

Konecranes D-series electric chain hoist



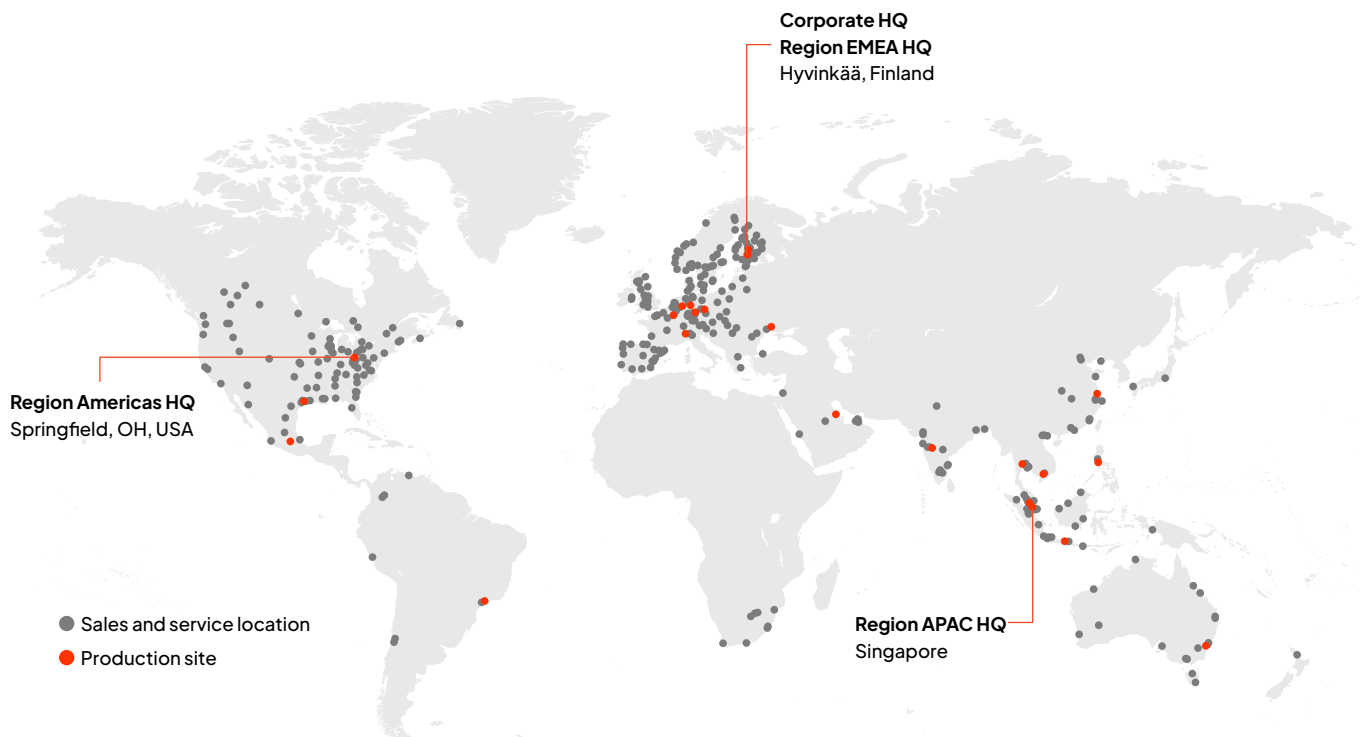
General company information

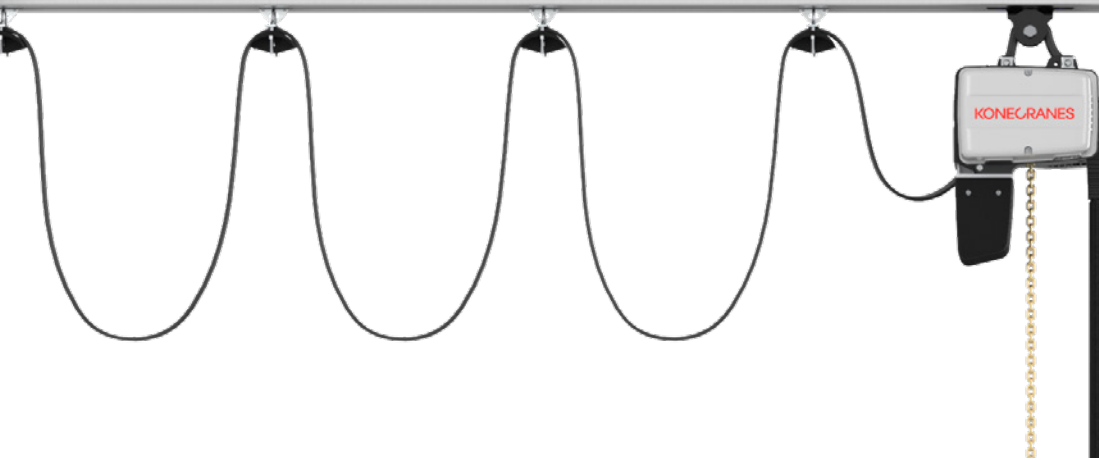
Konecranes is a global leader in material handling solutions, serving a broad range of customers across multiple industries. Our knowledge and technologies, solutions and services constitute a key link in enabling the flow of essential material and goods. We support our customers' operations with innovative solutions that enhance their productivity, lower their emissions and drive their business forward.

Together with customers and business partners, our resourceful people make material handling more productive and sustainable. We maximize lifecycle value and eliminate waste of resources, energy and time throughout the whole value chain. Our culture

is rooted on uncompromised safety, high ethics and diversity and inclusion. We work for a decarbonized and circular world for customers and society.

Our ambition is to provide our customers with sustainable solutions and services while preventing and minimizing emissions and waste. We design our products with their complete life cycle in mind. Usability, eco-efficiency, and safety are our guiding principles in product design, along with lifecycle thinking. Our aim is to maximize the lifecycle value of our products. We do this through innovative product design and by offering preventive maintenance.





Product description and application

