BIOFIDELIC CRASH TEST DUMMY
PRODUCT DESCRIPTION
PRIMUS UNBREAKABLE

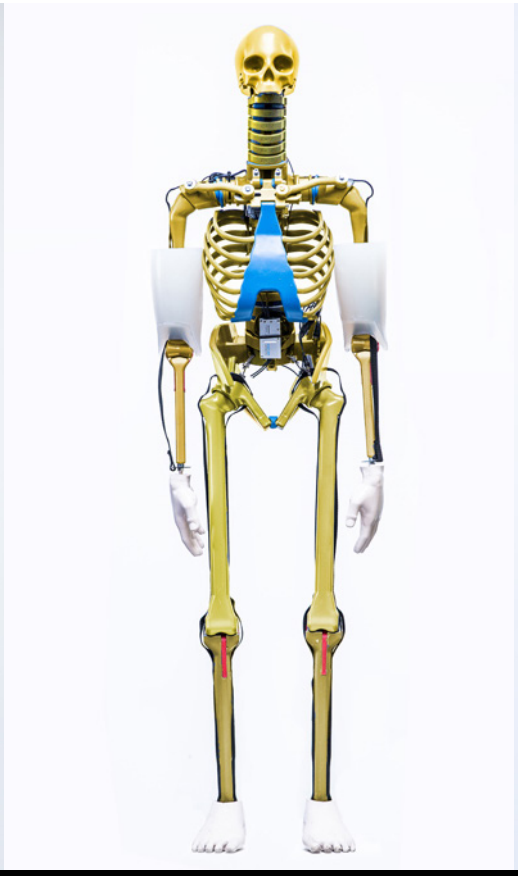
The properties of the biofidelic crash test dummy PRIMUS, especially the comparability with real humans, result from the interaction of the materials used and the special construction method.

The construction of the dummy's existing joints together with the muscle replacements leads to realistic degrees of freedom of movement of the trunk and the individual extremities. The elbow and knee joints of the dummy contain corresponding equivalents to the human ligaments.

The physical properties of the used materials correspond as closely as possible to those of „real human components". For example, the breaking strength of the bone replacement material is similar to that of human bone. The strength of these ribbons is also designed according to the human model. The internal structure of the biofidelic dummy is surrounded by components whose mechanical properties correspond as closely as possible to those of human muscle tissue.

In particular this is valid for to the hysteresis properties under pressure loads. This is important to gernerate realistic damages to vehicles and for the reproducibility of realistic human movement.

Due to the body density and mass distribution based on the human body, motion sequences, for example, can be simulated much more realistically than was previously possible with dummies made of steel and plastics.

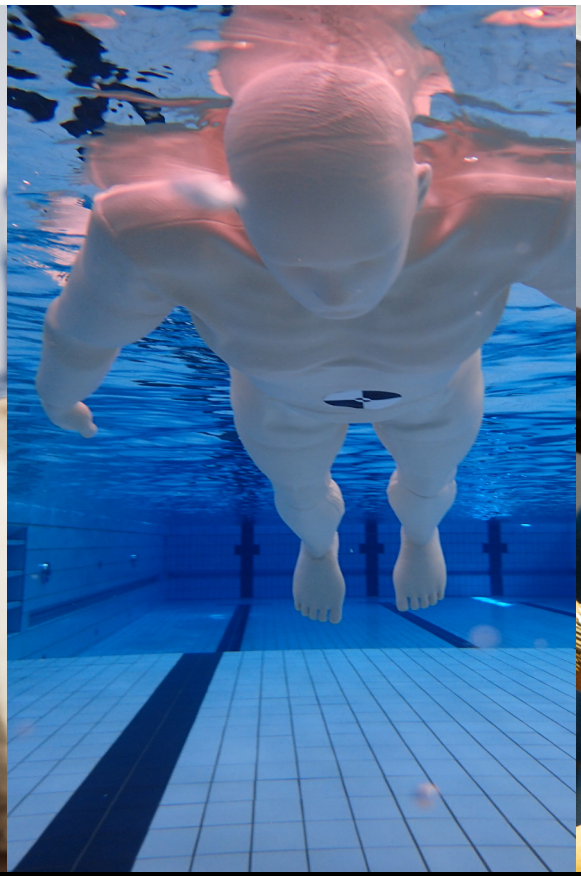


BIOFIDELIC CRASH TEST DUMMY
PRODUCT DESCRIPTION
PRIMUS UNBREAKABLE

The biofidelic crash test dummy “PRIMUS breakable” can be used in both sitting and standing positions without any modification. This is a unique construction compared to other crash test dummies. In a test situation the biofidelic dummy behaves like an unconscious person. Therefore the biofidelic dummies are suitable for every conceivable purpose in a wide variety of applications.

