

GINA – The BMW Group Design Philosophy. Challenging established concepts, hazarding visions.



Successful design arouses desire. In order to achieve this, it is more crucial than ever before that car manufacturers create the conditions that allow customers to establish a close relationship with their cars. Therefore, designers seek ways to promote and intensify people's identification with their car that reach beyond pure aesthetics. In the premium segment in particular, customers demand cars that stir emotions and allow them to express their individuality. BMW Group Design has set another deepened objective for designing new cars that moves today's consumers and their demand for enhanced utility and more versatility to the top of their agenda. An innovative concept introduced by BMW Group Design prepares the ground for this new approach: the GINA (Geometry and Functions In "N" Adaptions) principle grants more freedom for car design. It allows the creation of products with a design and functional range that express individuality and meet the wide variety of requirements of those who are using them.

In the 21st century, customers approach their purchasing decision with a high degree of assertiveness, clearly defined requirements and subjective conceptions – particularly when it comes to selecting their means of transport. In recent years, the interests and priorities that motivated them have changed and, more importantly, they have become considerably more diversified. This development will continue in the future. Today, the BMW Group is already responding to the highly diversified range of customer requirements and heightened expectations by providing services such as a substantially more varied product range, ever increasing possibilities for personalization and requirement-oriented production among others.

Future customer requirements as a benchmark.

By introducing the GINA philosophy, BMW Group Design presents ways of meeting these challenges in the future. The philosophy expresses the readiness and ability of BMW Group Design to consider individual customer requirements as an integral part of car development. Christopher E. Bangle, Head of BMW Group Design, speaks with conviction when he says: "Personal customer requirements will broaden the context of our products and change the core values that define our industry along the way." For more than ten years now, these issues have inspired Bangle's ideas. Time and time again, these ideas have been motivating the BMW Group Design team

to break new ground and to find pioneering solutions. These results have spawned new customer expectations which in turn inspires designers to develop further innovations.

GINA: Geometry and Functions In “N” Adaptions.

The GINA philosophy offers designers as well as development and production specialists an opportunity to challenge existing principles and conventional processes. Solutions that will benefit the car of the future are examined without predefined rules and from as many perspectives as possible. This also involves questioning what is believed to be set in stone. Does a car roof really have to rest on pillars and be bordered by windows? Do all functions have to be visible at all times, even when they are not needed? How many personalization options does my car offer? Are there any possible alternatives to the rigid body shell made of steel or plastic?

Questions like these lead to groundbreaking, cross-segmental solutions – and visions of the future of individual mobility. An essential principle of the GINA philosophy is to deliberately integrate the potential of new materials and pioneering, innovative constructions into the creative design process, and the idea of challenging existing manufacturing methods and material concepts. BMW Group DesignworksUSA, a subsidiary of the BMW Group that operates globally and caters to companies across the industry, has greatly inspired the design team at BMW Group Design. The design agency's extensive experience with projects for a number of industrial partners outside of automotive engineering, predominantly in the field of material development and production.

It is in the nature of such visions that they do not necessarily claim to be suitable for series production. Rather, they are intended to steer creativity and research into new directions. This approach helps to tap into formerly inconceivable, innovative potential that reaches far beyond the appearance of future cars and takes into account not only materials and structures but also functions and manufacturing processes. The potential requirements of tomorrow's customers serve as a benchmark. In addition to aesthetics, the GINA philosophy also deals with ergonomics, the functional range and all other factors that rule customers' emotional relationship with their car.

With the development of the GINA Light Visionary Model, the BMW Group presents examples of visionary solutions. For the first time, exemplary adaptations of various approaches described by the GINA philosophy are brought to life to illustrate the potential impact of this concept on the future of automotive engineering. The limits of current material properties and manufacturing processes are projected far into the future. All innovations that these cars present focus on the variable adaptation of form and function

based on individual and situation-related driver requirements as well as the demands of the driving situation itself. Therefore, both the exterior and the interior are equipped with a variety of components that differ significantly from conventional solutions, not only by the way they look but also in terms of their basic properties. For example, the GINA Light Visionary Model presents features such as a virtually seamless outer skin made of a textile fabric that stretches across a moveable substructure. Functions are only offered if and when they are actually required. The drastic re-interpretation of familiar functionality and structure means that drivers have a completely new experience when they handle their car. Reducing the car to its essentials and adapting it to the driver's requirements enhances the car's emotional impact and achieves a crucial objective of the GINA philosophy.

Visions spawn innovative concepts.

The strategy of challenging what is established, exploring new possibilities and focusing on customer demands and requirements has inspired the BMW Group to implement a wide variety of innovative concepts. It has also affected the design of production cars in ways that are completely new and unprecedented by any other car manufacturer. A wide range of innovations that have been acclaimed for their virtually revolutionary character is actually based on the GINA philosophy. On the way from vision to production model, visionary ideas have been turned into new concepts.

Both the sculptural design presented by the BMW X Coupé concept car, for example, and the interplay of convex-concave surfaces that has affected the design of all production vehicles, are derived from visions with an innovative power. This power is generated by the unrestricted freedom that characterizes the quest for wider design possibilities. In the example mentioned above, the natural material properties of the outer skin have been deliberately incorporated into the design process. The design process has integrated the twisted surfaces and has used the specific sculptural aesthetics of the convex-concave elements that are created by the material's reaction. The design of the BMW Z4, which has been modeled on the BMW X Coupé concept car, is a striking example.

These visions could only be implemented because of the development of completely new manufacturing technologies. As before, the objectives defined by the GINA philosophy have been achieved thanks to the special expertise of production engineers and their ability to move beyond traditional methods. Their effort has allowed the creation of a form language that has not only significantly enhanced aesthetic standards and the significance of design as an expression of product substance, but also the manufacturing processes themselves.