Konecranes offers a wide range of industrial hoists for different applications. These hoists can be electrically powered or operated manually. The Konecranes D-series hoist is meant for industrial use in various assembly and process applications, either as a primary production hoist or as a secondary maintenance hoist. The equipment is designed to perform lifting, lowering, and traveling operations, within the limits specified by its duty class. Due to the range of available frame sizes, possible configurations, manufacturing locations and variations in usage specifics, environmental impact might vary.

The Konecranes D-series has a comprehensive set of advanced features, providing excellent value in a compact size. The gearbox and brake are designed to be maintenance-free for up to 10 years, increasing reliability and reducing downtime. Integrated Konecranes Smart Features like the slipping clutch with speed monitoring—also maintenance-free for 10 years—and operating limit switches, help advance productivity and overall safety.

Installation has been made quicker and easier with the height-adjustable control pendant, “plug & lift” and “plug & drive” electric connects and versatile suspension bracket. Easiness of service and maintenance activities have also been considered in the design, like the robust chain drive that can be serviced or replaced without dismantling the motor or gearbox. With long-lasting, durable components and carefully selected raw materials, you get a hoist with

Product description of the Konecranes D-series electric chain hoist used in this EPD

	D02	D05	D10
Load	250 kg	500 kg	1000 kg
Reeving	1/1	1/1	1/1
HOL (Height of Lift)	5 m	5 m	5 m
Duty class	M5	M5	M5
Hoisting speed (high/low)	8/2 m/min	8/2 m/min	8/2 m/min
Hoist weight including trolley	28	38	71

an optimized lifetime, supporting you to reduce the overall climate impact of your operations.

