SWANTEC
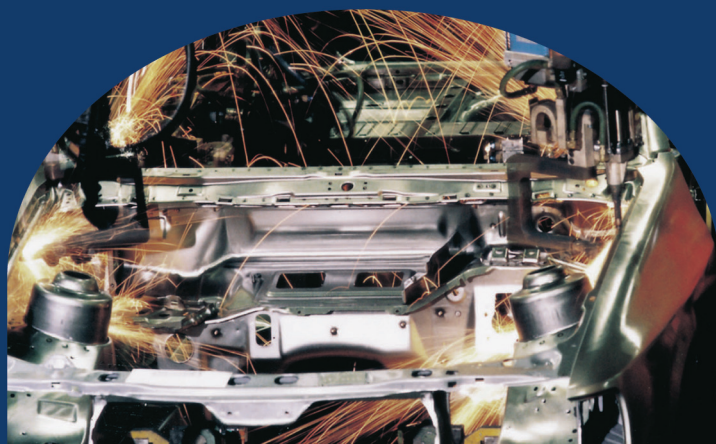
The Software for Innovative Resistance Welding

SORPAS®

Ensure before welding™

1999 - 2015
*16*th
ANNIVERSARY

# Innovation is the key to staying ahead of competitors!

The times when companies could count on long lasting models and loyalty of customers are over. With increasing competition, only the companies making a fast flow of new models or new products can keep their market share.

Resistance welding needs innovation

Resistance welding is one of the most productive and reliable assembly processes and is widely applied in manufacturing industry. Due to economical challenges and an increasing application of new materials, there have been strong demands from industry for innovation in technology and reduction in cost and lead time.

Set-up of practical spot welding.
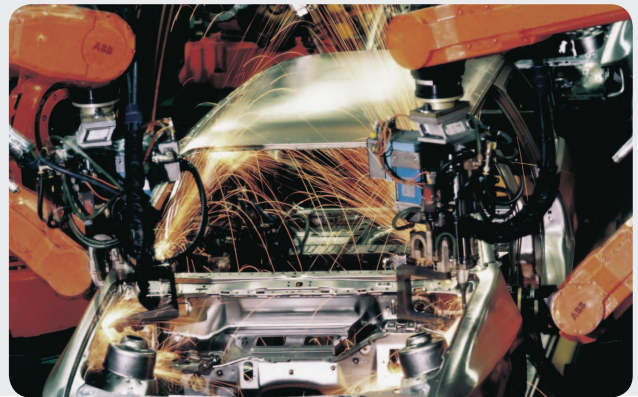
Automotive assembly line. Courtesy ABB.

The competence of SORPAS®

- Spot welding
- Projection welding
- Resistance butt welding
- Micro resistance welding
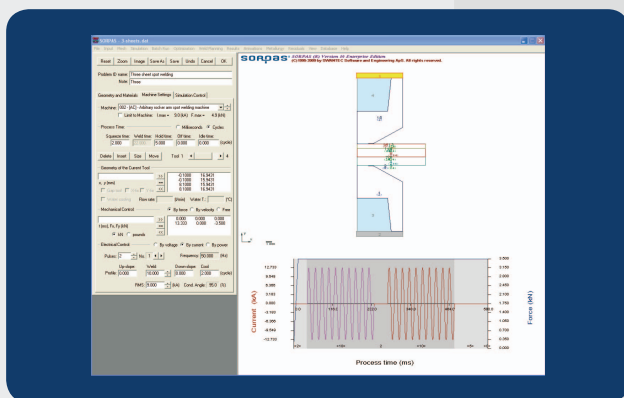
The industries needing SORPAS®

- Automotive and aerospace industry
- Electrical and electronics industry
- Machinery and metal processing
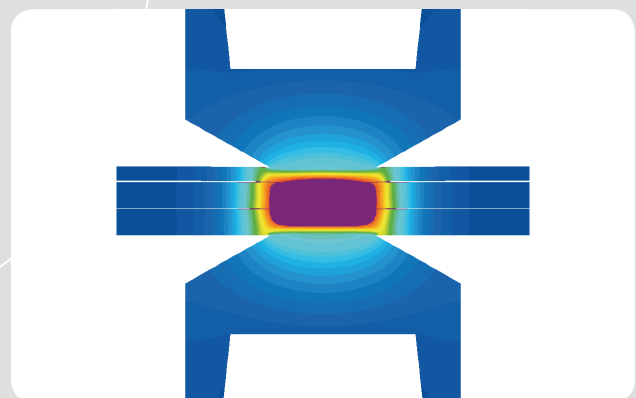- Other industries using resistance welding

SORPAS®

Ensure before welding™

SORPAS® is the professional software for

Simulation and
Optimization of
Resistance
Projection
And
Spot welding processes

Graphical user interface of SORPAS®

Weld nugget and temperature distribution in spot welding

"We can now make much more complex joints with resistance welding, which we wouldn't have found a solution for without support of computer simulation. We now simulate every new weld with SORPAS® before welding".

