CADWELL

Gesellschaft für Computerunterstützte Entwicklung mbH

CADWELL GmbH - Kränkelsweg 28-30, D-41748 Viersen, Tel.+49-2162-37498-0, Fax.+49-2162-37498-38, www.cadwell.de

"Gain access to sealing system and window regulator expertise for bespoke solutions "

- Engineering Services for Automotive Industry
- Program Management
- Specialized Development of
  - sealing systems
  - window regulators
- Finite Element Analysis (FEA)
- Benchmark
- Software Development

Homepage: www.cadwell.de

Mail-contact: Info@cadwell.de

Phone: +49 (0) 2162 3 74 98 0

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CADWELL IN GENERAL

CADWELL specialise in:

• The specific development of sealing systems including all seals which protect the passenger from the external environment

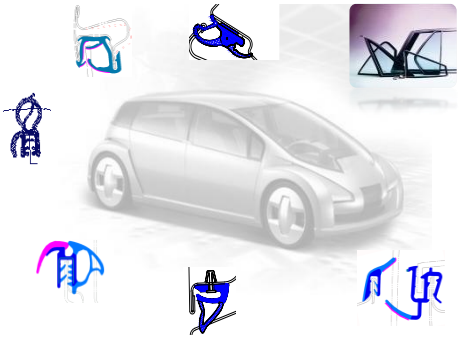
• Door Modules with the integration of Window regulators

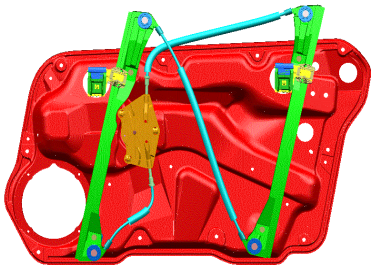
CADWELL was established in 1996 and has more than 20 years experience

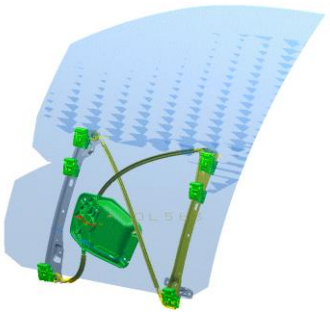
CADWELL has the capacity up to 25.000 h / year in house

""We know what future developments are!"

PRODUCT - GROUPS ALREADY DEVELOPED







Typical product developed by **CADWELL** are:

• Sealing-systems	– glass run channel, waist belt seal, door seal, trunk seal, etc.
• Door-modules	– including window regulator, loud speak, latch, wiring house
• Window regulators	– Bowden, banjo, arm and sector, etc.

"WE COMBINE SYSTEMS WITH AN INTEGRATED APPROACH !"

IN HOUSE PROZESS

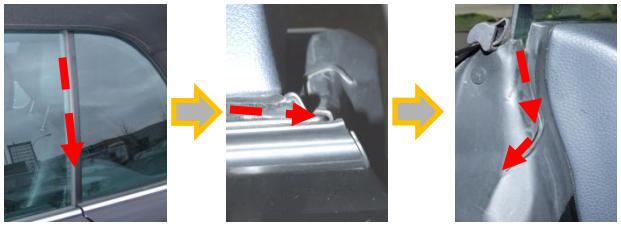
• Project-management and Project coordination
• Benchmark
• Installation of the whole project environment including BIW and all attached systems
• Concept-design of the whole system (Profile, Mould, BIW, feasibility study)
• Investigation of the tolerance system– Tolerance analysis
• FEA-Analysis 2D & 3D
• System-, Design-FMEA / Checklist
• Design –3D – Body position / Quasi-Body position / Tool position
• Drawing and Model
• Prototyping by external partners

Benchmark - Investigation

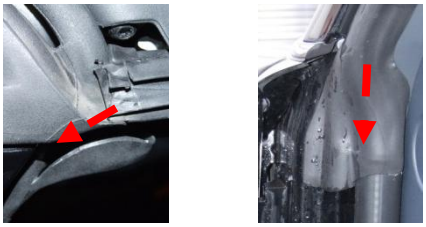
- Water test – Water management
- Acoustic-investigation
- Door gap dimension
- Door close effort
- door frame stiffness
- theft protection

Watertest - Watermanagement

After applying water to specified areas the water management system is analysed and weaknesses are identified.

