

AutoForm

Solution for BiW Assembly

AutoForm's State-of-the-Art Technology
Covers the BiW Assembly Process Chain



AutoForm Solution for BiW Assembly – Unique and First to Market Software Solution for BiW Assembly

AutoForm Solution for BiW Assembly supports the entire BiW process chain, which covers early feasibility, process engineering and BiW production. By implementing AutoForm software for the BiW assembly process, users can gain deep insight into the car body manufacturing process,

quickly evaluate alternative part and assembly process designs, identify the causes of dimensional deviations and undertake effective countermeasures. With AutoForm Assembly, assembly process issues can be successfully resolved prior to the start of production.

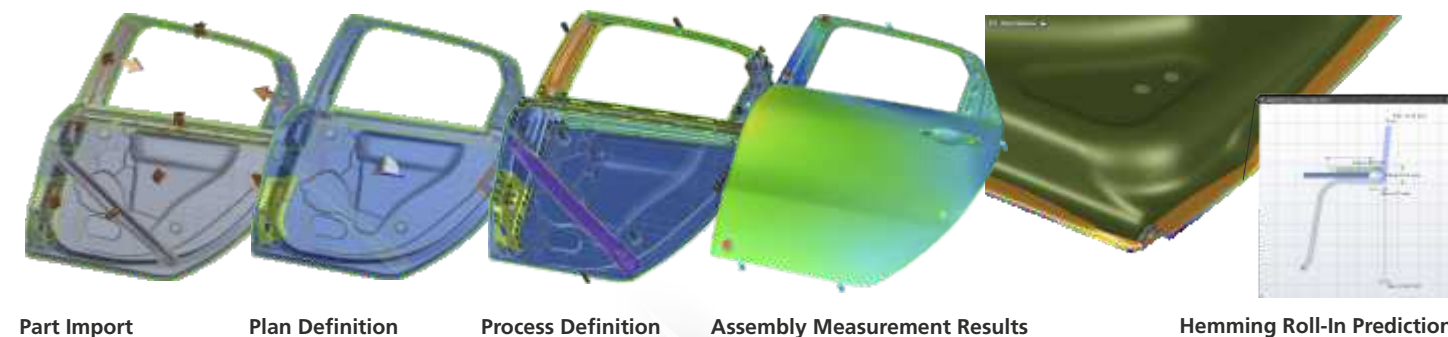
Process Feasibility

Evaluation and Improvement of Assembly Process Early On

AutoForm Assembly software allows the evaluation of the assembly process early on. Users can easily import nominal CAD geometry in a range of formats, including many native files. After geometry import, they can assign a suitable material for all single parts selected from an extensive material database integrated within the software.

From this point on, users can define a number of alternative assembly processes by varying critical aspects such as part design parameters, insertion order and angle, clamp position,

pilot location, join location and sequence. Through an analysis of the results, important information can be gathered, including deviation from nominal data, clamp force required and joining force applied. Finally, users can add a hemming process and gain a better understanding of issues that may arise as well as the effects of the hemming process on the quality of the BiW assembly. With AutoForm Assembly, users can improve the assembly process and ensure the desired level of quality very early on in the BiW assembly process chain.

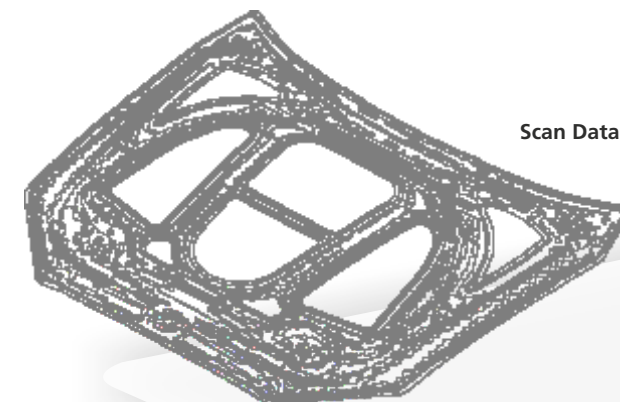


Early Feasibility

BiW Production

In a production process, whether in early ramp-up or during mass production, accuracy may suddenly decrease for no apparent reason. This may lead to unplanned production downtime, missed production targets or products of insufficient quality.

