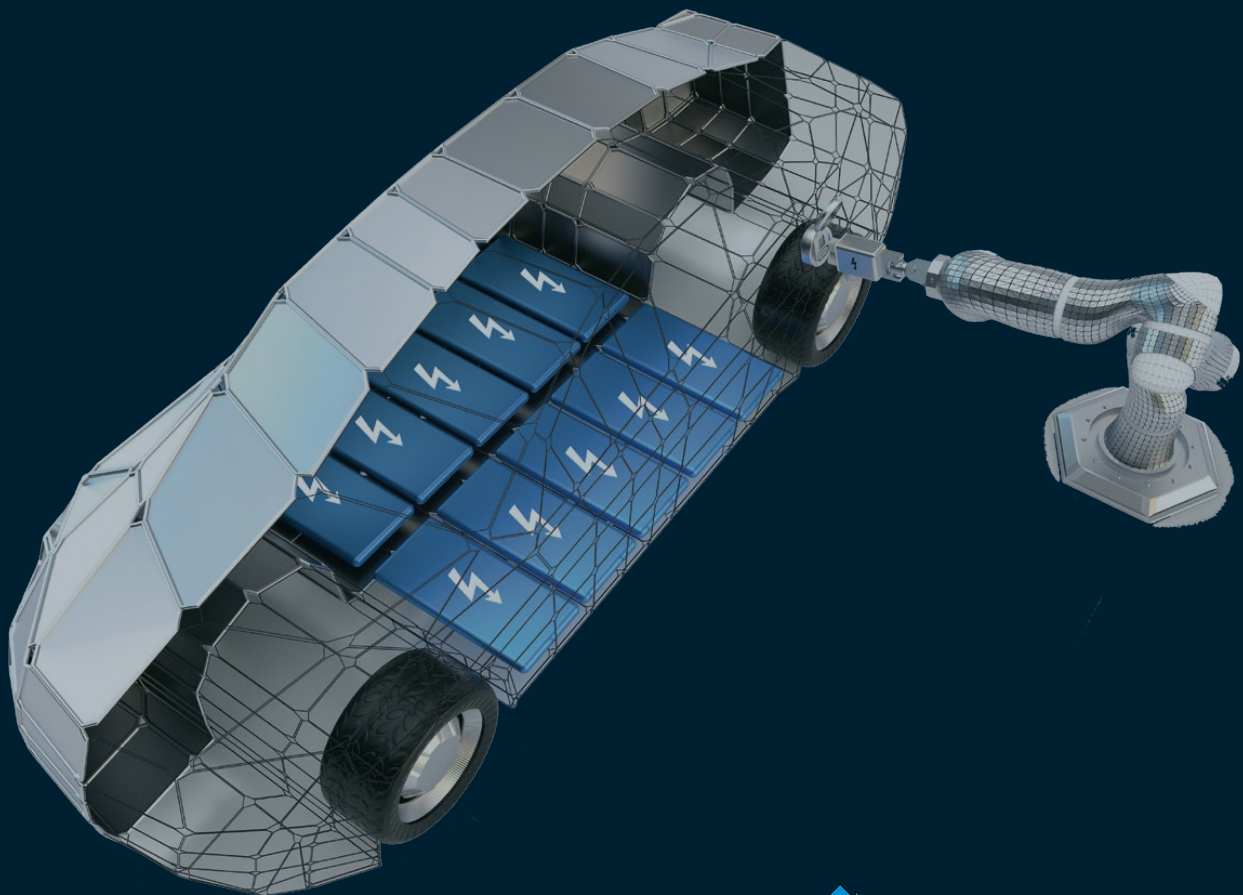


# Our solutions for the EV market





**STOKSORB**

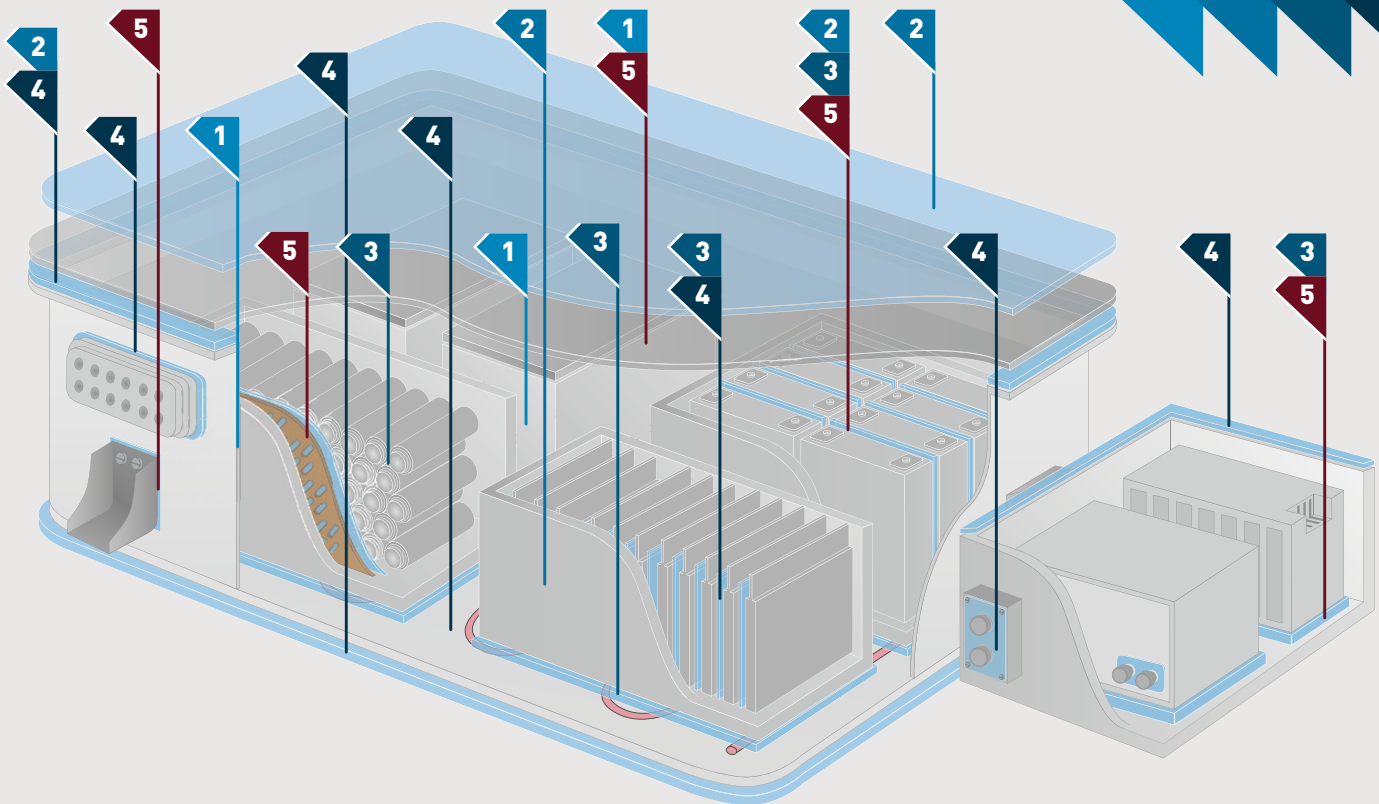
**STOKHEAT**

**STOKTHERM**

**STOKSEAL**

**ITWFORMEX**

# Product Overview



#### **STOKSORB | STOKSORB**

Anti-condensation of water

#### **STOKSORB | STOKSORB BA**

Anti-condensation of water

#### **STOKHEAT | STOKMEL**

Thermal insulation & noise absorption  
at high temperature, fire barrier

#### **STOKHEAT | STOKPAD DFX**

Thermal insulation & noise absorption

#### **STOKHEAT | STOKFBF**

Fire barrier

#### **STOKHEAT | STOKPET FOAM**

Thermal insulation

#### **STOKTHERM | TC-15**

Bonding & Thermal Management

#### **STOKTHERM | TCS 02010**

Electrical insulation & Thermal Management

#### **STOKTHERM | TPS-20**

Thermal Management of battery module  
& on-board charger

#### **STOKTHERM | TPS-30**

Thermal Management of battery module  
& on-board charger

#### **STOKSEAL | PU X SOFT**

Cushioning & vibration control