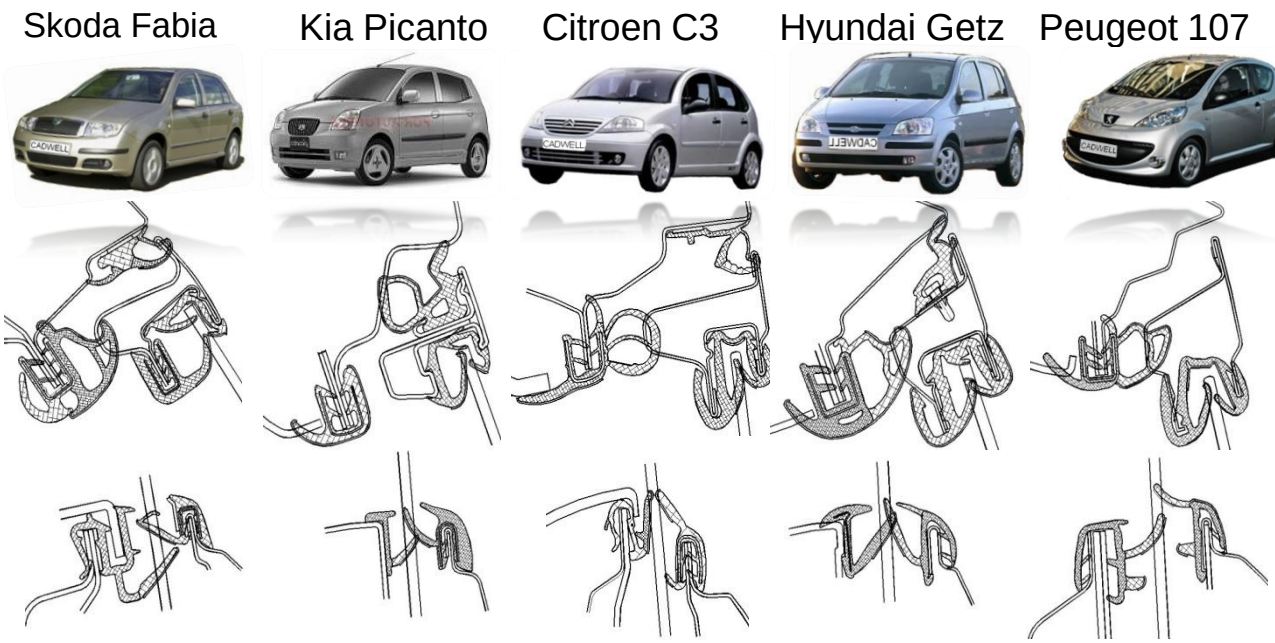


B-pillar area



A-pillar area

Evaluation of Sealing Concepts



"We prepare the typical cross sections as part of the benchmark investigation!"

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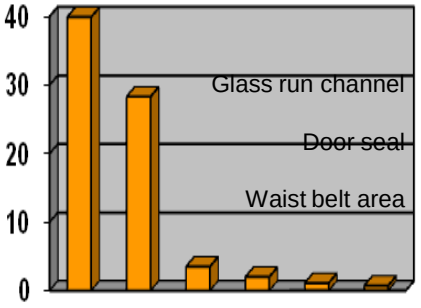
Acoustic Testing

CADWELL has a standard procedure to evaluate acoustic characteristic

Baseline
Car supplied by OEM

Quietest condition
All body gaps taped

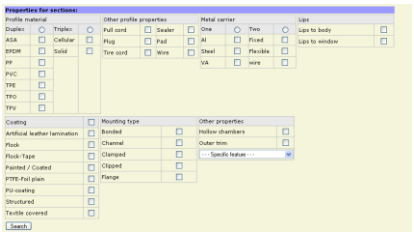
Exposed areas
Partially tapes removed

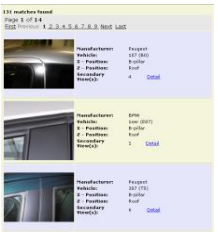


CADWELL evaluates potential for improvement

"We also road-test for rough noise analysis!"

Benchmark Data Base





Buy the access to the sealing world

With over 20 years of experience in the Benchmarking of vehicles with focus on sealing technology has provided an extensive sealing system data base which is constantly updated. We can provide you with bespoke access

Our WEB – based Data Base contains today:

- ✓ about **1400 vehicles** in OEM overview
- ✓ about **700 sealing cross sections**
- ✓ about **4300 photos** of all sealing areas of vehicles – and more

"Buy the history of sealing systems!"

