



Castrol® Iloform® CFX series forming oils:

Competitive advantage for industrial production



Sustainability and cost control are becoming increasingly important

The manufacturing industry faces a multitude of challenges, a number of which are technological in nature. For example, if companies want to continue to be successful they cannot ignore digital transformation, otherwise they will be overtaken by more agile competitors. Topics such as process automation and predictive maintenance to minimise downtime are important. They not only allow for a more flexible and more predictable process, but they also reduce costs.

At the same time, sustainability and environmental protection are becoming increasingly important topics. Environmental impact is often a key decision-making criteria when organizations commit to new products. This includes CO₂ neutrality and low energy

consumption, as well as water savings and waste avoidance.

These issues are complemented by general health and safety concerns, as well as continuously tightened regulations. One example is the EU regulation on persistent organic pollutants (POPs), which largely bans the production, use, and marketing of short-chain chlorinated paraffins (SCCPs) in the EU – a performance additive that has often been used in metalworking in the past. Medium chain (MCCP) and long chain (LCCP) chlorinated paraffins are still in use today in many metalworking processes. Due to their eco-toxicological hazard potential, MCCPs in particular are increasingly being considered as high-risk by legislation.

Castrol® Iloform® CFX series:

High performance without chlorine

 The Castrol® Iloform® CFX series offers companies significant benefits:

The six different forming oils do not require any chlorine-based performance additives and therefore come with a significantly improved environmental profile – with an extremely high performance that is in no way inferior to that of chlorine-based products. At the same time, Castrol® Iloform® CFX can reduce production costs and increase productivity. For example, the behavior of Castrol® Iloform® CFX products in alkaline cleaning baths offers a possible potential for optimization. Compared to chlorine-containing oils it helps reducing bath maintenance but also versus chlorine-free, high calcium containing oils it offers benefits in terms of parts cleanliness as well as it minimizes deposits building up in the cleaning equipment.

Compared to chlorine-free forming oils that contain calcium, the risk of increased lime soap formation is eliminated. This is due to the reaction agent being removed. This can have a particular effect on the service life of cleaning equipment – in one case, the bath service life was significantly extended. This also removed the previously necessary step of mechanically removing lime soap residue from the cleaning area. In vibratory finishing processes, as in this example, the abrasive particles also dirtied much more slowly than when using a product containing calcium.

Each of the six Castrol® Iloform® CFX versions is tailored to specific applications and has a corresponding viscosity. Depending on the application, the viscosity varies from 25 mm²/sec (Castrol® Iloform® CFX 25) to 6,000 mm²/sec (Castrol® Iloform® CFX 6000). Thanks to this extensive portfolio, the Castrol® Iloform® CFX series covers a wide range of applications. The oils feature an excellent lubricating performance as well as an extremely



The Castrol® Iloform® CFX series facilitates work in industrial production

good pressure absorption capacity. One of the numerous benefits is that they consequently enable a high surface quality – a core criterium for the selection of forming oils in industrial manufacturing.

If press speeds are increased during the drawing processes, the parts output is also boosted. In the particularly demanding pilgering of seamless stainless steel tubes, both the feed rate and the stroke rate can be increased compared to a common chlorinated oil. Castrol® Iloform® CFX products also enable an upturn in cutting speed during fine blanking, reducing the production cycle time for a workpiece on the latest generation of servo presses – while improving the overall output. In processes including not only punching operations but also an impact extrusion process, the dimensional stability or roundness of the workpiece was increased due to a more optimal material flow when producing a fly-wheel, for instance. A substitution of soaps or solid lubricants in the cold extrusion of large parts is also possible. As a result, the disadvantages of soaping (foam, lime soaps) can be avoided in downstream machining operations.

The CFX product family is suited for fine blanking of components, both low- and high-alloyed steels, and for deep drawing of high-alloyed steels and stainless steel with different sheet thicknesses. It can also be used for wire drawing of high-alloy steel and nickel wires of small to medium wire thicknesses. The forming oils are an important factor for industrial manufacturers' component production. Only if the produced parts meet the highest, most stringent requirements in terms of performance and quality will users receive the best possible products – whether they're in the mechanical engineering or automotive industry.

Users gain significant benefits

By using Castrol® Iloform® CFX.
Two examples:



An automotive industry use case highlights the advantages of Castrol® Iloform® CFX.

The required components are made of low-alloy steel up to 16 millimeters thick and stainless steel up to ten millimeters thick. The company also produces complex 3D parts. They were looking for a fine blanking oil that didn't contain chlorinated paraffin. The product also shouldn't impair the tools' service life. The Castrol® Iloform® CFX products ensure a consistently high performance compared to the chlorinated paraffin-based forming oils used so far.