*– Dr. Birthe Laursen, Danfoss A/S, Nordborg, Denmark*

Danfoss, the largest manufacturing company in Denmark, is the very first commercial user of SORPAS®.

# Computer simulation is indispensable for modern industry!

The time to market of new models or new products is mainly due to prototyping and running-in of production. Computer simulation has proven to be very beneficial for supporting design and process optimizations.

Benefits

- Save lead time
- Reduce costs and budget
- Speed up production running-in
- Improve weld quality
- Increase production stability
- Facilitate innovation
- Modernise technology
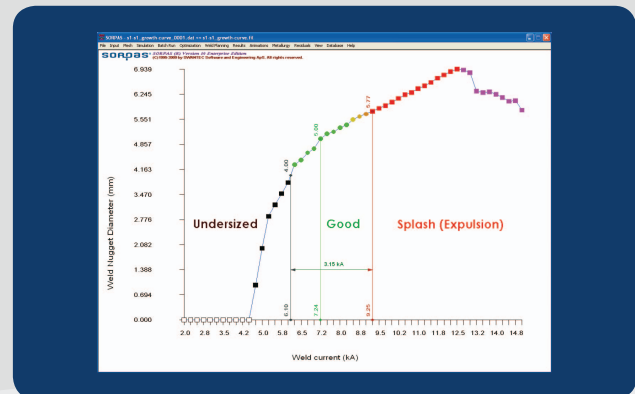
Prediction of weld growth curves and the welding process window.
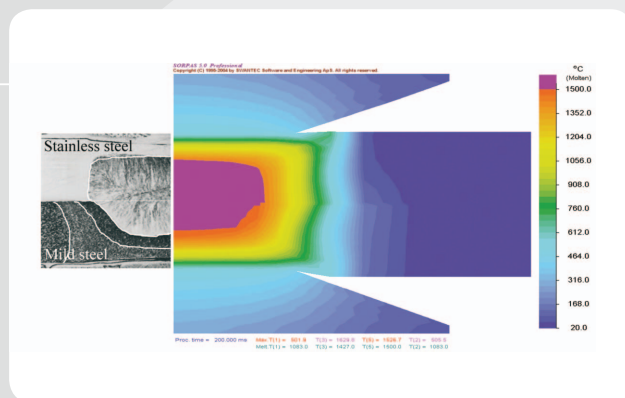
Simulation of spot welding 2.0 mm stainless steel to 2.0 mm mild steel sheets comparing to the cross section of real weld nugget.
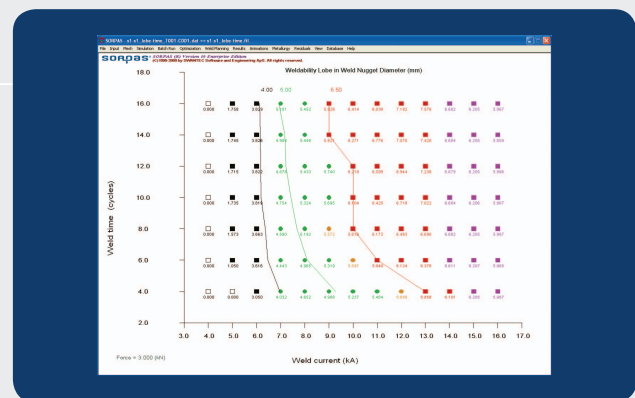
Prediction of weldability lobe curves and the optimal welding parameters.