The Konecranes D-series electric chain hoist is designed to maximize performance and reliability, lowering lifecycle costs. The main variant of this Environmental Product Declaration (EPD) is the most typical configuration of the Konecranes D-series 500 kg (D05) hoist, utilizing a 2-speed lifting motor and with a manually operated traveling trolley. Climate impact results for the Konecranes D-series 250 kg (D02) and 1000 kg (D10) hoists are also presented and the same general principles apply in design, manufacturing, supply, as well as maintenance and end-of-life processes throughout the whole Konecranes D-series product family.

To ensure the validity of this Environmental Product Declaration (EPD), an independent third party, VTT Technical Research Center of Finland Ltd. has critically reviewed the Life Cycle Assessment (LCA) calculations for the main variant D05 hoist used as the basis for this EPD. “Critical review” refers to a process in which VTT has provided feedback and advice on the LCA calculations used for this EPD composed by Konecranes. VTT is one of the leading R&D organizations in Europe.

Environmental impact of the Konecranes D-series hoist

At Konecranes, we are committed to supporting our customers in reaching their low-carbon targets with our offering. Decisions made at the design phase critically determine a product's overall environmental impact. Therefore, we can significantly improve the environmental performance by taking the environmental impacts into consideration early in the product development process.

We considered the environmental impact of the Konecranes D-Series hoist, for example, in the following ways:

- We applied our own Design for Environment concept and tools to the product design process to optimize the product weight and use of raw materials, while also considering reusability and repairability aspects to secure maximum lifetime.
- We optimized energy consumption with our purpose-designed Core of Lifting components—gears, motors and controls—specifically intended for lifting motions.
- We minimized substances of very high concern (SVHCs) in product design.
- We changed the packaging design and applied fully renewable and recyclable packaging materials.

We also assessed the environmental impact of the product throughout its entire lifecycle with a Life Cycle Assessment (LCA).

By using fewer and lighter materials and components, focusing on easy serviceability, and improving the energy efficiency of the hoist, we reduce the greenhouse gas (GHG) emissions across the lifecycle of the hoist.



Konecranes' Design for Environment (DfE) concept aims to reduce the environmental impact of the product's lifecycle. The concept focuses on repairability, durability, material selection and energy efficiency.



Material breakdown

The materials breakdown relates to the total weight of the 500kg rated capacity Konecranes D-series hoist with a maximum lifting height of five meters and 2-speed hoisting. The weight can vary slightly, depending on which Konecranes D-series features are selected for the hoist.

The total weight of the hoist is 38kg including a 7kg push trolley (not motorized trolley) and a 31kg hoist.

In this particular Konecranes D-series hoist (Figure 1.), 92% of the hoist materials are metals—including steel, steel alloy, cast iron, aluminum alloys and copper—which are fully recyclable at the end of hoist's lifespan.

The Konecranes D-series hoist does not contain any chemical substances that do not conform with our [Restricted Substances List](#), based on legal requirements in the EU and in other selected countries. Any factory-installed lubricants in the product are industrial hydrocarbons. Coatings are applied on-site, or the work is outsourced to a subcontractor.*

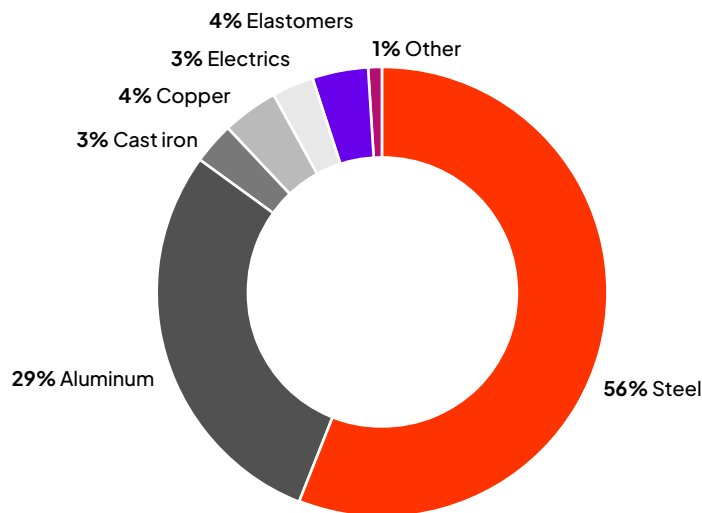


Figure 1. Material breakdown of selected D05 hoist without optional parts

Coatings that are used on the Konecranes D-series are mostly powder coatings, KTL (cathodic dip coating), solvent-borne epoxy binder paints and zinc electroplating. The electroplating process uses trivalent chromium, and the paints are pigmented with iron oxides.