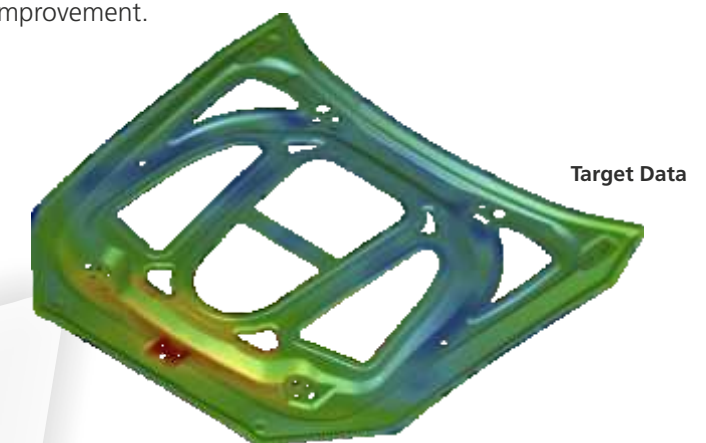
AutoForm Assembly addresses these issues and supports users in determining appropriate improvement measures. Whether in early ramp-up or during mass production, the software



Process Improvement

Effective Correction Strategies for Process Improvement

enables them to identify the critical areas in the assembly process and consider which measures should be taken to resolve them effectively. The software allows for the import of scanned production parts into the assembly simulation, which is particularly helpful for parts that may not have a simulation result available for use. With AutoForm Assembly, users can develop correction strategies to ensure efficient process improvement.



Compensation Strategy Development

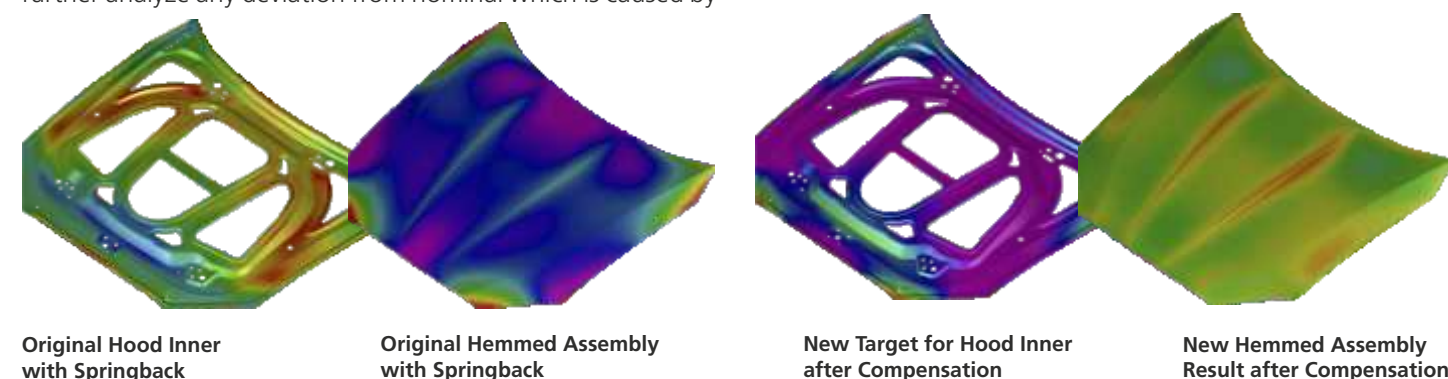
Identification and Compensation of Parts to Improve Assembly Accuracy

Assembling parts can lead to dimensional deviations due to gravity, tolerance stack-ups, clamping strategy applied and joining technology. Since the single parts to be assembled are affected by springback, the final assembly may significantly deviate from the reference design after these parts are joined. Therefore, springback must be managed early on to determine which parts need to be compensated in order to ensure the assembly is within the desired tolerance.

Stresses, strains as well as springback which are calculated with AutoForm Forming can be taken into consideration during assembly analysis studies. With AutoForm Assembly, users can further analyze any deviation from nominal which is caused by

the assembly process and determine which parts most influence dimensional accuracy. As a result, new target geometries for single parts can be derived to achieve the final dimensional fit of the assembly. These new target geometries are crucial for the adjustment of the overall compensation strategy and lead to significant savings in physical tryout loops.

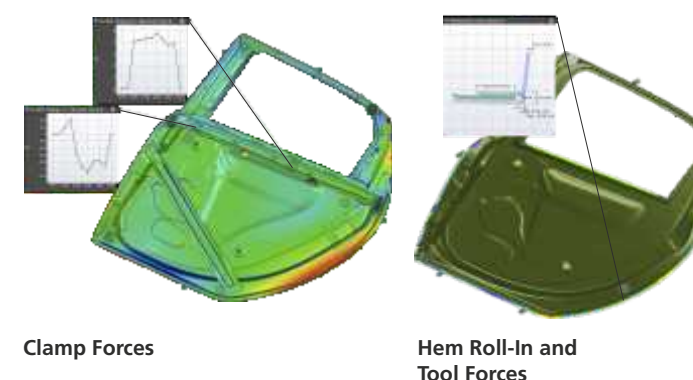
With AutoForm Assembly, users can analyze any deviation of the assembly from nominal and determine which parts most influence dimensional accuracy. They can then create a compensation strategy to produce the target assembly geometry within tolerance and with minimum effort.