#### **STOKSEAL | PU SOFT**

Cell expansion

#### **STOKSEAL | PU MED**

Sealing & cushioning

#### **STOKSEAL | SIL SOFT & MED**

Sealing connectors & covers

#### **ITWFORMEX | SG**

Cell separator & insulation

#### **ITWFORMEX | SL**

Busbar & general insulation

#### **ITWFORMEX | CPL**

General insulation when halogen  
free is needed

#### **ITWFORMEX | SN**

General insulation when halogen free  
& higher temperature is needed

# STOKSORB

Since the battery packs of EVs are not hermetically sealed, there is a risk of water condensation in cold spots, especially for highly efficient battery cells, during fast charging and dynamic driving or in humid and hot climates. To prevent the condensation of water vapor at cold spots inside a battery pack and to reduce the risk of corrosion or even electrical short circuits caused by water drops, humidity must be absorbed. Our flame retardant **StokSorb** products are fiber based and prevent the condensation process.

Materials inside

**STOKSORB | STOKSORB BA**



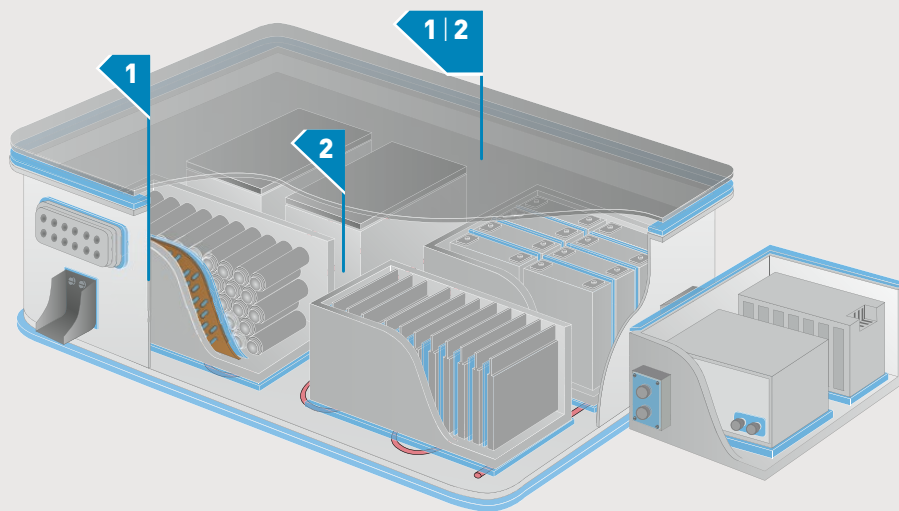
Anti-condensation



Self-adhesive  
versions



Flame  
retardant



## STOKSORB

1

Main Application	Anti-condensation of water
Material	Self-adhesive membrane, PET fibers
Thickness in mm	< 1
Weight in g/m <sup>2</sup>	110
Temperature resistance in °C	-40 to 80
Thermal conductivity in W/mK	0,038
Flammability	EN13501, A2-s1, d0
Specific features	Water absorption: 1. DIN 53923 (0° – 11g/100cm <sup>2</sup> ; 45° – 10g/100cm <sup>2</sup> ; 90° – 9g/100cm <sup>2</sup> ) 2. NF P 15-203-1 (750g/m <sup>2</sup> /min); bacteria resistance DIN EN 14119 (Index 0)
Colour	White-black melange

1

## STOKSORB BA

2

Main Application	Anti-condensation of water
Material	Viscose fibers
Thickness in mm	0,9
Weight in g/m <sup>2</sup>	140
Temperature resistance in °C	-40 to 80
Thermal conductivity in W/mK	–
Flammability	FMVSS302 – SE
Specific features	High moisture absorption, biodegradable
Colour	Black