The results speak for themselves: the company was able to increase the service life of their expensive fine blanking tools by up to 20% and the punching speed by up to 50%. The high viscosity index reduced consumption and ensured stable processes from the very start. In addition, the risk of corrosion compared to chlorine-containing fluids was significantly reduced. The excellent cleaning and demulsifying capacity of the Castrol® Iloform® CFX series allows for longer bath life of the downstream aqueous cleaning process and therefore reduces preparation costs. Due to the oil's low viscosity, the rinsing effect on the dies is increased and metallic particles are now easier to remove. Possible particle-related mechanical damage is also avoided, resulting in a better surface quality and a lower reject rate. This also lowers the post-processing costs.

All CFX series products are formulated for extremely high viscosity indices. This ensures that they are able to provide sufficient viscosity for lubrication, even if temperature differences in the tool between the start and full load of



Castrol® Iloform® CFX technology provides benefits for industrial production

production are quite significant. Conversely, it is also possible to start with a measurably lower viscosity right from the start, which can then generate double-digit savings in lubricants over the production period.

An additional industrial production example also emphasizes the Castrol® Iloform® CFX forming oils' advantages. The Castrol customer produces austenitic, (super) duplex, nickel-based alloy and titanium tubes for the automotive, hydraulic, and instrumentation industries. They needed to replace the previously used chlorinated oils to minimize corrosion and resulting surface quality problems.



Tube bundle



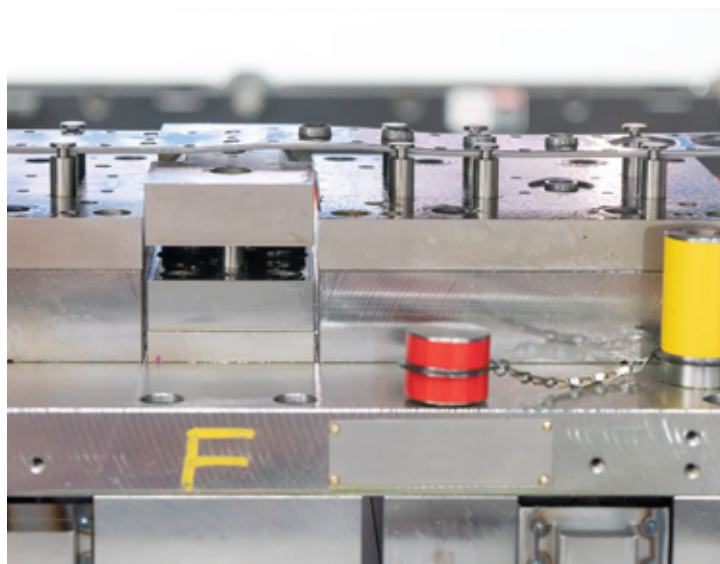
Excellent lubricating performance and good tolerability: the Castrol® Iloform® CFX series ensures high-quality components

The results are clear: due to using Castrol® Iloform® CFX oils the corrosion problem was eliminated. In addition, surface quality could be significantly improved, with surface roughness being reduced by up to 50%. Previous problems with gearbox contamination have also been solved and thrust length and stroke rate have been increased. The homogeneous, highly lubricating film of the oils ensures excellent surface quality and accuracy.

Castrol® Iloform® CFX forming oils also deliver when it comes to operating costs: due to high wear protection, long tool and mold lifetimes are possible, reducing downtime and tool costs. The above-mentioned longer bath life of the downstream aqueous cleaning systems further reduces expenditure – and leads to higher sustainability. As the Castrol® Iloform® CFX series does not use chlorinated paraffins they meet the requirements of local legislation, including waste treatment regulations, which can make the disposal of products containing chlorinated paraffin very costly.

As Castrol® Iloform® CFX products contain no chlorine, they are much lighter and also more cost-efficient to dispose of. At the same time, they feature an excellent lubrication performance as well as an extremely good pressure absorption capacity – extremely important criteria for companies. Moreover, Castrol oils ensure tolerability in downstream cleaning processes. They are easy to clean, improving component cleanliness and increasing the service life of the cleaner bath. They also boost the equipment's maintenance intervals. An additional benefit of using Castrol® Iloform® CFX oil is that the corrosion of components is reduced to almost zero – a distinct advantage over chlorinated paraffin-containing products, especially in high humidity.

Thanks to the new Castrol forming oil series, industrial production companies not only benefit from an extremely high-quality product, but also enjoy a number of competitive advantages. They are ideally equipped to successfully implement a connected factory down to the last detail.



High performance metal forming – without chlorine