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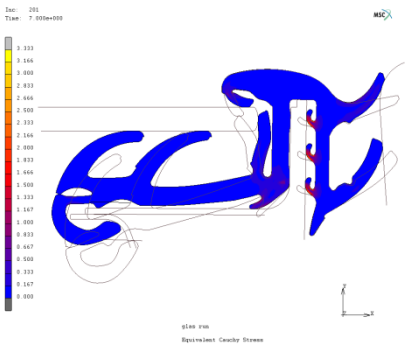
FE-Analyses – Table of contents

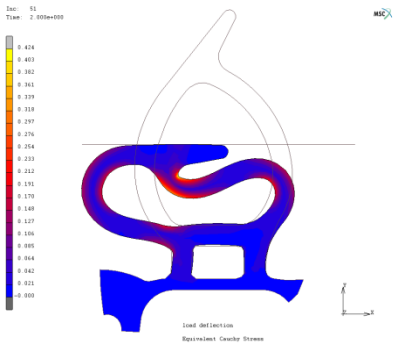
Examples of 2-D analyses

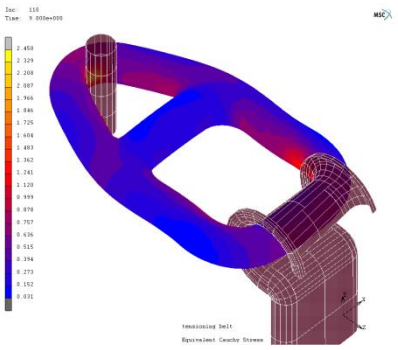
- Extrusion shape
- Load deflection
- Assembly of profile
- Tolerance study
- Push on / pull off
- Assembly of trim

Examples of 3-D analyses

- Improvement of radius behavior
- Function investigation of molded part
- Strength investigation of tensioning belt
- Window regulator rail under load
- Miscellaneous investigations of window regulator slider







"Get more than a picture, fulfill product potential!"

Software Overview

CADWELL utilizes the latest software products in the automotive industry

CAD & FEA
CATIA V5 R16
CATIA V4.2.4
UG & Ideas access
AutoCAD 2007
MSC Marc/Mentat
2003 R2 & 2005 R3

Data transfer systems
ODETTE/ENGDAT
Secure FTP
Autoweb

Supported data formats
IGES
STEP
STL
DWG
DXF

Quality Tools
Q-Checker
Validat
Endcheck

Software Development
Delphi
C++
PHP
ASP.NET
AJAX

Databases
Microsoft SQL Server
MySQL
Oracle

"We always have the right system!"

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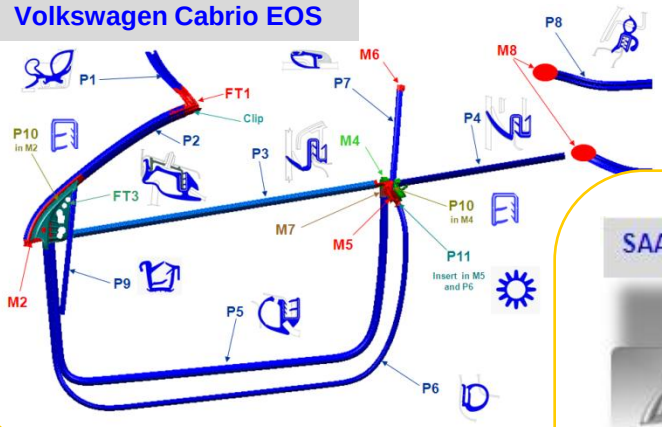
Expertise Reference

