

## Diamond-like coatings

Bekaert focuses on the development, marketing, production and sales of **Diamond-Like Carbon (DLC)** and **Diamond-Like Nanocomposite** coatings for a variety of industrial application areas.

These coatings are deposited using a **PACVD (plasma assisted chemical vapor deposition)** process at a deposition temperature less than 220°C. Another deposition technology is also used: PVD (Physical Vapor Deposition).

Bekaert diamond-like coatings differ from other diamond-like coatings thanks to their unique properties - developed with clear understanding of customer needs in specified markets.

Our expertise in the field of diamond-like coatings has benefited many companies from a variety of different industries:

- Automotive engine parts (Dylyn®Plus)
- Plastic mold components (Dylyn®/DLC)
- Optical disc mold parts (Dylyn®/DLC)
- Race engine parts (Cavidur®)
- Electronics (Dylyn®/DLC)
- Textile machinery parts (Dylyn®/DLC)

Working closely with those industries Bekaert is extending the horizons of the technology by constantly seeking new applications, solutions and opportunities.

The company has a range of vacuum deposition systems for job and high-volume coating applications and guarantees on-time delivery. The vacuum deposition systems are designed and built by our experienced design engineers.

Bekaert works closely together with its customers in order to find solutions to existing or potential technical problems and where necessary in order to develop new coatings or to modify existing coatings.

Let us work with you to show and explain how Bekaert can improve the efficiency and uptime of your production process!

On request, Bekaert will provide customer references for you to contact.

## Quality control

For specific applications e.g. race car components, a lot of control is required. This control consists of checking whether the coating meets the customer's requirements as for thickness, adhesion etc.. The most important matter is, however, checking whether the coating meets the quality criteria that Bekaert determines.

## Coating Definitions

Diamond-like Coatings are amorphous carbon based coatings with a high hardness and a low coefficient of friction. Their unique composition and structure results in excellent wear resistance and non-sticking characteristics. These coatings are thin, chemically inert and have a low surface roughness. They can be tailored to have a wide range of electrical resistivity.

The standard thickness of these layers is situated between 0,002 and 0,004 mm.

### Diamond-like carbon coatings (a-C:H)

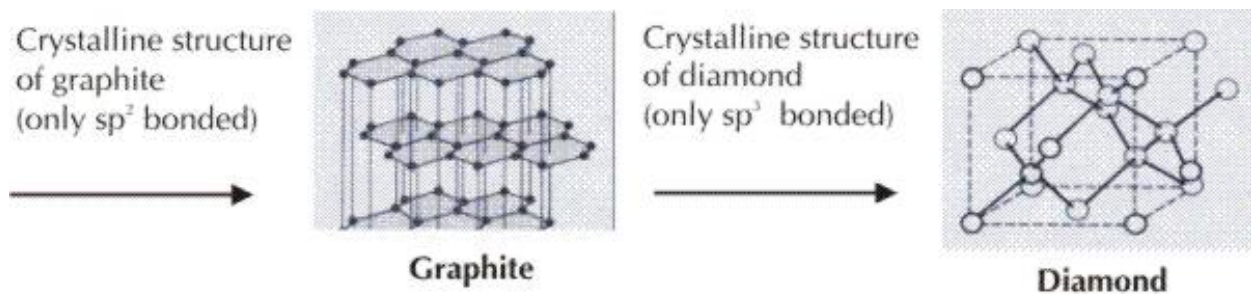
DLC coatings are a mixture of  $sp^2$  and  $sp^3$  bonded carbon atoms with a hydrogen concentration between 0 - 80%.

This coating provides the highest hardness and abrasion resistance characteristics.

Typical applications include high wear environments involving molds and metal forming.

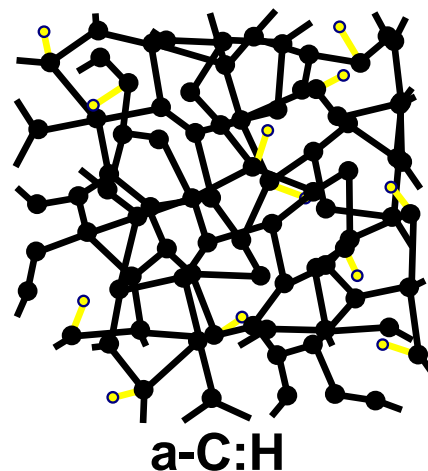
### Diamond-like carbon coatings (a-C:H)

DLC coatings are a mixture of  $sp^2$  and  $sp^3$  bonded carbon atoms with a hydrogen concentration between 0 - 80%.

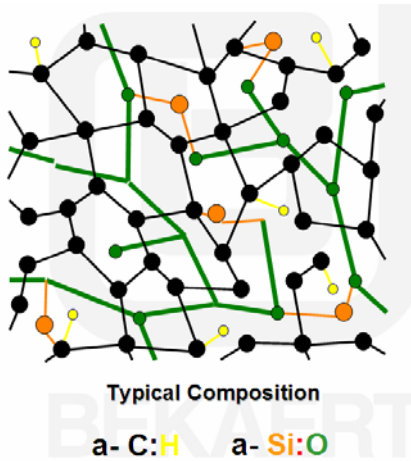


A DLC coating provides the highest hardness and abrasion resistance characteristics.