2

# STOKHEAT

Stable temperature inside a battery pack of EVs is very important from an efficiency point of view. The StokHeat presents a couple of products which improve thermal insulation of the whole battery pack. All products have not only common features like low thermal conductivity or high flame resistance but also some specific properties. **StokMel** is a fleece product made of melamine meltblown fibers which assures high temperature resistance and low emission. **StokPad DFX** is made of PET fibers and offers good broad band noise reduction. **StokFBF** is a needle punched flexible felt with excellent fire resistance which makes it a perfect fire barrier. **StokPET Foam** is a thermoforming PET closed-cell foam useful in that areas where it's crucial to combine good thermal insulation properties and 3D shape.

Materials inside

**STOKMEL | STOKPAD DFX | STOKFBF | STOKPET FOAM**



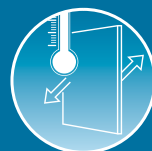
Temperature  
resistance



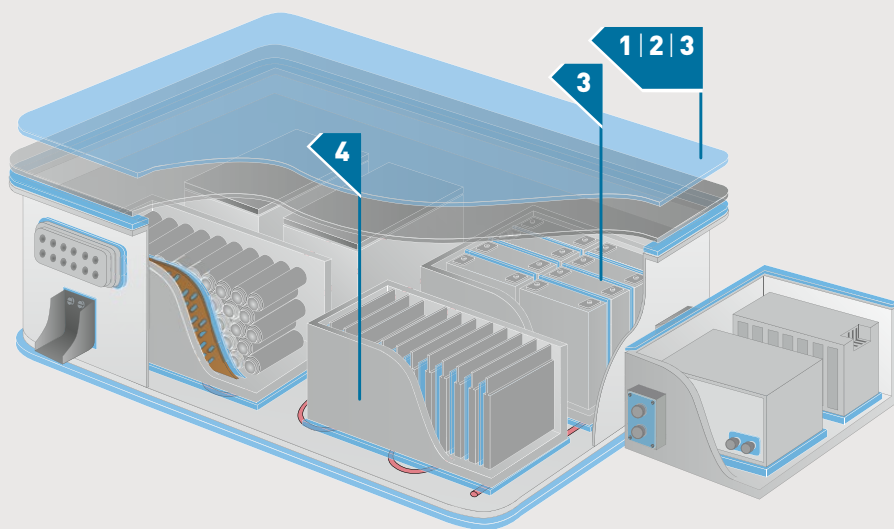
Noise  
absorption



Fire  
barrier



Thermal  
insulation



## STOKMEL

1

Main application Thermal insulation & noise absorption at high temperature, fire barrier

Material	Melamine fibers
Thickness in mm	3 to 30
Weight in g/m <sup>2</sup>	15 to 600
Temperature resistance in °C	-40 to 240 (350 st*)
Thermal conductivity in W/mK	0,024
Flammability	FMVSS302 – SE
Specific features	Low emission, good chemical resistance, LOI 32%, acoustic absorption
Colour	White

3

## STOKPAD DFX

2

Main application Thermal insulation & noise absorption

Material	PET/PP fibers, 2 layers
Thickness in mm	10 to 20
Weight in g/m <sup>2</sup>	240 to 500
Temperature resistance in °C	-40 to 140
Thermal conductivity in W/mK	0,032
Flammability	FMVSS302 – SE
Specific features	Hydrophobic, very light composition
Colour	White, black, white-black melange

4

StokPad DFX 0

## STOKFBF

3

Main Application Fire barrier

Material	Carbon fibers
Thickness in mm	2.5 to 3.8
Weight in g/m <sup>2</sup>	130 to 250
Temperature resistance in °C	-40 to 250 (350 st*)
Thermal conductivity in W/mK	0,029
Flammability	NFP92503 – M1
Specific features	LOI 55%
Colour	Black

5

## STOKPET FOAM

4

Main Application Thermal insulation

Material	PET foam
Thickness in mm	1 to 5
Density in kg/m <sup>3</sup>	70 to 300
Temperature resistance in °C	-40 to 150 (180 st*)
Thermal conductivity in W/mK	0,029
Flammability	FMVSS302 – <100mm/min
Specific features	Closed cell, oil, water and chemicals resistant, thermoformable
Colour	Green, blue, black

