

## Press release

### **Kistler launches THOR 5F crash test dummy in cooperation with Cellbond**

New crash test dummy represents vehicle passengers that are smaller and lighter than average

Winterthur, Switzerland July 2023

**Kistler and Cellbond are launching the new THOR 5F ATD crash test dummy featuring a complete measuring chain. The model corresponds with the fifth percentile of the adult population – only five percent of all adults are smaller and lighter than the dummy. THOR 5F ATD consists of 250 separate components and, thanks to its adapted neck, clavicle and pelvis design, closely matches the human anatomy. Kistler developed the compact DiMod 1.6 digitizing module to accommodate geometries that are smaller than the standard THOR50 model. This enabled engineers to increase the number of signal channels to a maximum of 288 and to ensure a higher integration density in data acquisition.**

For more than 25 years, Kistler has been delivering high-precision measurement results in the field of vehicle safety. Cellbond and Kistler have now created a new-generation THOR (Test Device for Human Occupant Restraint based on drawings published in 2019 by the National Highway Traffic Safety Association (NHTSA) in the USA. The THOR 5F is the successor to the Hybrid III 5<sup>th</sup> Percentile ATD. It corresponds with the fifth percentile of passengers in crash tests and enables a more realistic simulation of frontal impacts, particularly with female vehicle occupants who are smaller and lighter than the average person. The independent European New Car Assessment Programme (Euro NCAP) recommends implementation of the THOR 5F for future crash tests, presumably from 2029.

#### **Improved biofidelity and easier assembly**

Cellbond began designing the new crash test dummy in September 2021. Kistler joined the project in January 2022 and took over the development of the ribs and rib stiffeners – components that the company also supplied for the THOR 50M. The project engineers significantly reduced the number of components required for the new model: from 750 parts required for the THOR 50M, to just 250 individual components in the THOR 5F. This greatly simplifies production and assembly of the dummy. THOR 5F is also even more closely matched to the human anatomy than its predecessors.

The neck, clavicle and pelvic bone are very similar to the human figure – which enables more realistic test situations and results.

### **Precise measurement technology in a tiny space thanks to high integration density**

Up to 160 measurement axes are installed in the crash test dummy to precisely assess the loads on occupants in a frontal crash. Kistler developed a special inertial measurement unit (IMU) for the THOR 5F that is mounted in the head, chest, pelvis and feet – i.e., where the body absorbs the initial impact. In an extremely small space, these IMUs measure three acceleration and three rotation rates. Sensor signals are converted from analog to digital measurement data in the sensor itself.

Kistler developed a special DTI recorder with 288 channels to easily connect the dummy's 160 measurement axes. This design is based on the THOR-50M recorder with storage and battery units physically separated and connected by a single cable. If the connection to the onboard measuring system is interrupted during a crash test, the recorder continues to log reliable measurement data. This also enables standalone use of the crash test dummy.

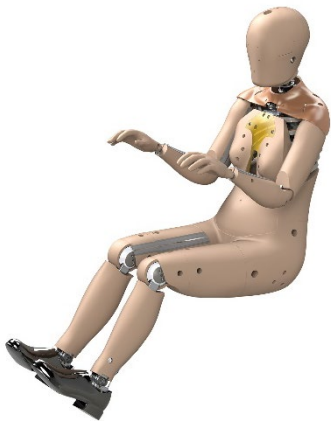
### **Complete solution from a single source**

Kistler is expanding its portfolio of solutions for crash test applications with the new THOR 5F. Along with the THOR 50M crash test dummy for frontal impacts, Kistler markets the World SID-50 dummy for side impacts. Kistler also supplies a wide range of other dummy and structural sensors with integrated technology for measuring physical values including force, torque, acceleration, angular rate, displacement, current and voltage. Kistler software solutions simplify the planning and execution of crash tests. An extensive portfolio of Kistler services ensures that test engineers have the reliable and precise equipment they need to design safe vehicles.

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The new THOR 5F ATD features improved biofidelity and easier assembly. The simplified rib structure is shown here.



The THOR 5F crash test dummy simulates vehicle occupants that are smaller and lighter than average.



Engineers can simulate realistic test situations using integrated crash test measuring systems supplied by Kistler. Shown here is a typical setup with crash block and crash wall along with a fixed and mobile multibarrier from ERNST.



Kistler developed new IMUs specifically for the THOR 5F ATD. They feature integrated DTI technology and combine six measurement channels in a tiny space. Located in the head, chest area, pelvis and feet they precisely measure impact forces.

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#### About the Kistler Group

Kistler is the global market leader for dynamic pressure, force, torque and acceleration measurement technology. Cutting-edge technologies provide the basis for Kistler's modular solutions. Customers in industry and scientific research benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge. Unique sensor technology from this owner-managed Swiss corporation helps to shape future innovations not only in automotive development and industrial automation but also in many newly emerging sectors. Drawing on our extensive application expertise, and always with an absolute commitment to quality, Kistler plays a key part in the ongoing development of the latest megatrends. The focus is on issues such as electrified drive technology, autonomous driving, emission reduction and Industry 4.0. Some 2,000 employees at more than 60 facilities across the globe are dedicated to the development of new solutions, and they offer application-specific services at the local level. Ever since it was founded in 1959, the Kistler Group has grown hand-in-hand with its customers and in 2022, it posted sales of CHF 434 million. About 8% of this figure is reinvested in research and technology – with the aim of delivering better results for every customer.