*Konecranes has clear processes in place to mitigate sustainability-related risks both in the supplier selection phase and during the business relationship. The [Konecranes Supplier Code of Conduct](#) includes the minimum requirements for suppliers on topics such as human rights, health and safety, environmental management, anti-corruption and compliance with laws and regulations. Konecranes Restricted Substances List describes our key requirements for the use of harmful substances.

Konecranes D-series hoist lifecycle assessment

We analyzed the environmental impact of the Konecranes D-series hoist with the Life Cycle Assessment (LCA) method and standards ISO 14040 – ISO 14044. The lifecycle of the hoist was divided into the following stages: raw materials, component production and final assembly, packaging, delivery to customer, usage at customer site, maintenance at customer site and dismantling and preparing for recycling. The logistics required during or between each stage to move the hoist from one place to another, were included. Only the components specifically relevant to the D05 hoist and trolley were under examination, excluding all the other parts of the crane.

The functional unit for the LCA study was the entire lifecycle of a hoist across 10 years (approximately 40,000 duty cycles). The Konecranes D-series hoists under examination have a maximum lifting height of five meters, using a 2-speed hoisting motor. The use profile was based on typical usage data representing an average customer in a workshop application with one shift per day in the European Union area (EU28) and application-specific lifting height of 1.25 meters. The LCA studies for D05 and D10 hoists were critically reviewed by VTT Technical Research Centre of Finland Ltd. The LCA results for D02 were derived from these studies.

The impact focus was set on climate impact (global warming potential) and the calculations based on emission factors from The Intergovernmental Panel on Climate Change (IPCC) dating back to 2013 using a 100-year time horizon and excluding biogenic carbon. At the time of the study, there was no product-specific LCA guideline (product category rules) available for electric chain hoists.

We used both average and specific data for the LCA. The ecoinvent version 3.8 lifecycle inventory database (cut-off system model) was the average data source for our LCA calculations and analyses. Additionally, we collected and used specific data on our products. Specific data was collected on the product structure and materials of the D05 hoist, in-house production



processes, selected first-tier suppliers (i.e., suppliers with whom we have a direct business relationship) and its use phase. Primary data was especially crucial for the use phase, because usage levels can vary significantly between individual hoists, depending on customer needs.

We analyzed usage data from customer equipment for calculating typical hoisting runtimes and together with internal experts' knowledge we modelled typical usage in a customer environment considering the running times, typical loads, hoisting distances and speeds. Power measurements were carried out in a laboratory environment on physical hoists considering various operation phases. These gave a representative figure for a typical use profile and typical electricity consumption.

Konecranes D-series hoist climate impact results

D05 hoist total climate impact result was up to 602 kg CO₂ eq. considering all the lifecycle phases and use for 10 years.*

The most significant part of the climate impact in the lifecycle of a Konecranes D-series hoist comes from the processing of raw materials which is done for the manufacturing of the hoist components. The raw material phase excludes the burden of recycled materials. Steel and aluminum production especially causes a high amount of value chain emissions. The second largest amount of climate impact of the hoist lifecycle is created when the hoist is in actual operation (typical use), mostly due to the GHG emissions related to electricity production used for powering the hoist.

Maintenance, including service technicians' visits to customers and spare parts production, is the third most significant source of emissions. The climate impact of the dismantling and preparing for recycling includes the transportation of the discarded product to recycling facility and its processing but excludes material recycling credits.

