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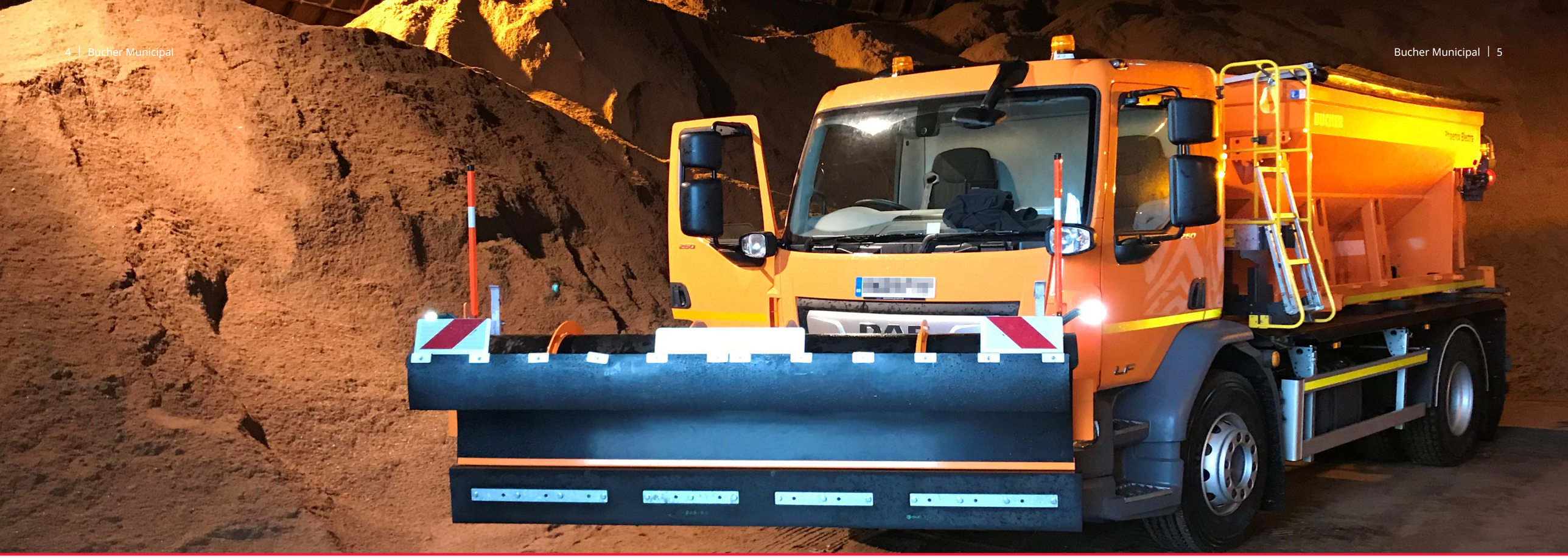
Bucher UniQa**e**
Report

Reduce CO_2 emissions and fuel use by **20%**

The UniQa Electra spreader from Bucher Municipal represents the company's commitment to the environment and highlights the capabilities of our ambitious research and development program. The use of electric technology in the municipal sector has become increasingly important, attracting the attention of many industries around the world. Bucher Municipal is proud to deliver a milestone in the industry with the world's first 100% professional electric spreader. The spreader was originally designed in 2014 and has been working in live operations over the past three years.

Following trials in the UK on Bucher Municipal UK's rental fleet during the 2020/21 winter season, Bucher measured a very significant 19.2% increase in efficiency between a conventional hydraulic spreader vehicle and UniQa Electra. This represents a fuel consumption saving of 19.2% and therefore a 19.2% drop in CO2 emissions from the diesel-powered vehicle*.

*The test was carried out on a fleet of six DAF 4x2 260 LF 18T Euro6 vehicles built in 2019, three of which were equipped with hydraulics and traditional UniQa and three without hydraulics and with UniQa Electra, under the same conditions of use. Comparable test conditions: urban areas with moderate traffic, conducted during winter 2020/21 under equivalent winter conditions. Collection of independent consumption data taken via DAF Connect Telemetry software fitted to each vehicle.