Research and Development

- Evaluating weldability of materials
- Evaluating design of weld combinations
- Evaluating design of electrodes
- Inventing new applications

Intelligent weld planning

- Predicting weld growth curves and weldability lobes
- Optimizing process parameter settings
- Determining welding and cooling procedures
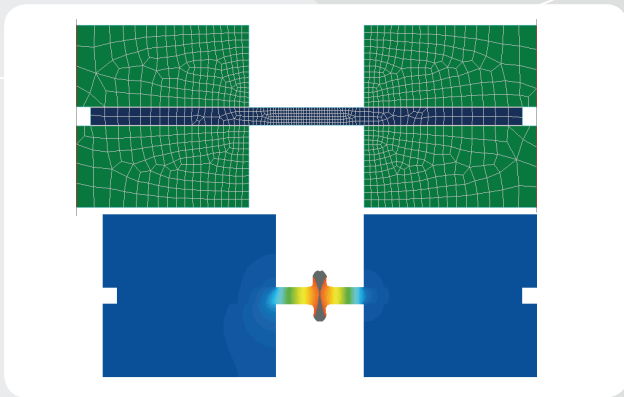- Trouble shooting welding problems

Industrial applications
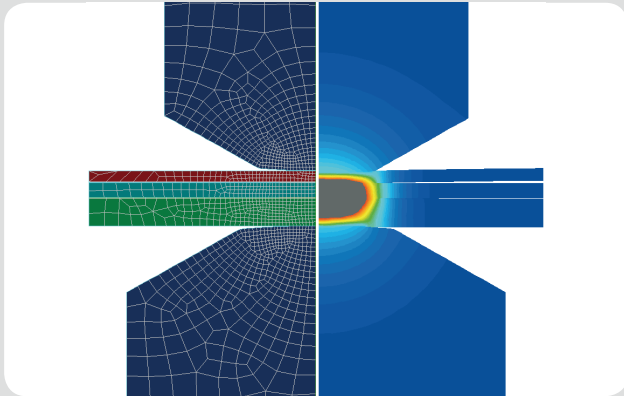
Spot welding
Three-sheet joint of low carbon steel, high strength low alloy (HSLA) steel and Dual Phase (DP) steel sheets.
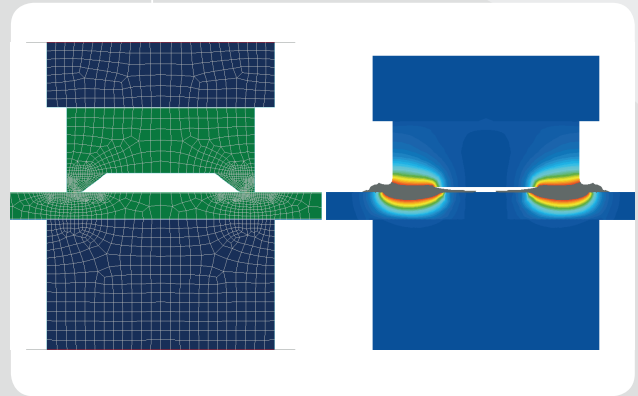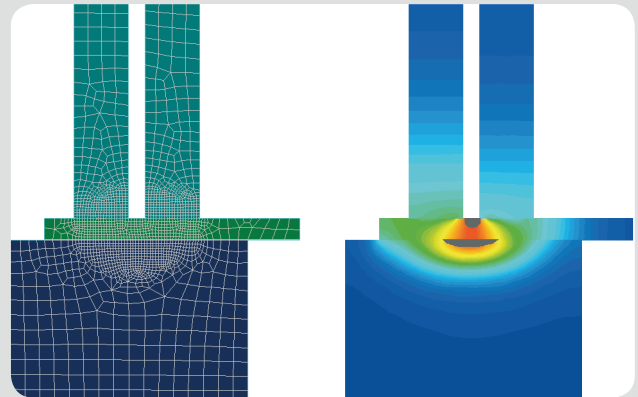

Projection welding
Square nut with corner projections joined to steel sheet showing the weld after collapse of the projections.

Resistance butt welding
Two steel plates joined at the ends with resistance heating and subsequent forging during the butt welding.

Micro resistance welding
Parallel gap welding for joining thin foil to substrate plate of titanium alloys.

"We have been using SORPAS® since 2001 and have made many innovative developments in resistance welding, which have resulted in several patents. We are now further extending the application of simulation to process optimizations for supporting production planning".

*– Mr. Matthias Graul, Volkswagen AG, Wolfsburg, Germany.*

Volkswagen, the largest car maker in Europe, is the first commercial user of SORPAS® in automotive industry.