Konecranes offers general overhaul, retrofitting and modernization services that can extend the life of the hoist and thus reduce its environmental impact. These, however, were excluded from the LCA analysis, as we focused on the basic product configuration. Hoist owners can also lower their operational climate impact further by using electricity from renewable sources on their site.

We analyzed the Konecranes D-series hoist's lifecycle environmental impact from various viewpoints such as climate impact, fossil depletion and mineral depletion.* In this EPD, we focus on the climate impact results. Other environmental impact results can be shared on demand.

D05 chain hoist lifecycle climate impact

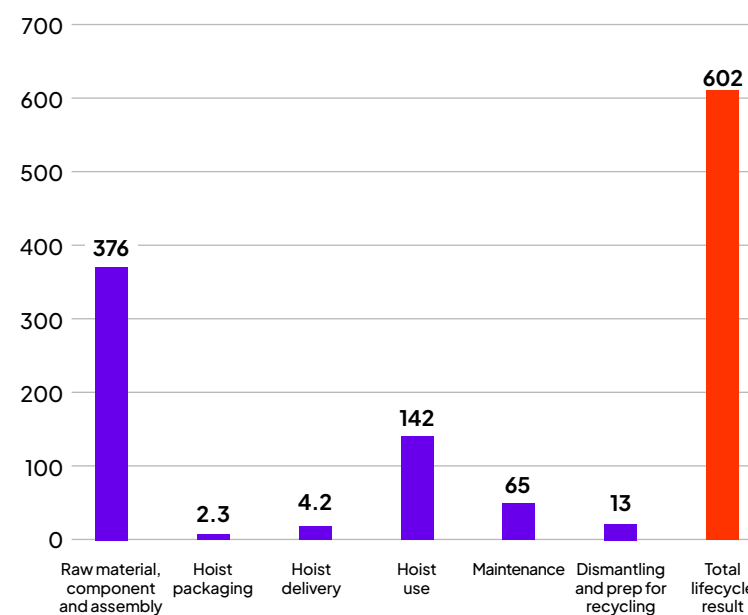


Figure 2. D05 lifecycle climate impact results in kg CO₂ eq. representing 10 years usage in a workshop application in Europe.

LIFE CYCLE PHASE	D02 CLIMATE IMPACT (KGCO2 EQ.) *	D05 CLIMATE IMPACT (KGCO2 EQ.) *	D10 CLIMATE IMPACT (KGCO2 EQ.) *
Raw materials, components and assembly	257	376	721
Hoist package	2,5	2,3	3,5
Hoist delivery	2,9	4,2	8
Hoist use	134	142	230
Maintenance	58	65	55
Dismantling and waste treatment	12	13	24
TOTAL LIFECYCLE RESULT	466	602	1041

Table 1. Konecranes D-series hoist's lifecycle climate impact results (D02 results scaled from other similar products). The results represent 10 years of usage in a workshop application in Europe.

*Climate impact results depend significantly on the initial assumptions and input data. For this reason, climate impact values from different LCA studies are not directly comparable and the absolute climate impact result values should be used with careful consideration.

Use phase energy consumption and climate impact

Hoists are electrically powered, mostly by supply from a main outlet. We analyzed the power consumption and climate impact of the Konecranes D-series chain hoists in its typical usage, using a default cycle as the basis of the calculations.

The default cycle defined by internal experts utilized in this LCA consists of:

1. 1.25m of load lifting
2. 1.25m of load lowering

The number of yearly cycles in typical use is 4,000. Of this, 2,000 lifting cycles are with typical load and 2,000 lifting cycles are with an empty hook per year for each 10 years of operation. The typical loads for each of the frame sizes have been identified by internal experts – 100 kg for D02, 150 kg for D05, and 250 kg for D10.