Three equivalent hydraulic spreaders and three electric spreaders were tested in live winter operations.
Truck telematics monitored fuel consumption during the tests and the results clearly showed a significant difference in figures between the hydraulic and electric spreader vehicles.

Until now, permanently mounted spreaders in the UK have been most commonly powered by a hydraulic system driven by a power take-off from the truck's engine. But it was the removal of the power take-off and its constant actuation of the hydraulic supply system that has resulted in the savings.
According to the test results, around 1 tonne of CO2 emissions from the truck is saved for every 2,500 miles (~4,000 km) travelled by the spreader. This figure, multiplied by a fleet of spreaders over the course of an entire winter season, equates to a very significant reduction in carbon dioxide emissions. The technology can be incorporated now to help meet decarbonisation initiatives and keep authorities on track with their climate contingency plans.

The main components of the UniQa Electra spreader remain unchanged, so customers can be confident that the machine will deliver the desired results. What has evolved is that instead of a hydraulic drive system driven by the truck's PTO, the UniQa Electra drives a series of brushless electric motors, each independently controlled and monitored. These motors are powered by a 48V low-voltage, high-performance Lithium NMC (Lithium Nickel Manganese Cobalt Oxide) battery, which has been designed to meet the requirements of the various spreader components and the low operating temperatures in which the spreader must be able to operate.
A charged battery can deliver up to 30 tons of salt for consecutive treatments without needing to be recharged. The 148 Ah (7.12 kWh) spreader battery is quickly charged from a standard 380 V three-phase power supply.
A full charge of the battery takes up to 80 minutes from zero. All data relating to the charge and expected battery life are constantly updated via the spreader's on-board battery management system (BMS), and information is passed on to the driver, who is constantly informed of the battery status and how many operating miles remain before the machine must be returned to base. In the event of prolonged winter event, a quick recharge is possible, 15-20 minutes is usually enough to provide enough power for a full hopper, allowing repeated chloride spreading runs without limiting service. The battery is simply charged while the spreader is being filled with salt and solution by connecting it to the charger provided.

As the spreader is an independent unit, it can be mounted on any type of chassis, either permanently or as a demountable unit on standard trucks. Within Bucher Municipal UK's rental fleet, the UniQa Elec-

tra is mounted on Euro 6 chassis, allowing customers to test future spreading technology while being able to integrate with their existing fleet.

Bucher Municipal's expertise in building chassis powered by alternative fuels such as hydrogen and CNG was also integral to the delivery of the world's first fully electric salt spreader vehicle, combining our electric spreader and snow plough with a 100% electric truck.
The electrical technology is much cleaner and much quieter, so the Electra really does offer a reduced environmental impact compared to conventional salt spreaders, which is particularly important given the anti-social hours commonly associated with chloride treatment.

The cost savings resulting from a much more efficient power and energy control means that the whole life cost of the UniQa Electra is comparable to that of conventional salt spreaders, making it a viable and credible alternative to current technologies today and the future of the municipal sector tomorrow.

Preventive maintenance is enhanced with the UniQa Electra spreader; the energy consumption for each electrical component is, in real time, individually monitored and reported remotely to our service department. Because of the efficient operation, the electrical components will last much longer than equivalent hydraulic components, resulting in fewer breakdowns and lower service costs. Whole

vehicle maintenance costs are also significantly lower, as all the hydraulic components that typically command the most maintenance in conventional spreaders are removed.

Hydraulic failures that can easily occur at low temperatures during cold starts in the early morning are now avoided, as the vehicle's hydraulic system is replaced by electrical technology. This approach not only saves on out-of-warranty repair costs and operational downtime, but also avoids dangerous hydraulic oil leaks. In addition, the spreading accuracy is greater because adjustments are linear, requiring no feedback sensors, and the spreading performance is not affected by the temperature of the hydraulic oil, as is the case with conventional spreaders.

