



COMPANY INTRODUCTION



July 11th, 2023



SCHERDEL GmbH
Marktredwitz, Bavaria
HEADQUARTER



GERMANY:

Berlin,
Chemnitz,
Coburg,
Erlangen,
Marienberg,
Marktredwitz,
Plauen,
Röslau,
Schmölln
Seifhennersdorf,
Treuen,
Waldershof,
Wiesau

EUROPE:

France: L'Arbresle, Beauvais
Portugal: S.J. da Madeira
Russia: Kaluga
Slovakia: Myjava
Czech Republic: Bor

AMERICAS:

Brazil: Sorocaba
Mexico: Silao
USA: Muskegon

ASIA:

China: Anqing, Huzhou
Japan: Nagoya
India: Jaipur

used in **80%** of all
passenger cars and utility
vehicles worldwide



approx. **90.000**
tonnes of steel processed per year



800 Mio. €
(consolidated)

approx. **4.500**
tonnes of plastic processed per year

more than **130** years
SCHERDEL history



approx. **6,5%** of sales
are invested



approx.
6 billion
springs and stampings per year

12
countries

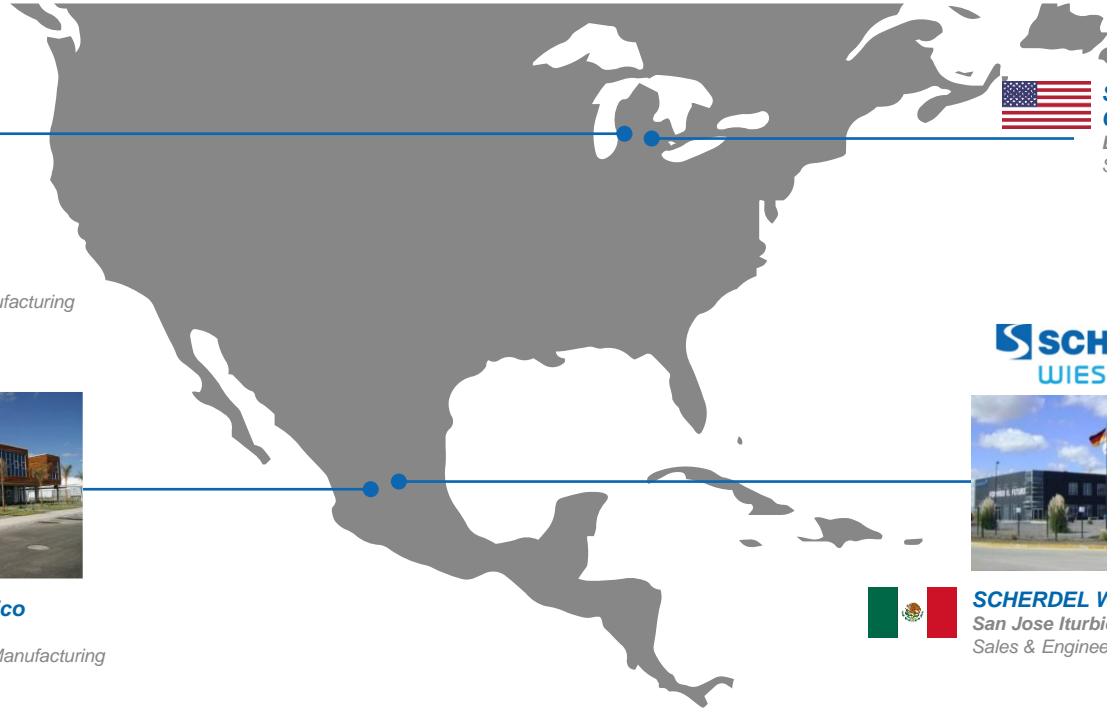
35
locations

46
production plants

6,500
employees worldwide

SCHERDEL – COMPANY INTRODUCTION

SCHERDEL NORTH AMERICA



SCHERDEL SALES & TECHNOLOGY, Inc.
Muskegon, Michigan
Sales & Engineering + Manufacturing