# SORPAS® is specially designed for engineers by engineers!

To meet the demands of industry, SORPAS® has been professionally developed by engineers and designed with integration of welding expertise. It is very easy to learn and user friendly for engineers working in industry.
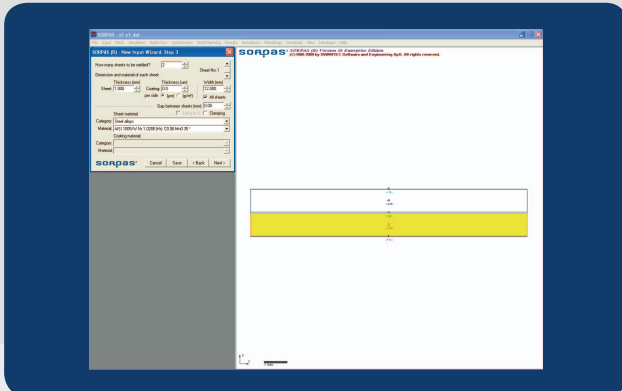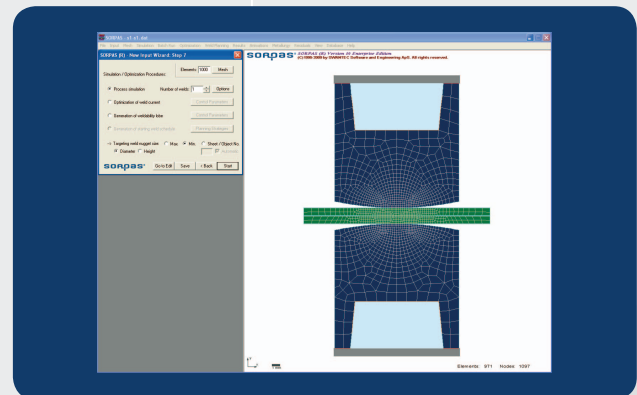

The new input wizard helps to easily prepare simulation data. Building up the weld combination of materials.
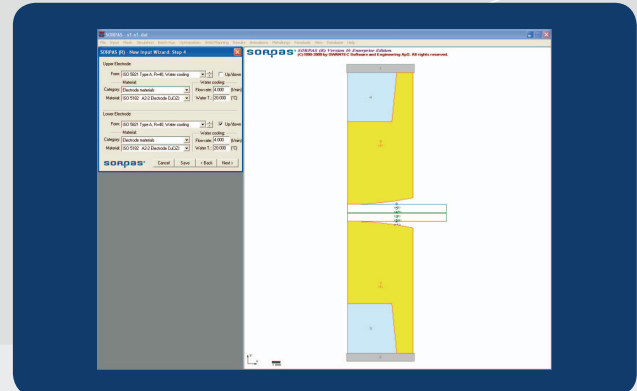
Selecting the form and material of electrodes from databases.
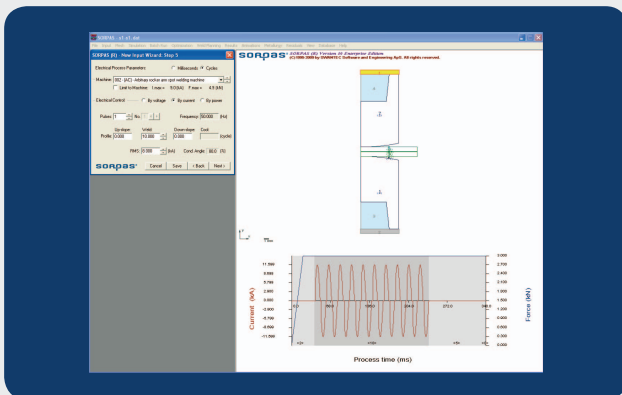
Setting up the welding process parameters.

Defining the procedures for simulation and optimizations. Mesh is generated fully automated.
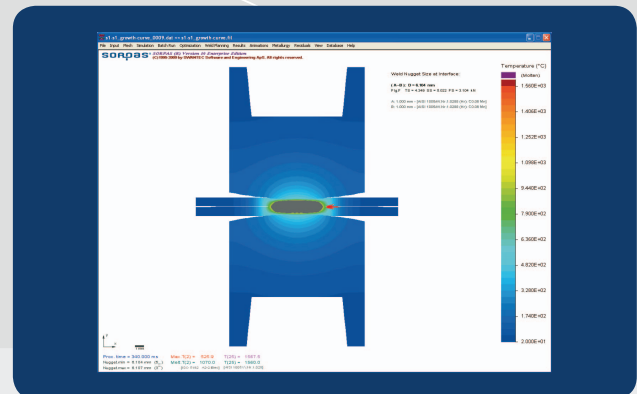
Input: Design parameters

