GKD – Gebr. Kufferath AG, an owner-managed technical weaver, is world market leader in the field of woven metallic architectural and design fabrics. Seven production facilities, two in Germany, the others in the USA, United Kingdom, Spain, South Africa and China, a branch in Dubai and agents all over the world ensure that GKD is always close to its worldwide market partners.

ag4 media facade GmbH bundles the expertise of its own architects and media specialists in the discipline of “mediatecture”, a discipline invented by ag4 itself. In collaboration with experts for multimedia, urban planning and communications, ag4 develops integrated solutions for media façades. Renowned reference projects speak for the company’s integrated competence.
Wire mesh: intelligent synthesis of aesthetics and function.

It is often the aesthetics of the textile-like structure of GKD’s wire mesh – originally a purely industrial material – which provides the initial impulse for the use in architecture and design. Supple and reflective, full of rhythm and tension, opaque or almost totally transparent depending on the light incidence: woven wire mesh for façades, partition screens or walls has sensual qualities. This effect is further enhanced by the weavable width of up to 8 m combined with practically unlimited length. Wire mesh follows any kind of architecture – as a versatile and apparently seamless outer skin.

It is the interplay of this creative potential with the outstanding functionality of the material that explains the success of GKD wire mesh. Whenever high-quality aesthetics and demanding architectural requirements have to be brought into harmony stainless steel wire mesh reveals its real strengths.

The flexible cables running the length of the woven panels are interwoven with robust weft wires. This makes the mesh flexible and at the same time stable. Its enduring resistance to weathering and corrosion, its fire-resistance, easy maintenance and recyclability all qualify the material as a long-lasting protection against rain, wind and sun. Additionally, used as safety balustrading or as a climatic membrane the metallic fabric offers functional added value for intelligent facility management. Worldwide, the unique appearance of GKD wire mesh characterizes the façades of high-rise buildings, stadiums, museums, cultural centers, hotels, airports and – frequently – of car parks.

Media: using architecture to communicate messages.

The medialization of architecture is conquering public space. The particular challenge lies in the conservation of transparency while offering an economic solution. Charged with images, messages or symphonies of color, media can give architecture a hybrid character. On the one hand, the static effect of architecture is revoked; on the other hand, the spectator is invited to think. But the quality and effectiveness of media façades depend ultimately on the successful tuning of the intricate interplay between communicative purpose, design-technical implementation and energy efficiency.

Apart from projection and back-projection – both of them techniques that only work at night, which require the creation of special projection surfaces and the deployment of extremely expensive projectors at precisely determined positions – billboards are the conventional procedure for the medialization of façades.

The rapid technological development of high-quality and high-luminosity semiconductors, light emitting diodes, or LEDs for short, has now cleared the way for the displaying of large-scale media content on building façades. As a holistic, visionary lighting solution, LEDs combine high luminosity with longer service life, smaller component size and the possibility of controlling them easily via Internet from any PC. A conventional lightbulb produces 3 lm/W; a halogen lamp 20 lm/W; an LED 60 lm/W. So an LED is twenty times more efficient than a lightbulb. The smaller the distances between the image dots, or pixels, the greater the resolution and the better the image quality.

The company ag4 has developed an alternative to conventional designs for electronic façades: the principle of the transparent media façade. This approach is based on the integration of LEDs into optically translucent, permanently installed carrier systems – combined with a strategic communications concept specific to each individual building which is realized in the form of an individually tuned display software. Another speciality lies in the invisible technology that allows high-quality images to be displayed even in daylight conditions.
**Mediamesh®**: transparent platform for complex content.

Stainless steel wire mesh with interwoven LED profiles provides a permanent, integrated and intelligent medialization of architecture. In an alliance of strengths, GKD and ag4 have developed Mediamesh® as a system that combines all the product advantages of wire mesh and IT-based LED technology. The basis is a woven cable mesh, for example, GKD’s mesh type “Tigris”. Sleeves are woven into its warp cables at predefined intervals. These form the mechanical interface for special round profiles into which the LEDs are inserted and sealed with a waterproof resin. The profiles, open at the front, are inserted into the sleeves in the cable mesh which is woven to the specified width and length. 16 of these profiles are interconnected by cables. Completely prepared and finished, the Mediamesh® is rolled up and transported to the building site ready for installation.