Typical applications include high wear environments involving molds and metal forming.



### Diamond-like nanocomposite coatings (a-C:H/a-Si:O; DLN)



This coating exhibits the lowest coefficient of friction, even in high humidity or wet environments. It offers the best possible combination of anti-stick and wear behaviour.

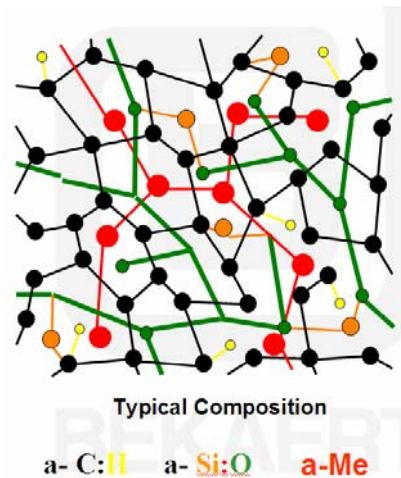
Typical applications include printer-copier equipment, insert cores and many others.

These coatings comprises C, H, Si and O:

- a-Si:O-> enhances high temperature stability, leads to lower friction & lowers films stress
- a-C:H-> diamond-like properties

### Metal-doped Dylun (Me/a-C:H/a-Si:O; DLN)

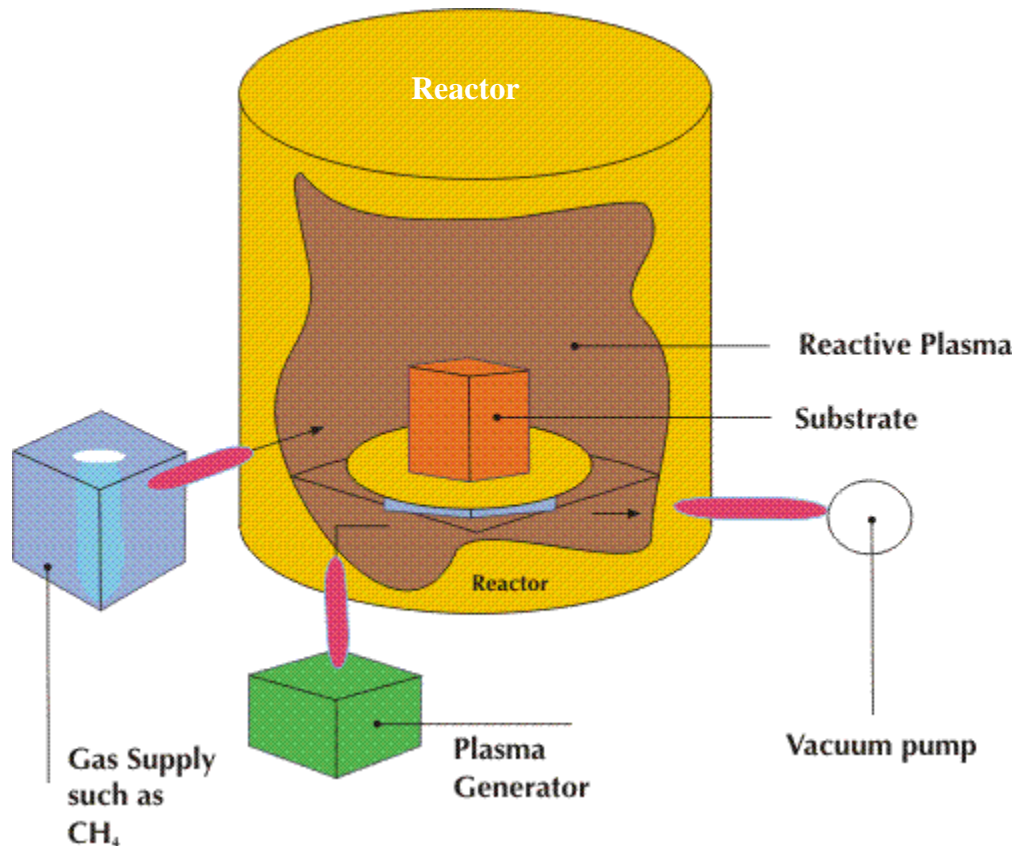
The electrical characteristics of the coatings can be tailored by the addition of metal dopants. This creates an engineered surface for specialized applications requiring a combination of wear, low friction and electrical conductivity. Typical applications include those requiring static discharge in addition to wear resistance, such as water manufacturing.



Please [contact us](#) if you would like to receive more information on our coating definitions.

## Coating technology

**Diamond-Like Carbon** and **Diamond-Like Nanocomposite** coatings are deposited using a **PACVD (plasma-assisted chemical vapor deposition) process**, at deposition temperatures below 220°C (428°F). Using this technology, both electrically conductive and non-conductive substrates in a variety of shapes and sizes can be coated homogeneously. This environmentally friendly technology can be scaled up, enabling Bekaert to offer cost-effective coatings in many industrial sectors.



Another deposition technology is also used: **Physical Vapor Deposition**. PVD refers to depositing atoms on one surface by physically removing them from another surface. It allows the design of advanced (or engineered) interlayers to improve the performance of the coating in specific applications.

Please [contact us](#) if you would like to receive more information on our coating technology.