

## FloEFD Customer Success Stories: Automotive

Mechanical Analysis Division

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# Mentor Graphics CFD applications in the Automotive Industry







### **MPC Optimizes Design of Hydrocarbon Trap by Quickly Evaluating 12 Versions**

Miniature Precision Components is a leader in the design and manufacture of injection molded emission control components. The company saw the need for a cost competitive hydrocarbon trap for a partial zero emission vehicle (PZEV) which is 90% cleaner than the average new car.

**Challenges:** Design a Trap that captures nearly all hydrocarbons while avoiding air backpressure increase entering the engine

- **Solution:** FloEFD for CATIA V5
- **Benefit:** Evaluated 12 different design alternatives to minimize backpressure and achieve required absorption specification
  - Tested various configurations quickly before committing to a final design
  - Final design from CFD predictions was tested with a prototype and good agreement with measurement

"The ability to visualize the flow helped me understand where the restrictions were in each design and provided insight into how to reduce the backpressure."

M. Van de Bogert, Product Design Manager, MPC Inc.

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Automotive



### Hitachi Design Throttle Valve Body in a Day for Car Engine Aspiration

 <u>Hitachi</u> is a large Japanese engineering conglomerate that makes consumer products and components for a wide range of industries.

**Challenge:** Design throttle valve for engine aspiration **Solution:** FloEFD

**Benefits:** - Designers required only a half day of training to become competent and the results were as good as those from traditional CFD codes used by specialists

- Upfront analysis by designers improved product quality by reducing thermal loads and optimizing airflows

- Visualization of the results allowed understanding of the physics leading to intelligent design decisions

"At first we purchased 1 license of FloEFD, but soon afterwards we realized 1 license was not enough. We decided to buy 2 more seats of EFD but the designers still fight over who will use the licenses. Due to the ease-of-use, designers can understand the fundamental operation after only 1 or 2 hours of training. And the results are as good as with traditional high-end CFD products."

Masayuki Sato, Hitachi Seisakusho, Japan



**Automotive** 

#### FloEFD for CATIA V5 Helps Save 4 Months in Design of an Automotive Valve

- Ventrex Automotive in Austria is a successful supplier of components to the German automotive industry
  - **Challenge:** Develop a new environmentally friendly valve in support of CO<sub>2</sub> based automotive air conditioning systems at 7-10 times higher pressures
  - **Solution:** FloEFD CAD-embedded in CATIA to simulate initial conceptual designs and to then improve them
  - **Benefits:** Reduced the number of prototypes by 50
    - Reduced pressure drops so that flow rates improved by 15%
    - Saved four months of design time
    - Predicted CFD performance seen in practice
    - Introduced new product to market faster

"FloEFDV5 because it simplifies the process of performing fluid flow analysis to the point where it can be accomplished by any engineer. By using CFD software that is embedded into our CAD software we could evaluate the performance of each new design iteration almost as fast as we could conceive it."

Daniel Gaisbacher, Project Manager, VENTREX Automotive GmbH





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