6

\* short term

# STOKTHERM

**StokTherm** is based on thermal conductive acrylic polymers and offers excellent electric insulation properties. All materials are silicone-free and comply with the flammability classification UL 94 V-0/VTM-0. Due to a wide range of hardness from hard to very soft, the material group can be used for special gap filling and bonding requirements. **StokTherm** can be fabricated in customized shapes in sheets or on rolls. In addition to our standard product line we can optimize thickness and thermal conductivity to adjust customers needs.

Materials inside

**TC 06015 | TCS 02010 | TPS 10020 | TPS 20030**



Tailored  
thermal  
conductivity



Tailored  
thickness  
and softness

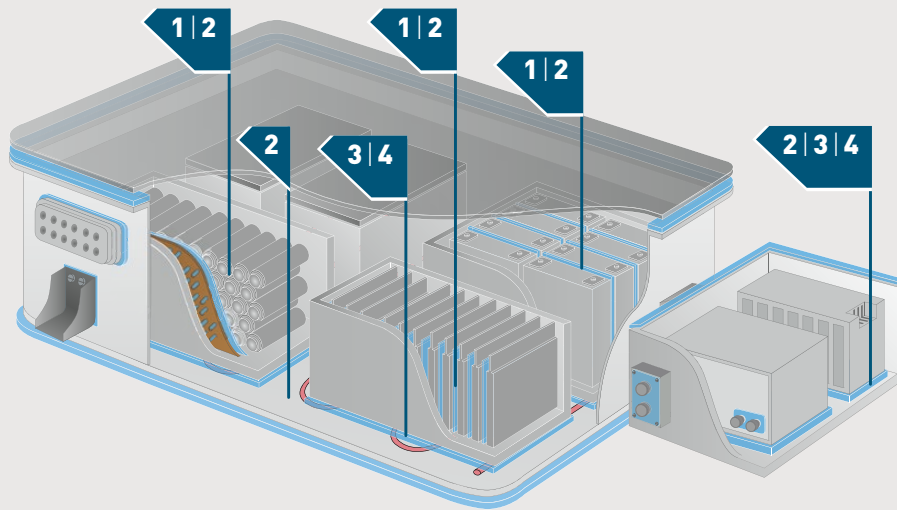


Best in  
class electrical  
properties



Flame  
retardant





## TC -15

TC 02015 | 02515 | **06015** | 10015 | 15015

1

Main application Bonding & Thermal Management

Material	Thermal conductive acrylic adhesive
Thickness in mm	0.2 to 1.5
Thermal conductivity in W/mK	1,5
Hardness Shore A	NA
Temperature range in °C	-40 to 120
Breakdown voltage kV/mm	10
Flame rating UL 94	V-0/VTM-0

7

## TCS 02010

2

Main application Electrical insulation & Thermal Management

Material	Thermal conductive acrylic adhesive with PET film
Thickness in mm	0.2
Thermal conductivity in W/mK	1
Hardness Shore A	NA
Temperature range in °C	-40 to 120
Breakdown voltage kV/mm	12
Flame rating UL 94	VTM-0

8

## TPS -20

TPS 05020 | **10020** | 15020 | 30020

3

Main Application Thermal Management of battery module & on-board charger

Material	Thermal conductive acrylic
Thickness in mm	0.5 to 3
Thermal conductivity in W/mK	2
Hardness Shore A	20
Temperature range in °C	-40 to 120
Breakdown voltage kV/mm	10
Flame rating UL 94	V-0

9

## TPS -30

TPS 05030 | 10030 | **20030** | 30030

4

Main Application Thermal Management of battery module & on-board charger

Material	Thermal conductive acrylic
Thickness in mm	0.5 to 3
Thermal conductivity in W/mK	3
Hardness Shore A	20
Temperature range in °C	-40 to 120
Breakdown voltage kV/mm	10
Flame rating UL 94	V-0

10

# STOKSEAL

**StokSeal** is based on elastomeric polyurethane and silicone foam which is highly compressible. It seals against water, moisture, dust and air. The material group includes a wide range of density and softness. Due to its excellent mechanical resistance, it is the best choice for high-end sealing, cushioning and shock absorption applications.