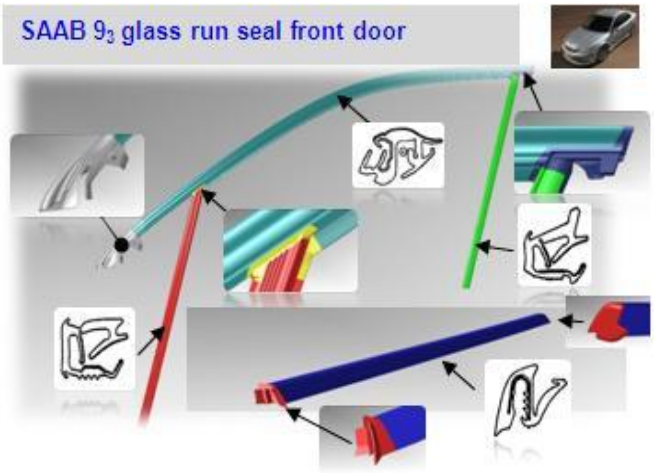
Cabrio

- BMW 3‘er
- VW EOS
- Peugeot 206 CC

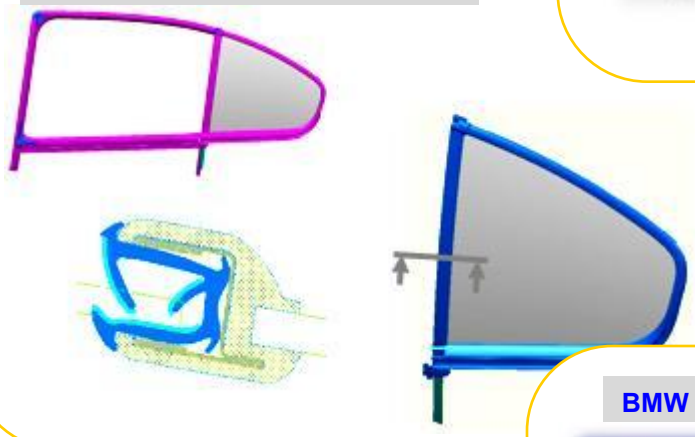
Volkswagen Cabrio EOS



SAAB 9$_3$ glass run seal front door



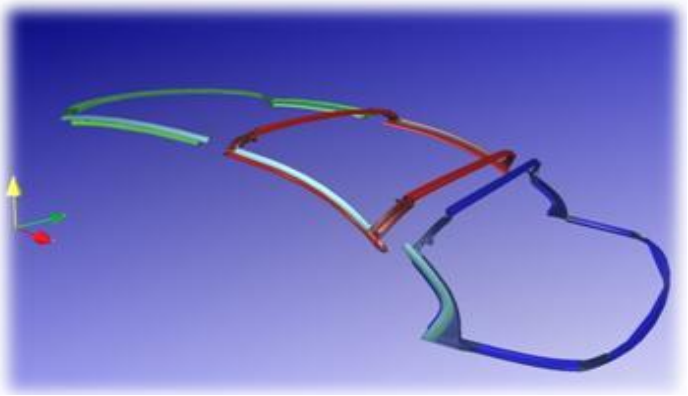
Skoda Octavia Glass run channel



Door seal

- Audi A3, A6
- Skoda Fabia, Octavia
- VW Passat etc.

BMW 3’serieas Cabrio RHT



Glass run channel

- Audi A3, A4, A6
- Saab 93, 95
- BMW X5, 5‘er
- Golf IV, V, V+
- Opel Zafira
- Skoda Fabia, Octavia

“we engineer the whole system – from concept to Production!”