After the installation, the supply of power and data to the LEDs is handled by control units – consisting of a power source and electronic components – which can for example be concealed in the ceiling and connected to a central server located in the building. Once all the cables have been connected the Mediamesh® display can be operated via the Internet – in an unusually generous color depth of 36 bit at a frame rate of 400 Hz. Power consumption for a 2,000 sqm façade will average 70 to 90 kW/h; for 500 sqm 15 to 22 kW/h. Maintenance is also uniquely simple within the patented construction of Mediamesh®; individual LED profiles or control units can be easily replaced if necessary.

Mediamesh® can be woven and finished in any size or special shape, individually tuned to the envisaged application and the image quality required. The medialized mesh can be used around the clock for any kind of display, ranging from simple graphics to video quality. The decisive factor for the image resolution is the ratio of horizontal (from 4 to 40 cm) to vertical pixel intervals (from 6 to 40 cm): the denser the pixels, the finer the resolution. Another important factor is the viewing distance of the spectator: the closer one stands to the image, the closer the pixels must be to each other. For reasons of cost efficiency, it may be advisable to reduce the pixel density in the mesh. For example, for graphics a minimum viewing distance of 20 m is recommended and ideally a distance of 50 m or more. With the appropriate resolution a display can be seen from as far as several kilometers. Here individually tuned display software compensates for the lower resolution. Generally speaking there are three planning parameters which determine the specific technical construction of Mediamesh®: the viewing distance, the size of the media surface and the type of video display software.

In contrast to LED boards and temporary single pixel systems, Mediamesh® is permanently weather and temperature resistant – it can even be installed beneath an ice surface. The mesh, adapted to the individual architecture and equipped with pixels that can be triggered individually, has no particular effects on the façade construction owing to low surface weight and wind loads imported to the structure. Another relevant aspect – especially in the case of large surfaces – is the considerably cheaper installed cost of Mediamesh®. In contrast to LED boards, conventional media formats like 16:9 and 4:3 do not have to be complied with. This flexibility of formal alignment allows this new electronic media to be integrated into architecture without compromising its design proportions. Thanks to the extraordinary appearance of the stainless steel mesh carrier structure, Mediamesh® is the only pixel-oriented media façade system which functions both as a spectacular medial skin and, when switched off, as a decorative mantle. The lightness of the integrated LED technology preserves the textile-like transparency of the wire mesh and transforms it into an intelligent platform for complex visual content. The system really shows its magic when logos or animated symbols appear in isolation on the transparent wire mesh. Then they form a mysterious overlay which perfectly fuses the architectural reality behind the mesh with a world of virtuality.
**Illu**mesh® is especially suitable for large-scale, nighttime illumination of façades. This creative illumination is achieved through intelligent implementation at a relatively low expenditure, with the high-performance LEDs lighting up the complete surface of the stainless steel wire mesh structure. From a distance, the media technology in the profiles mounted in front of the mesh blends with the structure of the mesh – what you see is the illumination, not the technology.

The quality of the illumination depends on the relationship of the horizontal and vertical pixel intervals. The recommended ratio is a vertical interval for the LED profiles of 50 to 400 cm and a horizontal pixel interval of more than 4 cm. Depending on the interval between the profiles, **Illu**mesh® offers a wide spectrum of visual design potential, ranging from changing color effects to complex animation and limited graphic performance. To optically enhance a building at relatively low cost, an individually programmed lighting concept can address each individual pixel in every color and thus create a color depth of up to 16 million colors which are well reflected by the wire mesh.

Compared to conventional lighting systems, the arguments for **Illu**mesh® are its higher image resolution and its maintenance-free operation. In addition, the robust, weather and temperature resistant properties of the projection system guarantee excellent functionality, making **Illu**mesh® the perfect choice for a permanent, transparent media surface for nighttime illumination which can be operated via the Internet.