CTS dummy solution produces the dummies and the components at our facility in Münster. Individual adoption and individual solutions are possible. Thus, body weight and body dimensions can be adjusted within certain limits according to the client‘s specifications.

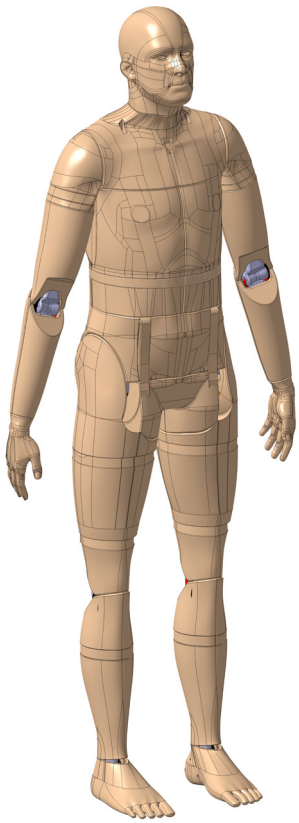
The bone skeleton of the PRIMUS unbreakable is extremely resistant. Therefore, no damage to the skeleton is to be expected after a test, which makes the PRIMUS unbreakable an ideal test specimen for serial tests. Therefore, due to these properties, inspection of the bones after a test is not necessary.

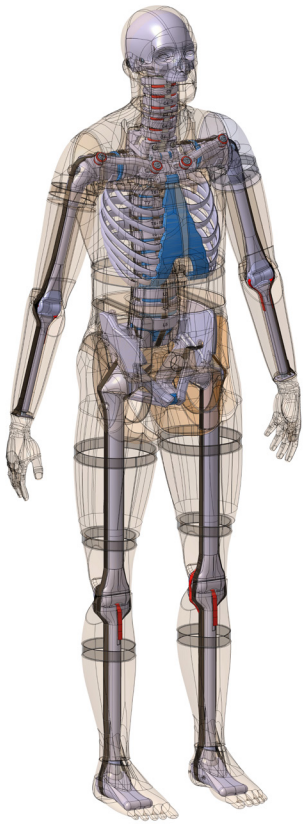


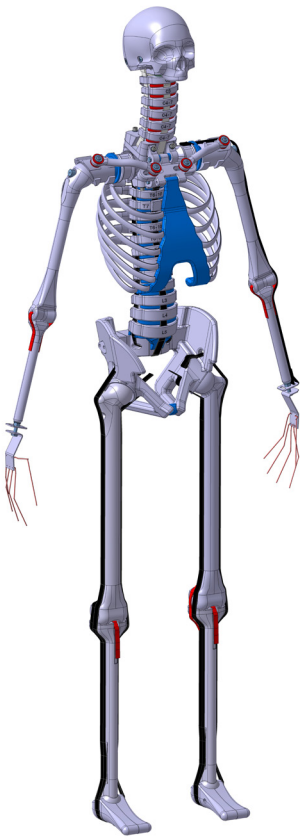
BIOFIDELIC CRASH TEST DUMMY DATA

PRIMUS UNBREAKABLE

Body height:	1,75 ± 0,01 m
Weight:	77.8 ± 0.2 kg
Age:	18- 65 years (corresponding to the 50-percentile male adult)
BMI:	25.4 ± 0.2 kg/m2
Bone material:	Epoxy resin / largely fracture resistant
Number of bones:	58
Soft tissue material:	Silicone / acrylic
Number of soft tissue:	45
Ligament and tendon replacement:	Polypropylene
Skin replacement:	Chloroprene rubber / latex
Joining techniques:	Screw connections / adhesive connections / clamp connections