- Geometry and dimensions
- Combination of materials
- Surface coatings and braze metals
- Material and electrode databases
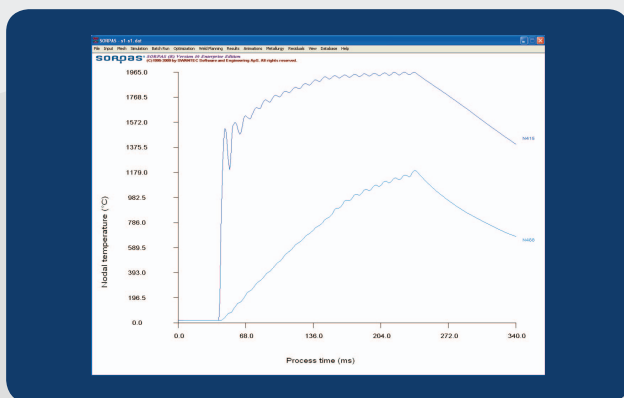
Input: Welding parameters

- Weld quality requirements
- Process parameter settings
- Welding machine characteristics
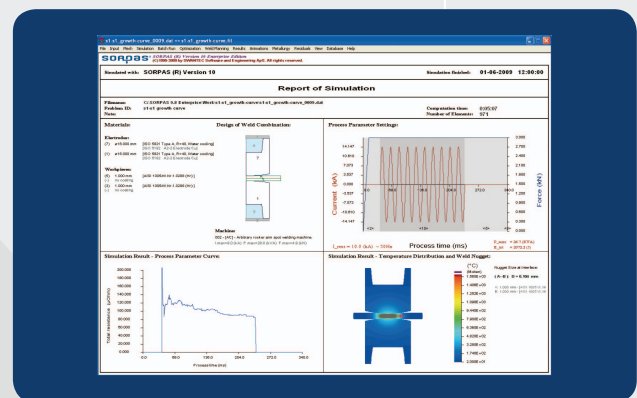- Water cooling of electrodes
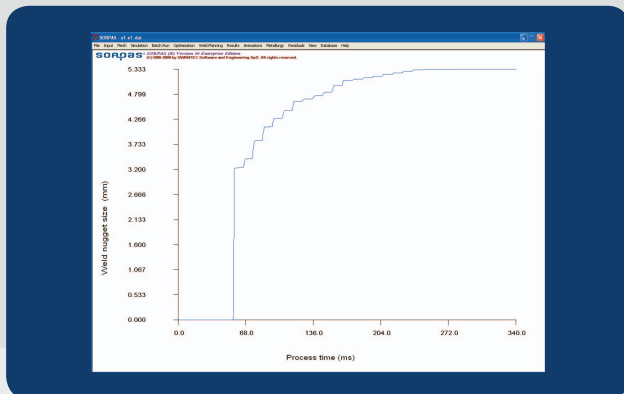
Weld nugget diameter evolution curve.

Final weld nugget formation showing the nugget sizes in each sheet and at each weld interface with indication of splash.

Dynamic temperature history curves at two points.

Report of simulation showing both the input conditions and the main results of simulation.

Output: Dynamic parameter curves

- Weld nugget size evolution
- Local temperature development
- Dynamic resistance curves
- etc.

Output: Weld quality results

- Weld nugget sizes and weld strengths
- Microstructures and hardness distribution
- Residual stresses and cracking risks
- etc.

SWANTEC

History

1988 – Engineering research
Research in resistance welding started at the Technical University of Denmark with several PhD and MSc projects and national research projects.

1994 – Computer simulation
Development of numerical models and program-ming started with a large research program in close collaboration with leading companies in Denmark.

1999 – Establishment of company
SWANTEC started as spin-off private company for marketing and further developing SORPAS® that is now used by companies and institutes worldwide.

Business areas

Welding software – SORPAS®
• Development
• Technical support
• Industrial service

Engineering service
• European and national projects
• Projects for large companies
• Consulting for small companies

Technology transfer
• International seminars
• Training and workshops
• Scientific publications

SWANTEC is always in the front line of technology with unique competence in both engineering expertise and an innovative approach in resistance welding.

SWANTEC
Software and Engineering ApS
Diplomvej 373
2800 Kgs. Lyngby
Denmark
Tel +45 7567 8888
Fax +45 7567 8885
www.swantec.com

1999 - 2015
16th
ANNIVERSARY

RAVIDA
Software Metal A.S.
Fethiye Mah. Sanayi Cad.
Corner Plus Business Center
No:263/28 Kat:3 Ofis: TT03-F
Nilufer 16140 Bursa TURKEY
Tel   : +90 224 999 63 02
Fax   : +90 224 999 62 01
E-mail : info@ravida.net
www.ravida.net