



**Alongside CAD, computer projection and augmented reality, car designers still use a very traditional method to bring their designs to life. Clay, an industrial plasticine, is heated and stored in a precise and thermally safe clay oven, producing life-size models.**



Clay model in the design studio

The team at Nissan's London design studio knows what is needed to make a good car design a great one. At the start of a new design study, conceptual blueprints and CAD renderings can advance the design process only up to a certain point. After that, the team has to see its design in 3D and life-size dimensions to get a proper idea of the look and feel of the new car.

Clay – or industrial plasticine – is plasticine made from waxes, oils, fillers and pigments. The most commonly used brown colour is designed to make the various shapes easier

to see. “Working with modelling clay is an art form; our team members are sculptors,” says Simon Shaw, Model Coordinator at Nissan’s design studio. “Sometimes they even work without looking, as they prefer to feel, rather than see, the smooth flow of a line”. Using a special plasticine, clay, the new car designs are built on a life-sized wooden and foam base frame. Like plasticine, clay never gets really hard, so the clay model can be adjusted after any design tweaks. The life-size clay model gives the team a very different experience from viewing designs on the computer.

“When the design is in front of you, it reveals things you can’t see on a computer screen – we might change the lines to influence light and shade on a side panel or to optimise the height and shape of the roof”. At room temperature, the modelling clay is solid, so car designers can straighten, mill, grind or chip parts. To first apply the clay to the base frame, it must be softened by heating it up to 60 °C. “If the clay gets too hot, it starts to deform and blister,” explains Simon. “If it’s too cold, it’s not supple enough to be applied to the frame”. The all-important, specific temperature conditions for modelling clay are found in a heating oven, the clay oven.

The global model-making community is a manageable size. Kolb Design Technology GmbH & Co. KG from Deggendorf in Bavaria is one of the few companies in the world that specialises exclusively in this market. The company’s history goes back to 1890, when the German pharmacist Franz Kolb invented plasticine. In the company’s showroom, you can inspect and try out the milling machine, clay heater and clay oven, which are specially designed for the needs of design studios.

Simone Göbel Sales Classic + Studio Equipment at Kolb explains why temperature control equipment manufacturers like Memmert adapt their standard heating ovens to special plasticine ovens. “Some of the modelling clay available on the market is made with sulphur as a filler. This is completely harmless to health, but the steam could be deposited on the electronic components of the heating oven. The clay oven therefore has a virtually gas-proof interior. Furthermore, parts of the electronics are coated with a protective varnish”. Another important aspect to the design of clay ovens is



Heavy-duty reinforced Memmert clay oven

thermal safety. A good 100 kilograms of modelling clay are needed on average to shape a clay model. It can get tight in a clay oven. This is a real stress test for a heating oven, so they are usually equipped with heavy-duty steel grids. To prevent the clay blocks from overheating to a dangerous level, if they come into contact with the Memmert heating elements due to overloading, the heating control ensures that the temperature of the unit's interior walls never exceeds a potentially critical value. Generally, the heat output cannot exceed 120 °C. The unit shuts down completely.

“Digitisation has revolutionised the design process,” explains last Göbel. “CAD design and modelling was a first step. Now it's augmented reality, but we're convinced that the clay model is far from over”. It will probably be ‘both...and...’ instead of ‘either...or...’ in the future. She is not alone in thinking this. After all, humans have three skills over computers which are essential in car design: creativity, emotionality and their sense of touch to feel ideal shapes and structures. Swedish scientists found out in 2013 that humans can feel unevenness as small as 13 nanometres. By way of comparison, a single water molecule is approximately 1.5 nanometres. And so manual precision work on clay models will continue far into the future.

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#### **Overview of the main topics**

- Design studio, car design, model-making
- Industrial plasticine, modelling clay, plasticine
- Clay model,
- Oven modelling clay, clay oven
- Kolb Design Technology, Kolb Clay
- Memmert, heating oven

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