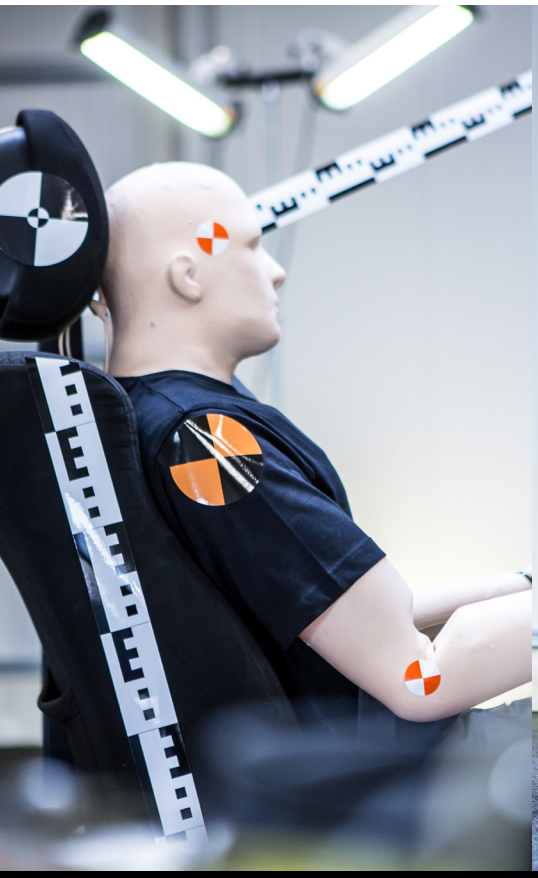






BIOFIDELIC CRASH TEST DUMMY
EXEMPLARY FIELDS OF APPLICATION
PRIMUS UNBREAKABLE

- Crash tests for the reconstruction of traffic accidents
- Pre-development crash tests for the automotive industry
- Tests for autonomous driving in non-standard seating positions
- Development and safety tests for the aircraft industry
- Life cycle and vibration tests (including earthquake protection rooms)
- Airbag tests Test of protective clothing (motorcycle clothing, equestrian sports, bicycle, fall protection)
- Blast or mine tests / bullet tests
- Accidents with mechanical technical equipment / crime scene reenactment (murder / suicide)
- Reproducible product tests with human bodies (e.g. mattresses)
- Rescue exercise for rescue services (fire department, mountain rescue)
- Water resistant: suitable for use under water when all openings are closed



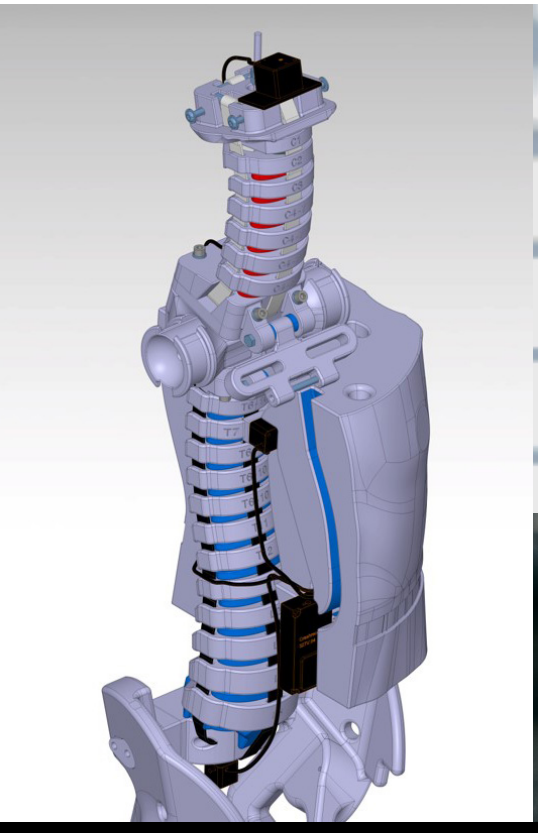
BIOFIDELIC CRASH TEST DUMMY MEASUREMENT TECHNOLOGY
PRIMUS UNBREAKABLE

As standard, the PRIMUS breakable is equipped with crash-resistant measuring technology from Kistler. The corresponding sensors are located in the head, chest area and hip. The corresponding data recorder is placed in the chest area and can be read out via LAN cable (max. 48 channels).
This fully digital measuring system, a permanent cable connection does not require to external measuring equipment. This recommendation is well suited for many applications in the field of motor vehicle accidents. But the correct equipment with measuring technology must always be adapted to the problem to be examined.

Suggestion standard equipment measurement technology:

- Head: 6-axis sensor
- Chest: 3-axis sensor
- Hip: 3-axis sensor

Technical information about the standard measurement technology can be found on the homepage of our measurement technology partner KISTLER.



BIOFIDELIC CRASH TEST DUMMY MEASUREMENT TECHNOLOGY
PRIMUS UNBREAKABLE

The PRIMUS unbreakable can contain standard built-in, very meaningful measurement technology.

Due to the in-house production any desired positioning of sensors can be realized additionally.

There is no limitation to standardized, firmly prescribed measuring positions (as with conventional dummies).

In this case, either measurement technology from our partner Kistler or measurement technology already available in your company can be used.