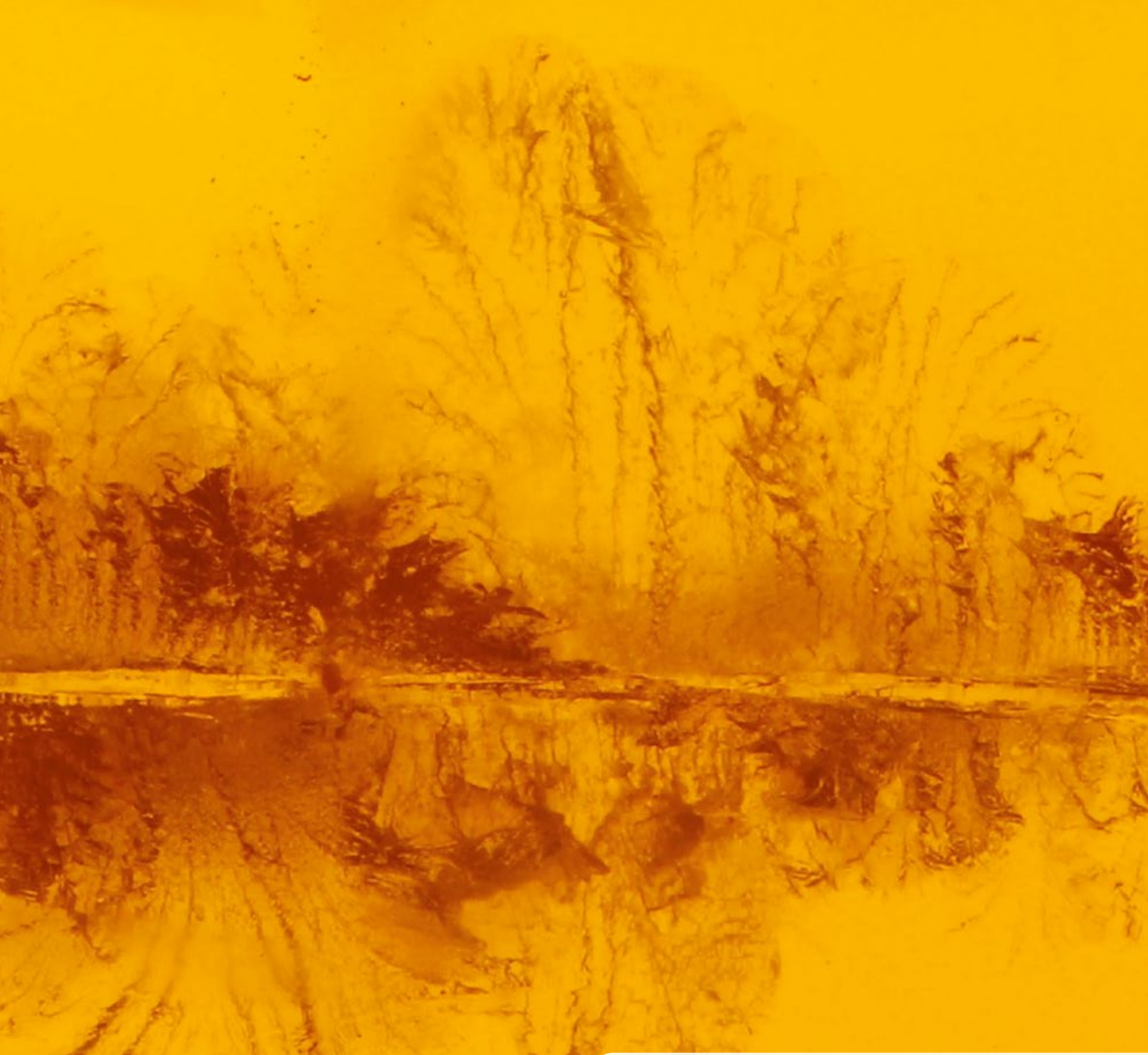


GELITA® BALLISTIC Gelatine

- Precise tissue simulation
- Official ballistic test material
- Reproducible crash test material

GELITA
Improving Quality of Life

GELITA® BALLISTIC Gelatine Portfolio

All kinds of simulations

BALLISTIC Gelatine immediately conjures the image of a crime scene, but it is not only used in forensic labs, it is also a very reliable and useful material for tissue simulations in medical applications, crash tests and simulations.

The DLR, the German Aerospace Center, uses artificial birds made from BALLISTIC Gelatine, in aerospace bird strike tests. The tests simulate real birds hitting the engines, wings or other parts of the fuselage. In crash tests, BALLISTIC Gelatine is used to simulate animals (e.g. wild boars or deer). BALLISTIC Gelatine is also used to evaluate injuries caused by drones and quadcopters to human arms and legs. To develop new medical techniques and train physicians or surgeons, it's BALLISTIC Gelatine to the rescue once again.

The German Cancer Research Center uses so-called BALLISTIC Gelatine "phantoms" to model human tissue, allowing trainee surgeons to practice even very complicated surgical procedures.

Gelatine test dummy for the training of minimal invasive surgery

All GELITA® BALLISTIC types can be used in different concentrations to simulate specific tissue.