**Illu**mesh® façades have plenty of magic of their own. The projection of the monochrome LED light structure on the round stainless steel wires creates a three-dimensional optical effect. A change of the viewing angle adds extra dynamics to this effect as the light rays seem to move with the spectator, apparently changing their direction from vertical to diagonal.
As a face turned to the outside world, every façade makes a statement. In addition to its traditional role as protection against cold and heat and undesired entry, as an independent "inter-space" it façade passes information inwards and outwards, and bridges interferences. For this reason, the architecture of façades has always reflected the advance of technology. Media façades exploit the fascinating scope of electronically controlled forms of expression. These transform static façade designs into a reciprocal interaction of architecture and media content. As an integral component of architecture with dynamic validity, Media mesh® and Illu mesh® make it possible to create a technologically visionary media façade.

In their function as a symbol of identity, transparent media façades made of Media mesh® and Illu mesh® turn the particular architecture into a vivid experience and communicate the processive development of corporate identity by picking up on the architectural notions and translating and extending them. But they never dominate the building itself. Due to their transparency, they form a medialized skin which is completely adapted to the architecture. Just like the skin of a human being, a transparent media façade, thanks to the textile-like structure of the wire mesh, is still attractive even without illumination, or, to maintain the simile, without make-up. In addition, such a façade makes it possible to redesign old façades of existing buildings without intervention into the actual substance of the building.

The precondition for the success of a transparent media façade is a sound concept for content and context, to ensure that the relationships between the inhabitants of the building, their message and their respective surroundings are made visible, and that space is available for advertising purposes, if required. As an integrated solution, Media mesh® and Illu mesh® represent the synthesis of a highly functional, technical product, of an individual design precisely tailored to the required content, and of sustainably valid content itself.

The interplay of the two mesh systems enhances the façade both visually and emotionally. Skilful media design takes the distance of the spectator into consideration and synchronizes the separate sections of varying resolution into a unified, allround dramatic experience. The optical overlaying of the different display forms creates the impression of a double media veil. Another fascinating aspect of the combination of the two systems is the transparency of the medialized wire mesh. This ensures the seamless adaptation of the individual architecture even when the media façade wraps the whole building thus preserving the identity of the building no matter how large the media display. Against the significant backdrop of the architecture, video images fuse with dramatic color effects which dissolve the concrete images, only to set them free again as the dynamic seeds of new images. Great attention is therefore paid to conceptualizing content for such installations. Only a display concept individually developed for the specific project can ensure an authentic harmony between the media message and the respective architecture, and so achieve a perfect balance between expenditure and performance. This makes tailor-made software alongside sustainable service essential elements for success.
Checklist for media façade.

For GKD and ag4, service means partnership from the start. This checklist will help you to get an overview of the essential parameters for the planning of your media façade.

What is the surface area of the planned media façade?
What is the minimum viewing distance from the façade?
What is the aim of the video display?
Which target group will the video display address?
How much attention can be expected from the target group (spontaneous duration of observation)?
What sort of video display/what content is required (adverts, information, brands, emotions)?
At what time of day is the media façade to be operated?
What is the building used for?
Which compass direction will the media façade face?
What is the available budget?

The way to a transparent media façade.

The construction of transparent media façades is a challenge in terms of creativity and planning. Communicative goals, cost-effectiveness and efficiency must be defined regarding content and technology before they are elaborated into a concept. For this reason, planning starts with the meticulous definition of the frame parameters. Experts at GKD and ag4 with years of experience are ready to advise you in the early stages of planning.

With their profound experience in architecture, technology and media design, these proven experts will accompany you through all stages of development and work with you to develop a customized concept for design and video display. On this basis, GKD will then produce the precisely equipped wire mesh in the specific dimensions required for your project. ag4 will create the authentic content and will provide expert handling of video display operation and service. In this way, you will receive an integrated turnkey solution, i.e. fully installed, internet connected, and display capable, all from a single source.

At www.mediafaçade.com/mediamesh, you will also find specific questionnaires relating to your individual requirements which will make it easier for you and us to work on your project.