Materials inside

**PU X SOFT | PU SOFT | PU MED | SIL SOFT & MED**



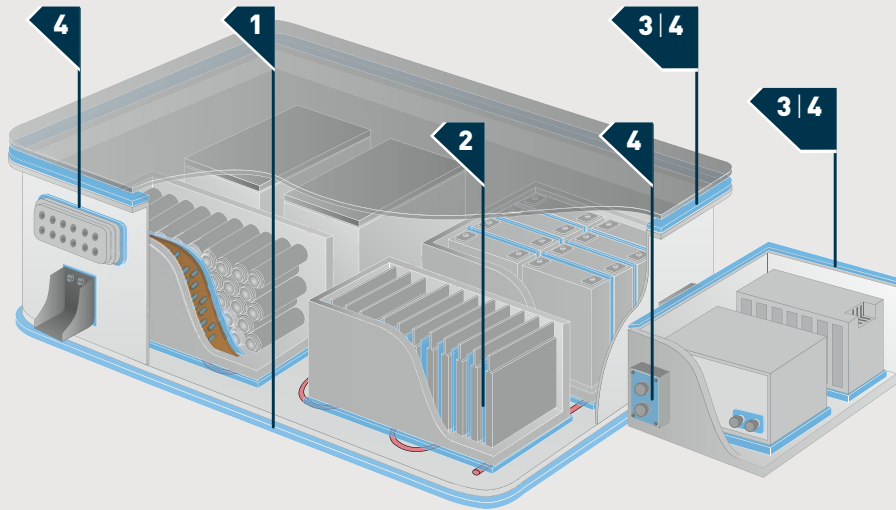
Sealing against  
water, dust  
and air



Cushioning &  
vibration  
control



Flame  
retardant



## PU X SOFT

PU X SOFT 190 | PU X SOFT 240

1

Main application	Cushioning & vibration control
Material	Semi closed PU foam
Thickness in mm	1 to 9.5   1 to 12.5
Density in kg/m <sup>3</sup>	190   240
Compression set % @ 70 °C	1
Temperature range in °C	-40 to 90
CFD @ 25%/70°C in N/mm <sup>2</sup>	0,012   0,015
Flame rating UL 94	HBF

11

12

## PU SOFT

PU SOFT 190 | PU SOFT 320

2

Main application	Cell expansion
Material	Semi closed PU foam
Thickness in mm	1 to 3   1.6 to 3.2
Density in kg/m <sup>3</sup>	190   320
Compression set % @ 70 °C	5   2
Temperature range in °C	-40 to 90
CFD @ 25%/70°C in N/mm <sup>2</sup>	0,06   0,02
Flame rating UL 94	HBF

13

14

## PU MED

PU MED 240 | PE MED 320

3

Main application	Sealing & cushioning
Material	Semi closed PU foam
Thickness in mm	3.2 to 12.5   1.6 to 3.2
Density in kg/m <sup>3</sup>	240   320
Compression set % @ 70 °C	1   2
Temperature range in °C	-40 to 90
CFD @ 25%/70°C in N/mm <sup>2</sup>	0,04   0,09
Flame rating UL 94	HBF

15

16

## SIL SOFT & MED

SIL SOFT | SIL MED

4

Main application	Sealing connectors & covers
Material	Silicon foam
Thickness in mm	1.6 to 12.7   0.8 to 12.7
Density in kg/m <sup>3</sup>	240   350
Compression set % @ 70 °C	1
Temperature range in °C	-40 to 180
CFD @ 25%/70°C in N/mm <sup>2</sup>	0,03   0,07
Flame rating UL 94	V-0

17

18

# ITWFORMEX

**ITW Formex** flame retardant insulation films are seeing wide adoption in Electric Vehicle (EV) power system applications around the world. Formex understands EV power insulation safety needs and requirements as well as EV power engineering design considerations. Superior performance specifications make Formex the ideal insulation solution for EV power system components including EV Battery Pack, EV Onboard Charger, EV DC/DC Converter, EV Power Electronics Controller, EV DC Charging Station, EV Battery Management System.