Specification Overview – Find the ideal type

PARAMETER	TEST METHOD	BALLISTIC 1	BALLISTIC 2	BALLISTIC 3	UNIT
Gelatine Type		Type B	Type A	Type A	
Gel Strength (Bloom)	AOAC	250 – 290	270 – 310	255 – 265	g Bloom
Viscosity	6.67 %; 60 °C	5.00 – 6.00	4.80 – 5.80	3.40 – 4.60	mPa*s
pH	6.67 %; 60 °C	5.35 – 5.95	5.10 – 5.70	4.70 – 5.70	–
Transmission 620 nm	6.67 %; 620 nm	>= 95	>= 95	>= 93	%
Transmission 450 nm	6.67 %; 450 nm	>= 85	>= 85	>= 83	%
Conductivity	1.00 %; 30 °C	<= 120	<= 190	<= 300	µS/cm
Moisture	>= 16 h; 105 °C	9.0 – 13.0	9.0 – 13.0	9.0 – 13.0	%
Calcium	Complexometry	<= 150	<= 150	–	mg/kg
Total aerobic microbial count (tamc)	Ph. Eur./USP-NF	< 1000	< 1000	< 1000	cfu/g
Salmonella	ISO 6579	negative	negative	negative	/25g

GELITA® BALLISTIC 1 – For clear results in highspeed photo and video documentation

The very high transmission values of this gelatine guarantees a maximum of clarity when shooting films in highspeed. Typically used for simulations where objects passing the block need to be recorded. The gelatine concentration and preparation procedure will depend on the tests to be performed. Typical concentrations used are 20 wt.% or 10 wt.% gelatine solutions.

Perfect model for forensics: Excellent visualization of bullet penetration, deformation, fragmentation, path yaw and tissue disruption.

GELITA® BALLISTIC 2 – Crash tests without victims

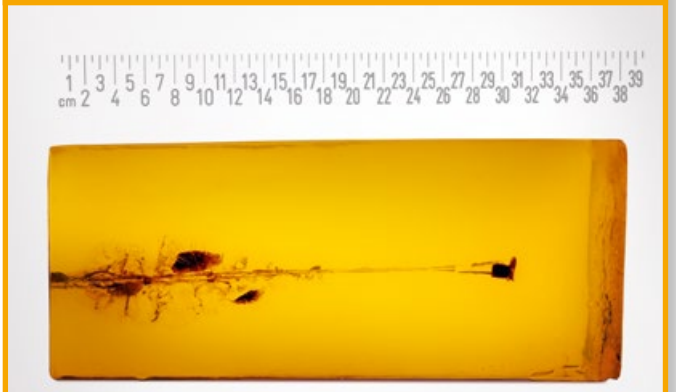
The high gel strength and very bright color of this gelatine, is ideal for preparing large phantoms used for special crash test models. The gelatine concentration and preparation procedure will depend on the tests to be performed. Typical concentrations used are 20 wt.% or 10 wt.% gelatine solutions.

The German Aerospace Center (DLR) uses artificial birds made from gelatine to shoot at airplanes. The tests simulate real birds hitting the engines, wings or other parts of the fuselage.

GELITA® BALLISTIC 3 – The official material for ballistic investigations, surgical research, test-runs and trainings

The very narrows specification of this gelatine for gel strength secures a maximum of high reproducibility, used e. g. by FBI, NATO, Federal Polices and Institutes. Typically used for simulations where objects remain in the block. The gelatine concentration and preparation procedure will depend on the tests to be performed. Typical concentrations used are 20 wt.% or 10 wt.% gelatine solutions.

Ideal properties for tissue simulations: Providing a better understanding of the interaction of projectile and tissue.



How to produce Blocks of BALLISTIC Gelatine

The following procedure can be used for all GELITA® BALLISTIC Gelatine products.

1. Cold water – preferred distilled water – is weighed and poured in a jacketed tank or a beaker. If necessary a preservative agent may be added.
2. The amount of gelatine is depending on the type of tissue simulation and chosen gelatine concentration. The gelatine is weighed and added slowly to the cold water while stirring. As soon as all gelatine has been added and is homogenously mixed, the stirring is stopped to avoid the intake of air bubbles.
3. Wait 1 to 2 hours without stirring until all gelatine is soaked with water.
4. The mix is heated in the jacketed tank or in the beaker using a water bath to 55 °C ± 5 °C. Temperatures above 60 °C should be avoided to reduce thermal degradation of the gelatine. Stirring is done only occasionally and slowly to avoid air intake.
5. When all gelatin is completely dissolved, the mixture is stirred carefully a last time for homogenisation.
6. If the solution contains too many air bubbles, wait until the bubbles reach the surface and remove them with a foam spoon or spatula.
7. The warm (> 40°C) solution is filled (preferably siphoned from the bottom of the container) to the casting device.
8. The resulting gelatine block is stored inside the mould at room temperature over night for gelation.
9. To remove the block from the mould, dip the mould briefly into hot water. Alternatively, a steel cast with a hole at the bottom (closed by a screw during filling of the cast) can be used and the release is done by feeding compressed air through the hole.
10. Released blocks should be wrapped with a moisture sealing barrier such as clear plastic wrap to prevent loss of water on drying.
11. The gelatine block has to be stored in the cast or unmolded for conditioning for 18 to 66 hours in a refrigerator at 4 to 15 °C ± 1 °C depending on the ballistic test procedure. For larger blocks even longer storage times may be necessary. It is important to use the same experimental setup, temperatures and time schedules for all blocks if the results need to be comparable.
12. The ballistic test procedure should be carried out at a defined temperature.
13. Never use remelts of a used block for the preparation of new blocks as each thermal processing of the gelatine will degrade its physical properties, especially gel strength.

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