Versatility in function and form stirs emotions.

Some of the pioneering visions that are based on the GINA philosophy have also been implemented in the interior design of concept cars such as the BMW CS1 concept car of 2002. This car's interior is equipped with control and functional elements that become visible only if and when the driver wishes to avail of them. Thanks to a flexible, Neoprene-covered instrument panel, the driver's attention can focus on the required functions. This situation-oriented variability of form and function invites the driver to engage in a dialogue with his car. Using these functions, the driver experiences an emotional reaction. This is caused by the fact that he can adapt the car's appearance to suit his personal wishes. In this application, the intelligent deployment of flexible material dispenses with the need for complex mechanical features. At the same time, the versatile appearance has a natural aesthetic appeal.

The control concept iDrive, first demonstrated by the BMW Z9 and refined in the BMW CS1 concept car has long since become established as part of BMW production models. It is a perfect enhancement to the spirit of the GINA philosophy, as it is guided by the principle of displaying only those functions to the driver that are relevant to the individual driving situation. The cockpit adjusts to the driver's needs. As he handles the car by interacting with it, the driver forms a strong emotional bond.

Integration of meaningful functions that are relevant to the customer.

It is one of the GINA principles to challenge existing solutions in order to broaden the context, thus extending the scope of possibilities for customers. In the engine compartment of the BMW CS1 concept car, the engine cover has been replaced by flexible stretch material. A graphical display panel provides information on the particular arrangement of the service functions, integrated zip fasteners facilitate easy, hands-on access to the filler caps of the cooling water and wiper water tanks. A number of functions – cover, orientation and access to service points – are integrated into one component in a logical and attractive manner. This deliberately minimalist approach to the deployment of components is an active contribution to the protection of resources.

Rapid Manufacturing for more versatility.

As a result of our interdisciplinary cooperation, we have developed a method that allows manufacturers to decorate outer skin components that have been preformed by conventional methods with individually configured high-precision contour lines prior to their reintegration into the manufacturing process. The GINA design philosophy has been applied to Rapid Manufacturing to create an unparalleled method of manufacturing single components fast, cost-efficiently and with a focus on individual requirements.

This combination of processes was first used during the production of hoods for the BMW Z4 M Roadster and the BMW Z4 M Coupé. These models received their distinctive contour lines at a separate production stage which differed significantly from conventional sheet metal processing. The lines were embossed into the hood with pin-point precision by a robot-guided steel pin. This approach allows for entirely new ways of individualized production. With Rapid Manufacturing, customer preferences can be implemented when car body elements and other components are designed to the specifications of designers.

New materials and manufacturing processes create a natural aesthetic appeal.

The cockpit surface of the BMW Concept Coupé Mille Miglia 2006, which has been influenced by the technology of industrial origami, is another example of vision-based, revolutionary design. It has produced solutions that reflect several guiding principles of the GINA Philosophy. The number of components is significantly reduced compared to conventional cockpits while completely new methods of combining different materials have provided valuable stimulation for the conception of innovative production technologies. The manufacturing process has deliberately relied on the expertise and technical skills of highly-qualified specialists, whose competence is a prerequisite for the practical implementation of design visions.

The exterior design of concept cars also reflects innovative concepts resulting from the practical implementation of visionary ideas. Both the sculptural design presented by the BMW X Coupé concept car, for example, and the interplay of convex-concave surfaces that has affected the design of all production vehicles (introduced for the first time in the Z4), are derived from visions with an innovative power. This power is generated by the unrestricted freedom that characterizes the quest for wider design possibilities. The design deliberately uses the interplay of splines as character lines and the natural flow of stretched convex-concave surfaces.

The designer's metal processing ideas for the interior of the BMW Mille Miglia Concept Coupé were inspired by the traditional Japanese art of paper folding. An inherently stable, three-dimensional structure was created from two-dimensional V2A sheets of metal by means of a special laser cutting and folding processes. This technique produced joints which were strategically employed for integrating ventilation functions into the cockpit without the need for additional elements. The result was an innovative solution with a natural aesthetic appeal that was produced with a minimum amount of tools.

The GINA principle: Priority for sustainable solutions.

The GINA philosophy objective also includes the quest for sustainability on different levels. The search for new materials and production technologies favors solutions that work with less raw material and energy. A minimalist approach to the use of components and production stages yields ecological and economic benefits. As part of our endeavor to create social sustainability, we are looking for production methods that rely on the expertise of highly qualified specialists instead of expensive manufacturing tools.

With its goal-oriented research into new materials, the assessment of production processes without tools such as Rapid Manufacturing and the incentive to incessantly challenge existing solutions, the BMW Group is already equipped with a variety of tools that bring the implementation of the GINA philosophy to life for the customer. Research objects such as the GINA Light Visionary Model demonstrate that the principles of the GINA philosophy grant designers maximum freedom for approaching their subject with visionary thinking. This approach is used for finding solutions that offer customers new possibilities of adapting forms and functions to suit a variety of personal requirements and the driving situation in hand. They pave the way for innovative ideas that can be implemented in concept cars in order to stimulate series production.

This way, visions can create products that allow drivers to interact with their vehicle in ways that reach far beyond the conventional individualization potential established thus far. The GINA philosophy allows BMW Group Design to support and steadily enhance this interaction and help drivers build a strong emotional relationship with their car. With its sensible and careful use of resources for products and their development, the GINA principle contributes to the sustainability of future car generations. After all, the social significance of the GINA philosophy is a product of its heightened application of social aspects both to the development processes and to the conscious reflection of customer requirements.