SCHERDEL Service Center Detroit
Brighton, Michigan
Sales & Engineering



SCHERDEL de Mexico
Silao, Guanajuato
Sales & Engineering + Manufacturing



SCHERDEL Wiesauplast de Mexico
San Jose Iturbide, Guanajuato
Sales & Engineering + Plastics Manufacturing

PISTON RING SPRINGS



VALVE SPRINGS



COMPRESSION, TENSION AND TORSION SPRINGS



BRAKE CLIPS



STAMPING AND BENDING PARTS



FINE BLANKING PARTS



WIRE AND TUBE BENDING PARTS



TORSION BARS



CONSTANT FORCE AND POWER SPRINGS



SPIRAL SPRINGS



WAVE SPRINGS



DISK SPRINGS



SCHERDEL
WIESAUPLAST

**Brake Fluid
Reservoirs**



Filler Caps



Control Housings



Floats



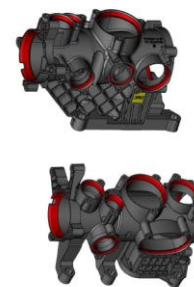
New Applications



Electrical Housings & Covers



TMM Housings



Pedals & Others



SCHERDEL

+

SCHERDEL
WIESAUPLAST



USA – Muskegon, Michigan



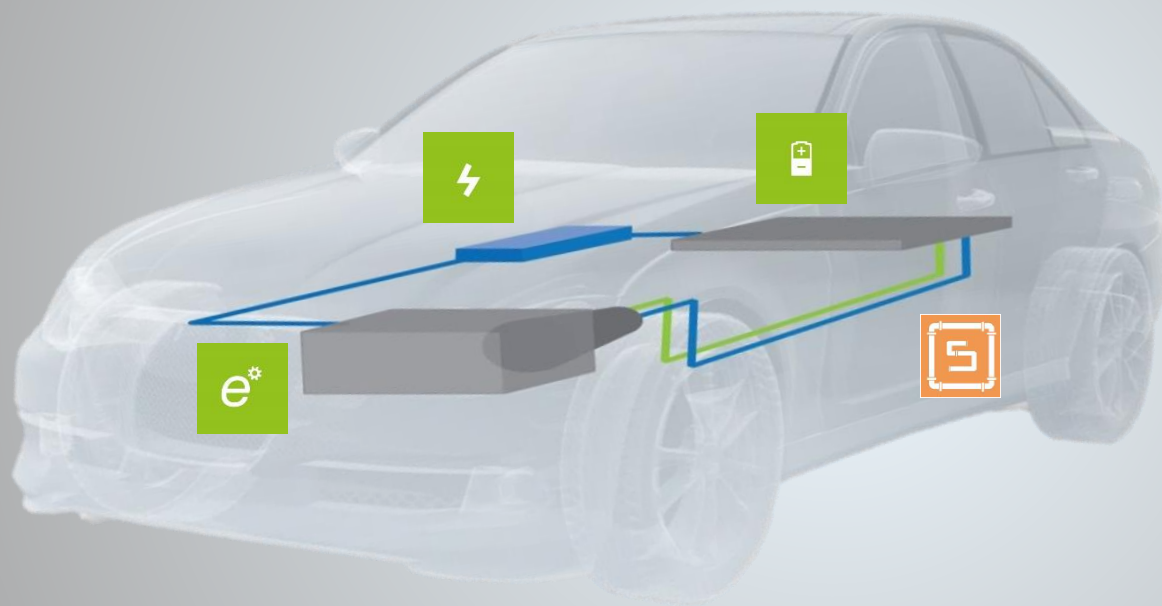
MEX – San Jose Iturbide, Guanajuato



MEX – Silao, Guanajuato



SCHERDEL
THERMOMANAGEMENT



POWER
ELECTRONICS



ELECTRIC
DRIVES



BATTERY
SYSTEMS



THERMAL
MANAGEMENT

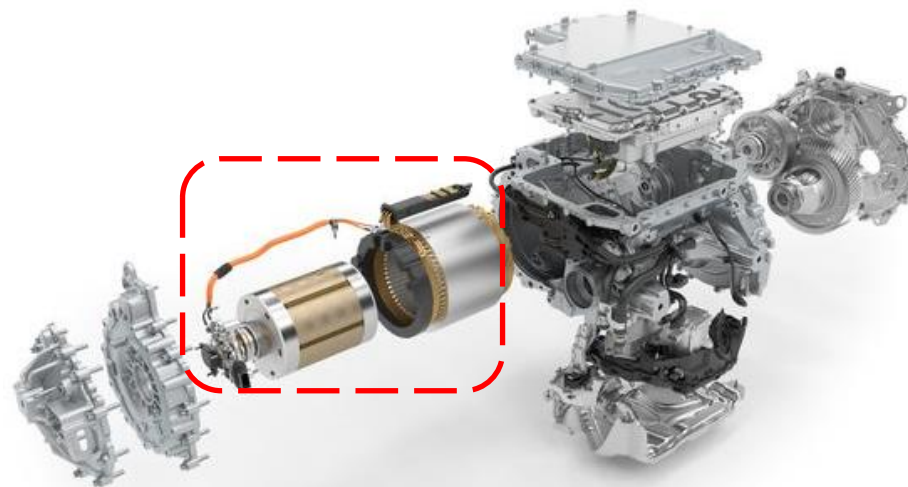
e* ELECTRIC DRIVES

Materials:

Copper, Plastic

Applications:

- Busbar assemblies
- Connection rings for E-Motors
- Power Connectors / Overmolded Busbars
- Copper Wire Forms for E-Motors
- Media-tight Stator Connectors





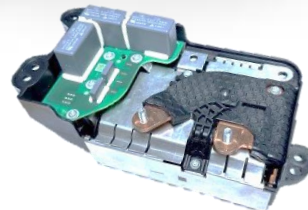
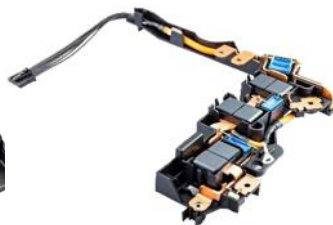
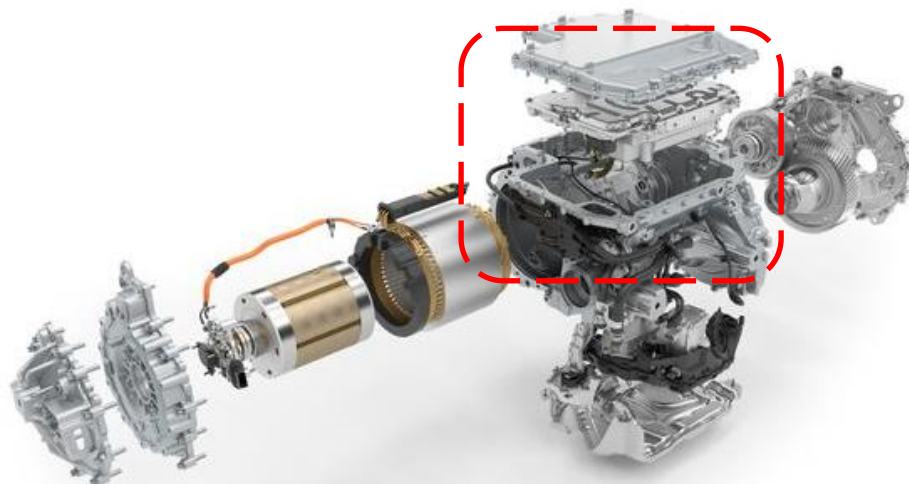
POWER ELECTRONICS

Materials:

Copper, Plastic

Applications:

- Busbars assemblies / Overmolded Busbars / Flexible Busbars
- AC and DC connectors (Overmolded busbars)
- EMC Filters





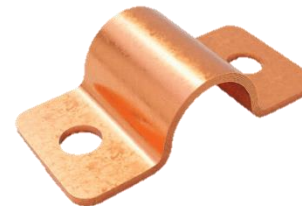
BATTERY

Materials:

Copper, Plastic, Insulated Busbars, Pre-coated Busbars

Applications:

- Module Connectors
- Cell Connectors
- HV Busbars



THERMAL MANAGEMENT



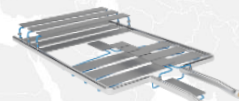
**POWER
ELECTRONICS**



**ELECTRIC
DRIVES**



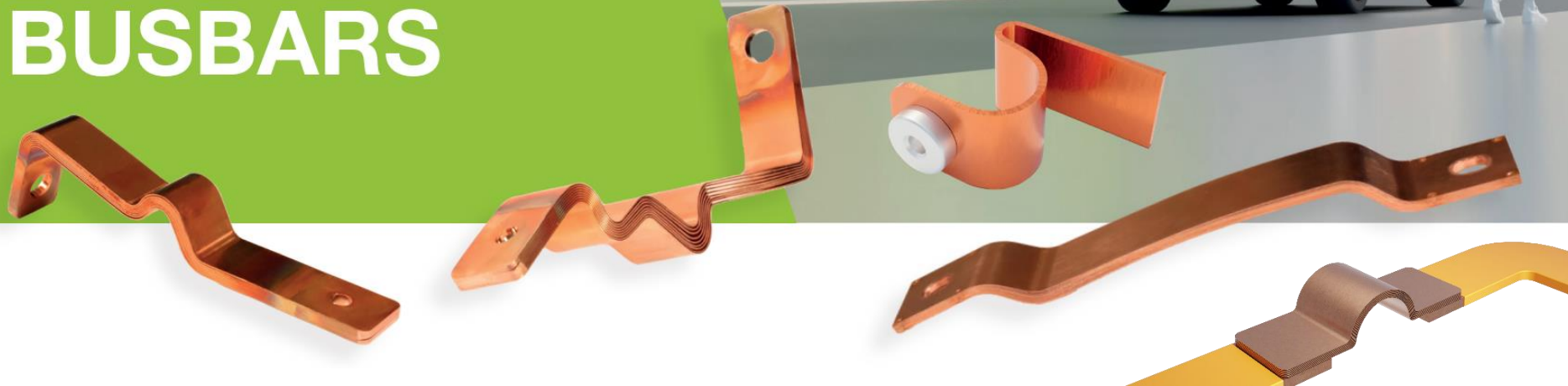
POWER GENERATORS/STORAGE



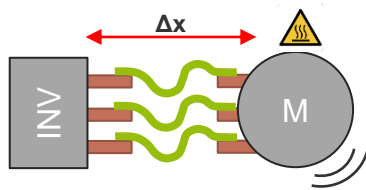
**CLIMATE- &
HEAT-PUMP-SYSTEMS**



AUTOMOTIVE GRADE
**FLEXIBLE
MULTILAYER
BUSBARS**

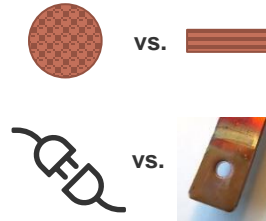


COMPENSATION OF SYSTEM MOVEMENTS



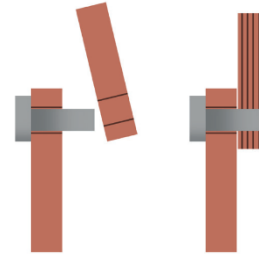
Unlike rigid busbars, the flexible multilayer busbars help to mechanically decouple the systems and compensate for thermally induced changes in length. Rigid busbars would lead to severe mechanical tension in the system.