A D05 hoist in a typical usage scenario, used in a workshop application for one work shift per day uses about 367 kWh of electricity in its 10-year lifetime. All hoist usage states have been considered in the calculation, including hoisting with a typical load as well as an empty hook, along with the standby and idle power consumed by the chain hoist electrics when not actively hoisting or traversing. It is important to note that traversing energy consumption is applicable only to the larger D10 frame size which features a motorized trolley. For the D05 and D02 models, which utilize a manual push trolley, the traversing energy component is absent.

The way customers use the hoist can alter the energy usage and climate impact results significantly. When we only look at the hoist's use phase, heavy use of the D05 hoist at maximum capacity consumes more energy and the corresponding use-phase climate impact is three times as high as the typical use of this product.

Operational climate impact

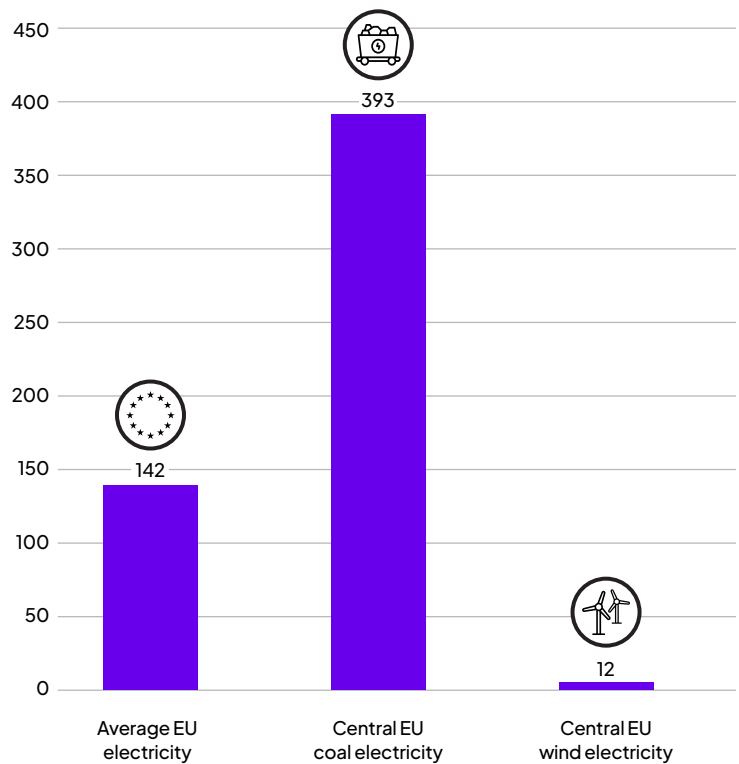


Figure 3. The operational climate impact of the D05 hoist with different electricity sources over 10 years of use in typical workshop application. Operational electricity demand is the same.



Manufacturing and logistics

Konecranes has set near-term science-based targets (validated by the Science Based Targets initiative) for reducing scope 1, 2 and 3 emissions 50% by 2030. These targets are aligned with the ambition of the Paris Climate Agreement to limit global warming to 1.5°C. Additionally, in 2024 Konecranes committed to set long-term emissions reduction targets with the SBTi in line with reaching net-zero by 2050.

We work to decarbonize our own operations by continuously improving the energy efficiency of our manufacturing operations while maximizing the share of renewable energy sources, and—for example—we already use renewable electricity in all our factories. We're also improving the fuel efficiency of our service vehicle fleet. In 2022, we managed to reach the science-based target of halving scope 1 and 2 emissions from our own operations. Following this we set an additional, more ambitious target of reaching carbon neutral own operations by 2030.

We produce the Konecranes D-series hoist and other products at our factory in Wetter, Germany. In this factory we use 100% renewable electricity and continuously work to improve the energy efficiency to further reduce the emissions from factory operations.

We follow our internal guiding principles for chemical handling, energy and emission management, and waste and resource management globally — setting the company standard for environmental

management. The majority of our factories have an ISO 14001:2015 Environmental Management System in place, requiring continuous development, solid risk management and annual targets.