Process Engineering

During production, problems may arise due to process variations. To ensure repeatability and robustness in production, crucial process parameters must be defined already during process validation. AutoForm Assembly enables the accurate validation of the assembly process.

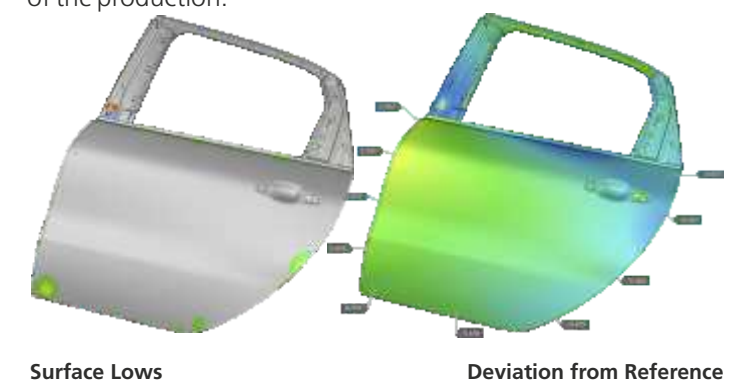
With unique software capabilities, users can set up the entire assembly process, including joining and hemming technologies. They can make process modifications easily by taking into consideration different part insertion orders, changes to



Process Validation

Addressing Assembly Problems Prior to Production Start

pilot and clamping positions, and different sequencing of the joins. With AutoForm Assembly, they can achieve higher product maturity earlier in the development process and reduce the number of product modifications later in tryout or manufacturing. The software allows them to reduce costs for tooling and equipment modifications as well as to reach higher process maturity and greater robustness at tryout and the start of the production.



AutoForm BiW Software Products

AutoForm-Explorer®

Simulation Set Up and Evaluation of Results

With AutoForm-Explorer, users can set up simulations and evaluate all of the important results related to their stamping and BiW assembly processes. The software enables them to set up alternative process designs and define tool geometries for forming, hemming and other joining operations.



AutoForm-HemPlanner

Efficient Planning of Hemming Processes

AutoForm-HemPlanner enables users to easily define and optimize the hemming operation as well as create the required tool geometries for the simulation. With AutoForm-HemPlanner, they can efficiently design table and roll hemming processes.



AutoForm-FormFit®

Modification of Part Geometries for Dimensional Fit in Car Body Assemblies

AutoForm-FormFit allows users to modify part geometries to achieve dimensional fit in car body assemblies. By using AutoForm-FormFit in an engineering phase, they can analyze alternative designs of single parts of an assembly, compensate single parts to adjust for springback or make use of scanned part data as part of their simulation studies.



AutoForm-LineWelding

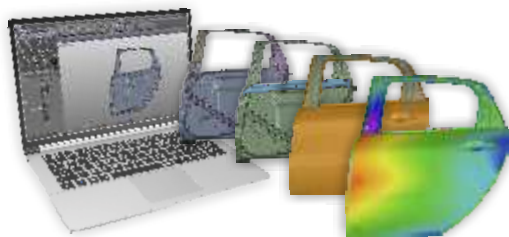
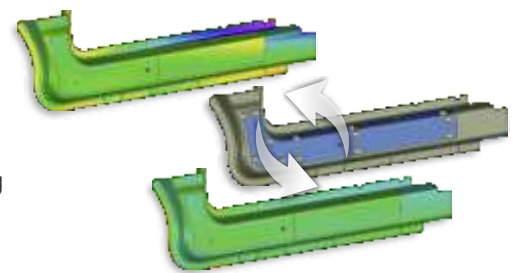
Efficient Planning and Optimization of Line Welding Processes

AutoForm-LineWelding enables users to determine the influence of thermal effects on dimensional accuracy during the line welding of joined parts. With AutoForm-LineWelding, they can optimize the line welding process already in the process engineering stage.

AutoForm-BuildOptimizer

Selection of Optimal Parameters for Assembly Production

With AutoForm-BuildOptimizer, users can easily determine appropriate equipment parameters for an efficient assembly production. The software allows them to define which clamps and joins should be considered for shimming and teaching. By running multiple simulations, AutoForm-BuildOptimizer enables users to determine the optimal parameters that can be applied to resolve accuracy issues in the assembly.



AutoForm-AssemblySolver

Simulation of BiW Assembly Processes

AutoForm-AssemblySolver allows users to simulate BiW assembly processes guided by AutoForm's intuitive user interface. An evaluation of the results can be carried out using AutoForm-Explorer. With AutoForm-AssemblySolver, users can quickly obtain simulation results both during an early development phase and the final validation analysis.