EFFICIENT USE OF SPACE



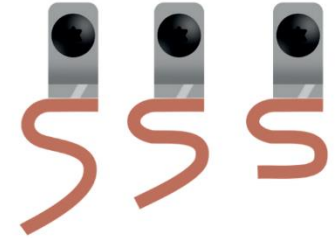
Flexible multilayer busbars achieve a higher copper density in comparison to cables. Additionally the installation space is smaller while maintaining the same current carrying capacity. Furthermore no cable lugs or connector systems are required.

TOLERANCE COMPENSATION



Tolerances in subassemblies are adding up and need to be considered for mounting them together. Flexible busbars are working as a tolerance compensating interface between two modules.

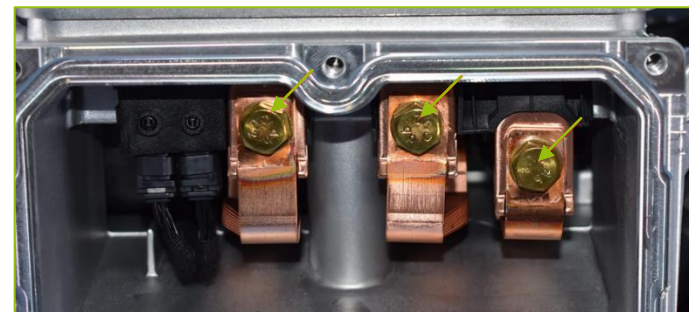
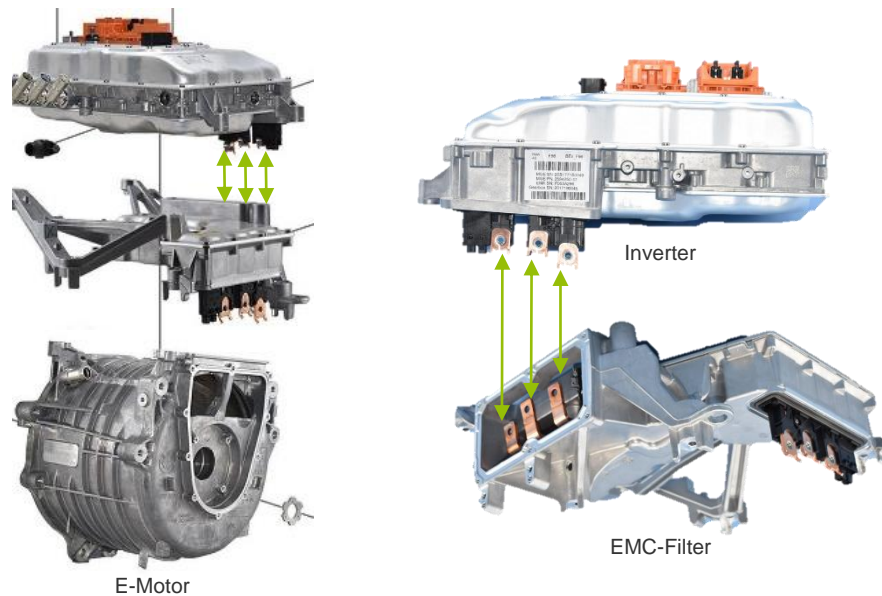
MULTIPOSITION PARTS



One uniform flexible busbar which can be extended to three different positions while assembling the subsystems together. One part strategy.