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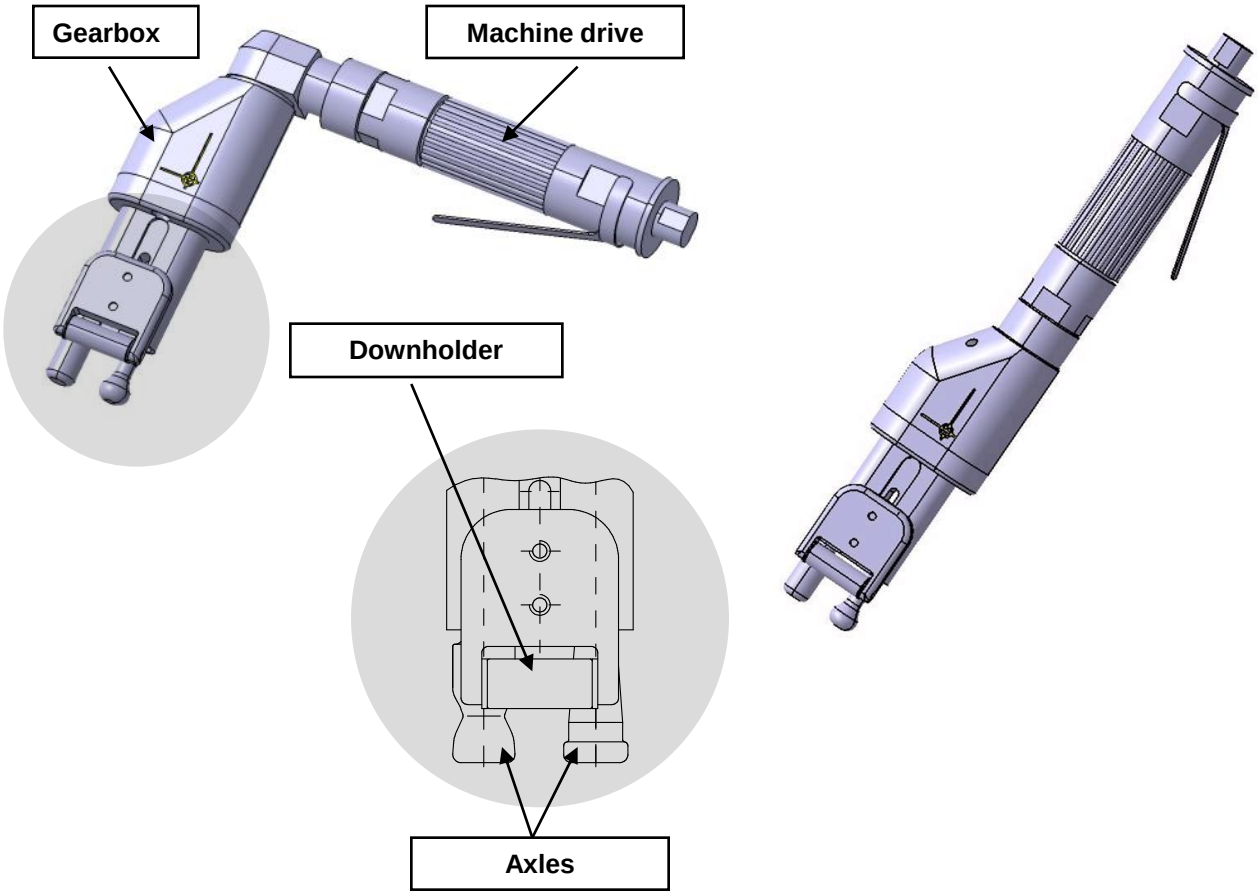
Rollforming

- **ROLLFORMING** is the tool for closing carriers of door- and decklid seals, flange protectors and other profiles with metal carriers, directly on the flange of body in white.
- The semi open legs of the profile carrier will be pressed by the rotating axles into the final U-Shape.



The Gearbox design is in accordance to the installation situation and profile form with different lengths and axle distances. The construction can be angled at the machine drive but also straight.

The Machine drive can be constructed as an air-pressure driven or as a cordless electric screw driver.

The Down holder pushes the profile on the bodywork flange and adjusts the position of the machine

The Axles press the legs of the carrier in the final U-Position without damaging of the sealing body. The axles drive is carried out by the gearbox which drives the axles rotating against each other.

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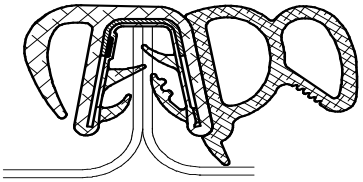
Hammer - Mounting, the classic method

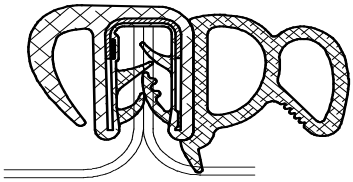
With the classic hammer mounting the pull-off force is in directly correlation to the push on force. So a compromise has to be found. Push-on - and pull-off forces are defined with the opening of the carrier and can´t be adjusted on the assembly line.

ROLLFORMING - Mounting

The difference to the hammer profile are the open legs of the carrier. The pull-off force of the "open" carrier is just so high that the profile can be securely mounted by hand on the body flange and doesn´t fall down by ist own weight before ROLLFORMING operation. The pressing of legs in the final shape takes place in one single circulation.



Open carrier



Closed carrier

The pull off force after ROLLFORMING is much higher than with the conventionally hammer mounting, even if different, by metal or paneling parts conditional flange jumps. Other advantages are the uniform seal course, and of course the time savings in the assembly. Noises and the effort for the handling are extremely low. The implementation of the ROLLFORMING tool always correspond to individual circumstances, but may be adjusted according to customer needs.

For optimal ROLLFORMING-Adjustments several factors have to be considered:

- Profile shape
- Flange thickness
- Body radii
- Panels
- Site of use etc.

Ask for the right solution!