We expect high ethical standards from ourselves and our business partners. And as we work with companies around the world who provide us with materials and components, we expect all of our suppliers and subcontractors to commit to the same ethical, environmental and labor-related principles that we ourselves apply. To help mitigate risk in our supply chains, we ask our suppliers to follow our [Supplier Code of Conduct](#), which describes the standards we expect from our business partners.

In addition, we pay attention to efficiency in logistics and packaging. With our global factory network, we are able to optimize the delivery chain for the Konecranes D-series and other products. The old package was redesigned and replaced with new cardboard packaging, minimizing the use of non-renewable materials. The new package was tested rigorously internally and externally to ensure the same quality of packaging. Climate impact of the new package is 59% of the previous package, it is fully reusable and in the end of lifetime 100% recyclable.

The emission reductions gained through optimizing the weight of the product multiply during delivery as there is less physical mass to transport.

Maintenance

Well planned and executed maintenance not only helps increase safety and reduce downtime, but it can also extend equipment life, optimize energy use and reduce environmental impact. Material handling equipment that is not properly inspected and maintained can experience premature wear on components resulting in breakdowns. More service calls and downtime mean more time on the road for technicians, more parts consumed, and more product wasted.

When carefully maintained, a crane can last for decades. An active service program is vital to maintaining the safety and productivity of the equipment. Regular inspections and preventive maintenance are key to keeping equipment and components in use. Inspections identify risks and improvement opportunities and preventive maintenance tasks help keep equipment productive and minimize downtime.

The Konecranes D-series hoist makes maintenance easy with a status display including operating time counter for easy service. The seven-digit status display is visible from the outside and it shows real-time information, such as operating time, status, warnings and errors.

These services can not only improve energy efficiency and performance, but save a great deal of raw materials, reduce emissions from the transportation of new equipment, and decrease the energy used in manufacturing. Reduced need for unscheduled maintenance and repairs improves reliability and decreases the environmental impact associated with unexpected downtime.



Dismantling and end of life

The Konecranes D-series hoist is compact and lightweight so it can be easily relocated and reused if a customer's production set-up changes. This reduces the need for scrapping existing lifting equipment and producing new equipment, thus lowering the environmental impact through less raw material acquisition, component production, transportation, and waste handling. The standard suspension bracket of the Konecranes D-series fits into a majority of trolleys available in the lifting market, so it can be easily relocated.