FLEXIBLE BUSBARS IN E-MOBILITY APPLICATIONS

CONNECTION BETWEEN EMC-FILTER AND INVERTER



FUNCTION: TOLERANCE COMPENSATION DURING ASSEMBLY

Copyright: A2MAC1



Layers: 8

Layer thickness: 0.5 mm

Layer width: 17 mm

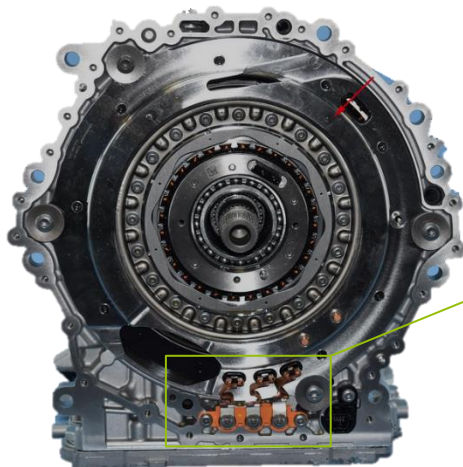
Material: Cu-HCP

Joining Technology: Resistance Welding

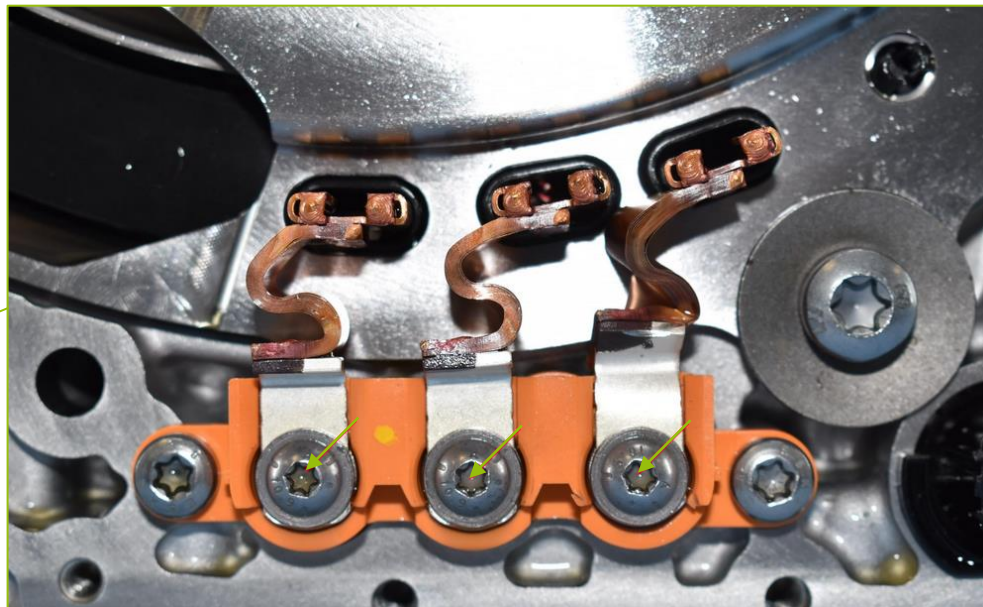
Surface Treatment: -

Insulation: -

Function: Tolerance compensation
during assembly



E-Motor



FUNCTION: UNIFORM PART DESIGN FOR MULTIPLE POSITIONS

FLEXIBLE BUSBARS IN E-MOBILITY APPLICATIONS

CONNECTION BETWEEN E-MOTOR AND INVERTER



Layers: 20

Layer thickness: 0.1 mm

Layer width: 12 mm

Material: Cu-HCP

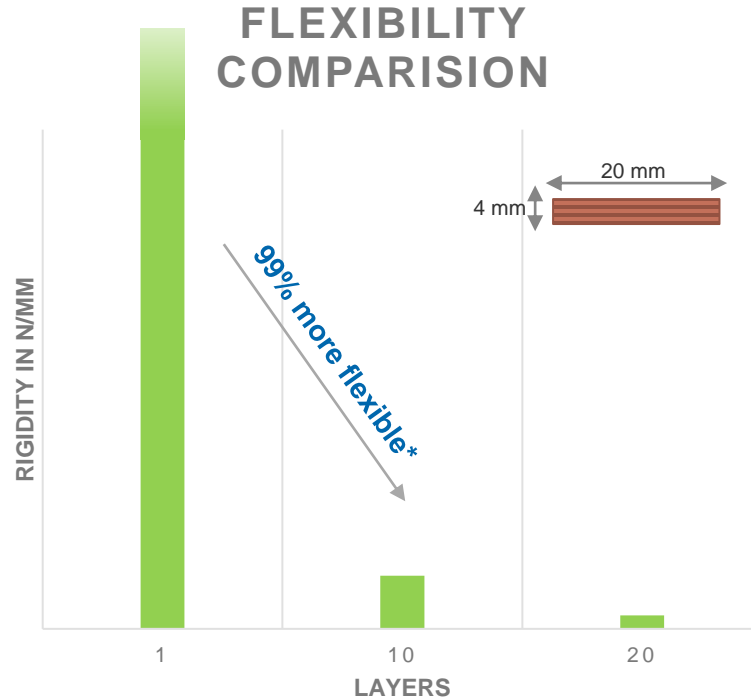