Materials inside

**SG 5 | SL 17 | CPL 8 | SN 10**



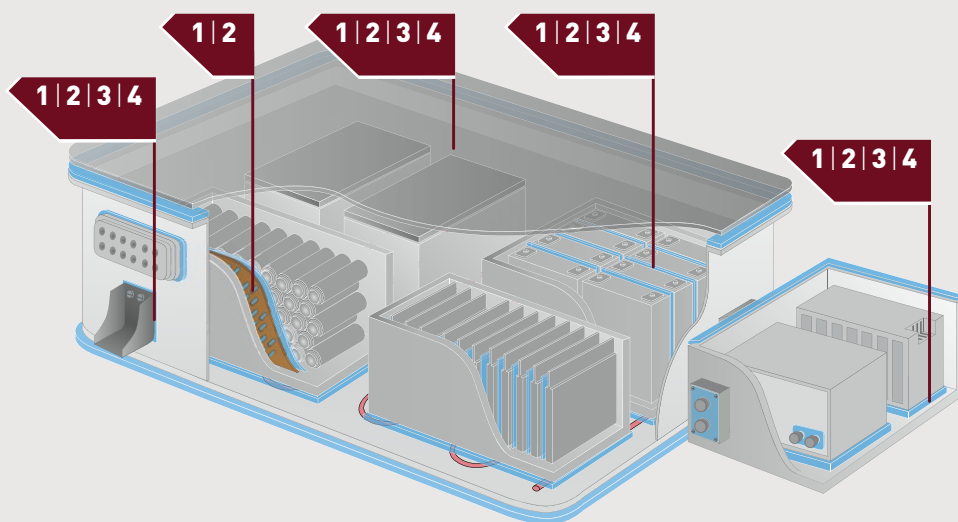
Score and fold  
from 2D to 3D  
design



Flame  
retardant



Best in  
class electrical  
properties



## SG

**SG 5 | SG 10 | SG 17 | SG 40 | SG 62**

1

Main application	Cell separator & insulation
Material	PP
Thickness in mm	0.127 to 1.57
Breakdown voltage in kV/mil	2.2 to 0.67
Volume resistivity in Ohm-cm	3.97 E+15
RTI (Relative Thermal Index) in °C	115
Flammability UL 94	V-0/VTM-0
Heat deflection temp. in °C	121
Water absorption in %	0,06

19

## SL

**SL 10 | SL 17**

2

Main application	Busbar & general insulation
Material	PP
Thickness in mm	0,25   0,43
Breakdown voltage in kV/mil	1,88   1,22
Volume resistivity in Ohm-cm	3 E+15
RTI (Relative Thermal Index) in °C	125
Flammability UL 94	VTM-0   V-0
Heat deflection temp. in °C	122
Water absorption in %	0,06

20

## CPL

**CPL 8 | CPL 10**

3

Main application	General insulation when halogen free is needed
Material	Multi layer PC halogen free
Thickness in mm	0,2   0,25
Breakdown voltage in kV/mil	2   1,7
Volume resistivity in Ohm-cm	1.2 E+16
RTI (Relative Thermal Index) in °C	80
Flammability UL 94	VTM-0
Heat deflection temp. in °C	140
Water absorption in %	0,2

21


## SN

**SN 8 | SN 10**

4

Main application	General insulation when halogen free & higher temperature is needed
Material	Multi layer PC halogen free
Thickness in mm	0,2   0,25
Breakdown voltage in kV/mil	2   1,75
Volume resistivity in Ohm-cm	1.2 E+16
RTI (Relative Thermal Index) in °C	130
Flammability UL 94	VTM-0
Heat deflection temp. in °C	140
Water absorption in %	0,2

22



**Sealing.  
Insulating.  
Conducting.  
Absorbing.  
Bonding.**

We develop, design, and create  
the best solution for you.