Environmental savings can also be made using on-board technology. Automatic route treatment programming with Assist system, which comes as standard, ensures that only enough salt is dosed for the road conditions and configuration, giving the driver the ability to vary treatment rates at any time where they see fit. Application rates can also be adjusted remotely to choose the correct amounts of chlorides, based on the increasingly accurate weather forecast data available and with the help of sensors that constantly monitor the state of the road and tire grip.

And Bucher's exclusive metal belt salt distribution system is proven to operate for the entire life of the vehicle without needing to be replaced, reducing material waste and avoiding operational downtime compared to traditional rubber belt approaches.

The UniQa Electra salt spreader is a proven means of saving tons of CO2 emissions from your winter maintenance fleet. Contact Bucher Municipal to discuss your needs further and to learn more about the tests conducted. We can offer Electra technology on spreaders with salt capacities from 4m³ up to 9m³.
We can offer full-service maintenance packages as well as seasonal or long-term rental options, configuring a solution that is right for you.

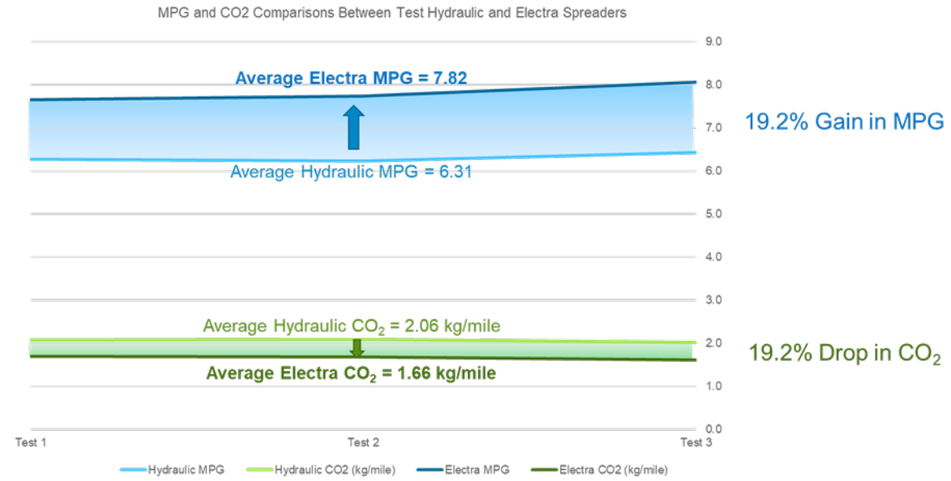
Fact / Highlight / Headline

- 100% electric salt spreader
- Capacities from 4m³ up to 9m³
- Measured reduction of 19.2% in fuel consumption and CO2 emissions of the truck emissions of the truck (tested vehicle DAF 4x2 260 LF 18T Euro6)
- Demountable - can be used with existing fleet

High interest in the industry, Bucher on trade magazines

Fleet Vision, a renowned international magazine, dedicated an article to the report and to Bucher UniQa Electra.
Read the article here

The **data**



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Fact / Highlight / Headline

- Lower installation costs, no PTO requirement on the vehicle, no hydraulics, no auxiliary engine; can also operate the electro-hydraulic control unit of the snow plough
- Low-voltage 48V - 148 Ah (7.12 kWh) Lithium NMC battery (Lithium Nickel Manganese Cobalt Oxide) with on-board charger.
- Full charge - 80 minutes. Fast recharge 15 minutes
- Remaining battery charge communicated to the driver
- Brushless electric motors with integrated controller and degree of protection IP6K9K (dust-proof and protected against high-pressure washing).
- Over 20 m3 of salt spread with one complete battery cycle
- Quiet operation - ideal for city centers with noise restrictions
- Significant reduction in costs of maintenance and downtime due to faults

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At Bucher Municipal, we innovate and engineer better cleaning and clearing solutions, helping our customers grow and maintain efficient and profitable businesses. Leveraging the over 200-year-old heritage of Bucher, we are committed to helping you achieve more using less. Taking pride in being seen as a reliable partner, we work locally with you in realising the possibilities for a smarter, cleaner and more efficient tomorrow. Today.

Driven by better