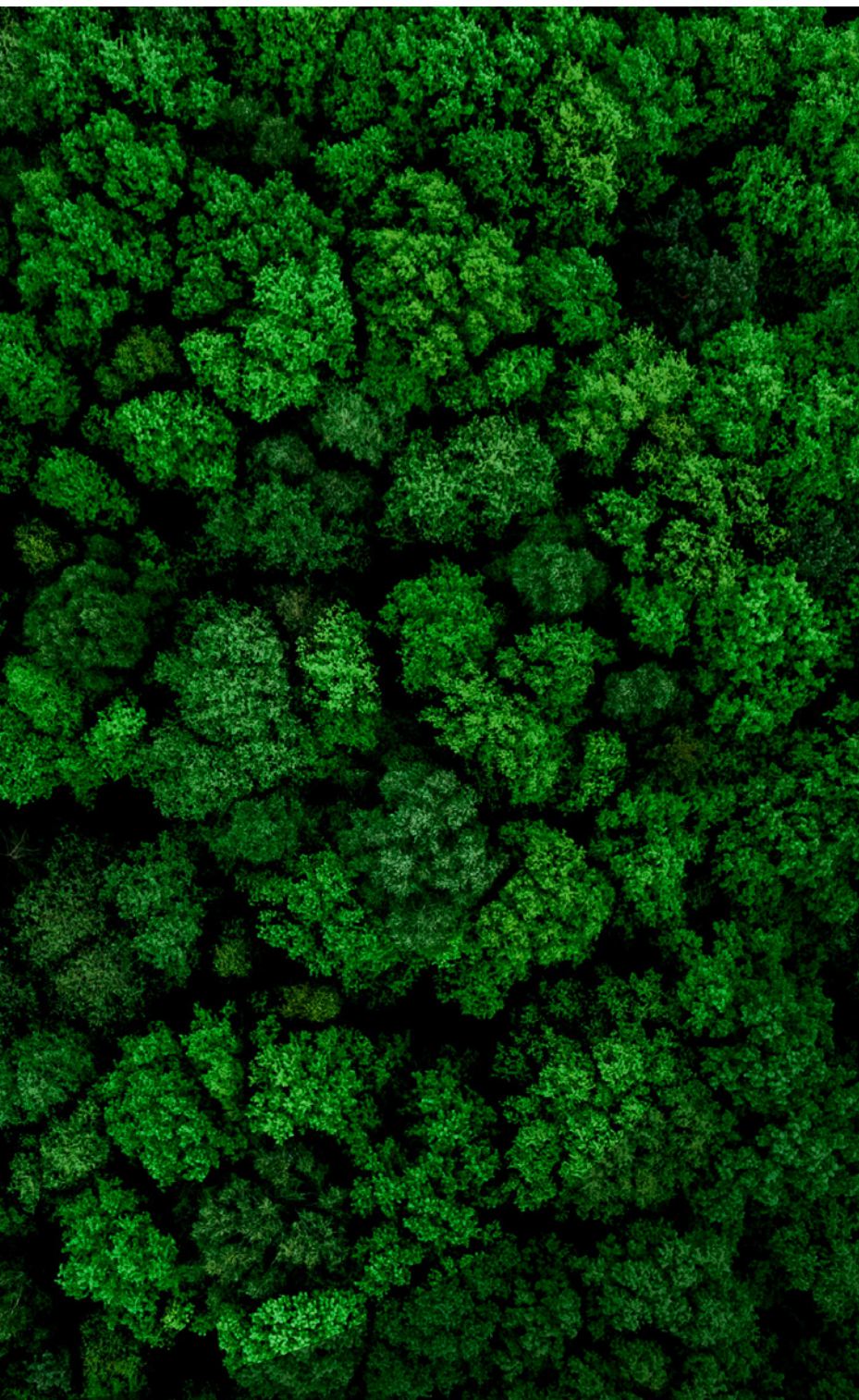
The Konecranes D-series hoist can be recycled to a high extent as more than 90 % of the hoist materials are recyclable metals. The customer is responsible for taking care of the equipment when it reaches the end of its life span. When that happens, the hoist materials can be utilized for a new purpose, or they can be recycled based on available infrastructure. Waste material from installation, maintenance or dismantling should be taken care of by the customer, according to local regulations. Dismantling should always be planned and executed by licensed professionals. Regulations and methods vary regionally, but we expect that our customers always use licensed waste-handling companies for industrial waste disposal and/or recycling of the recyclable materials.




Proposed waste handling methods *

MATERIAL	HANDLING METHOD
Metals	Materials recycling, multi-metal scrap recycling
Plastics	Recycling, if applicable or incineration as energy
Elastomer parts	Recycling
Electrical and electromechanical components	Recycling, e-waste management
Lubricants (gear oil, bearing grease)	Oils should be removed from the hoist before end-of-life recycling, oil can be regenerated or treated as hazardous waste.

*We encourage waste handling to be based on the EU Waste Framework Directive (EU)2018/851



Konecranes is a global leader in material handling solutions, serving a broad range of customers across multiple industries. We consistently set the industry benchmark, from everyday improvements to the breakthroughs at moments that matter most, because we know we can always find a safer, more productive and sustainable way. That's why, with around 16,600 professionals in over 50 countries, Konecranes is trusted every day to lift, handle and move what the world needs. In 2023, Group sales totaled EUR 4.0 billion. Konecranes shares are listed on Nasdaq Helsinki (symbol: KCR).

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