Joining Technology: Laser Welding

Surface Treatment: Ag Coating

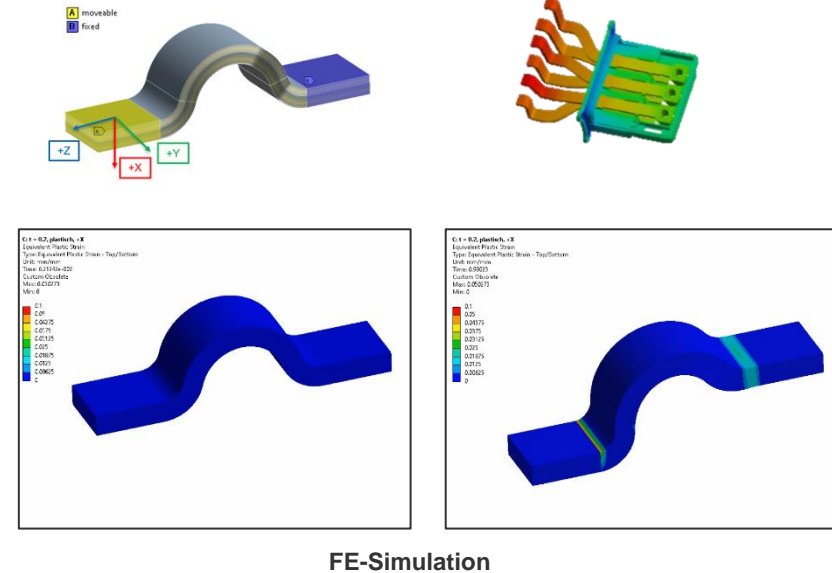
Insulation: -

Function: Uniform part design for multiple positions

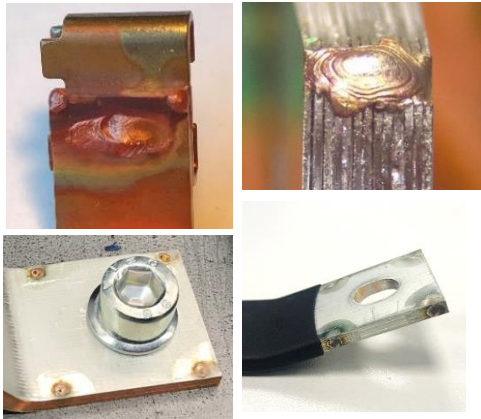
Mechanical and Electrical Design of Flexible Busbars according to costumers needs:



*Bending over the horizontal axis



TECHNOLOGIES:	Stamping & Bending, Resistance Welding, Resistance Soldering, Laser Welding, Diffusion Welding, Clinching ($t_{\text{Layer}} > 0,2 \text{ mm}$)
MATERIALS:	Cu
COATINGS:	Ni, Ni + Ag, Ni + Sn, (All layers or top layers only)
FEATURES:	Heat-shrink tubing (Isolation), Press-Fits



LASER WELDING
(Layerpackage Thickness $t_{\text{max}} = 10 \text{ mm}$)



RESISTANCE WELDING
(Layerpackage Thickness $t_{\text{max}} = 5 \text{ mm}$)



DIFFUSION WELDING
(Layerpackage Thickness $t_{\text{max}} = 12 \text{ mm}$)

APPLICATIONS

- Busbar
- EMC-Filter connection interface
- Battery module connectors
- E-Motor interface
- Thermal Management

ENGINEERING

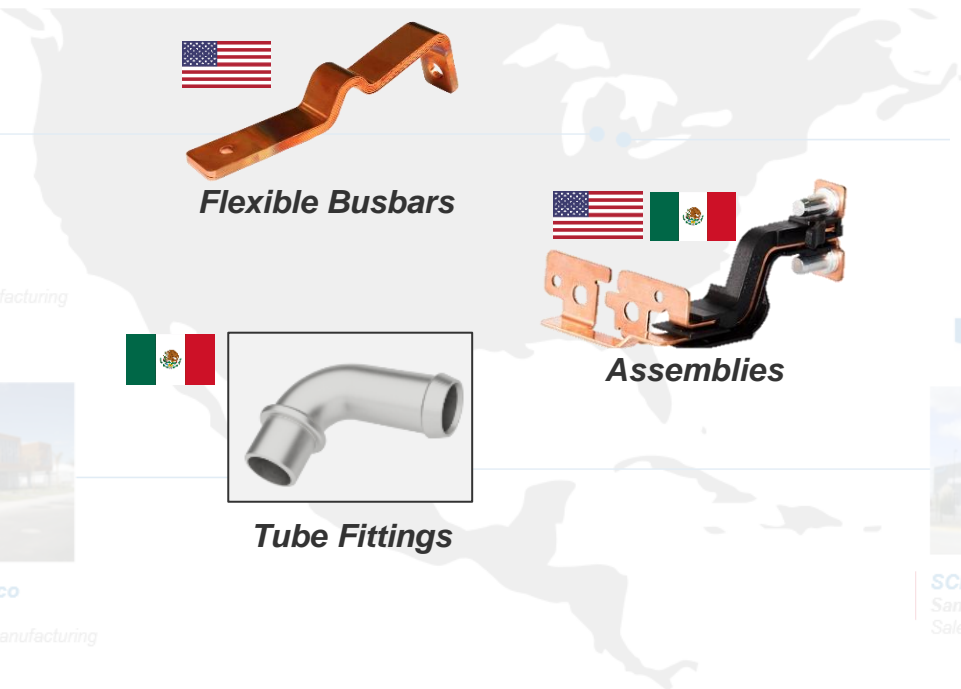
- Conversion of solid busbars to flexible busbars
- Mechanical design
- Electrical design
- FE-Simulations
- Mechanical & electrical testing

TECHNOLOGIES

- Stamping/bending technologies
- Laser welding
- Resistance welding
- Diffusion welding
- Surface coatings
- Press-fit technology



SCHERDEL NORTH AMERICA e-mobility Products



The map shows the locations of Scherdel's North American operations. The United States is highlighted in light blue, and Mexico is highlighted in light green. The locations are marked with flags and connected to product images by lines.

SCHERDEL SALES & TECHNOLOGY, Inc.
Muskegon, Michigan
Sales & Engineering + Manufacturing

SCHERDEL Service Center Detroit
Brighton, Michigan
Sales & Engineering

SCHERDEL de Mexico
Silao, Guanajuato
Sales & Engineering + Manufacturing

SCHERDEL WIESAUPLAST
San Jose Iturbide, Guanajuato
Sales & Engineering + Plastics Manufacturing

Flexible Busbars

Assemblies

Tube Fittings

CUSTOMERS







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THANK YOU FOR YOUR ATTENTION

Thank you! obrigado! 谢谢! *Děkuji!* **Merci!** ありがとう! **Gracias!** спасибо! **d'akujem!** *dankjewel!* teşekkür ederim! **köszönjük!** **tack!** *dziękuję!* धन्यवाद!

