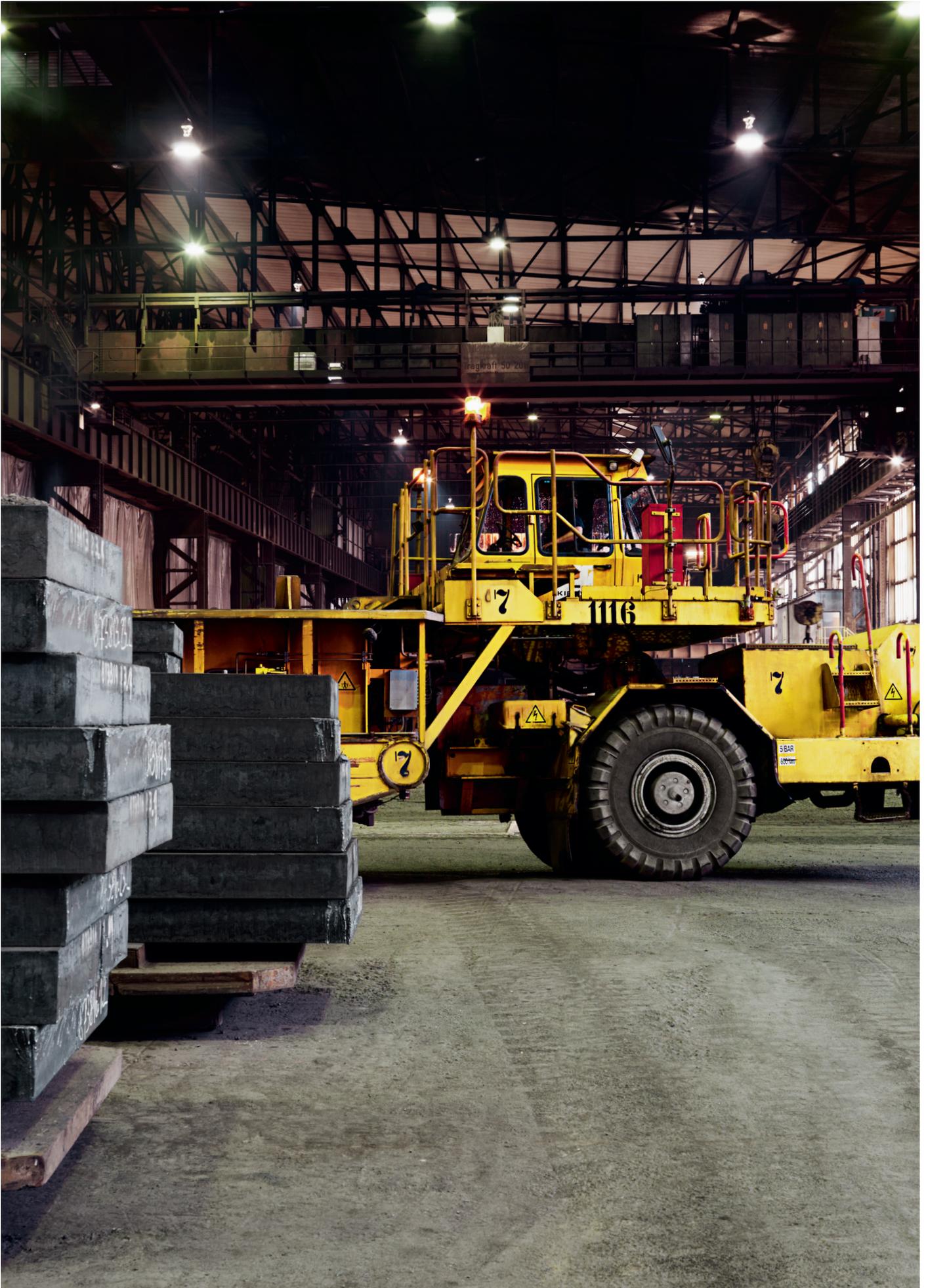


MULTI FLEXUS

F 60 – 200 / D 40 – 60
B 70 – 140 / L 60 – 150

ARTICULATED TRANSPORTERS





↑
The Multi Flexus in a typical steel mill environment

THE MULTI FLEXUS. THE FLEXIBLE TRANSPORTER.

THE FLEXIBLE TRANSPORT SYSTEM
FOR STEEL MILL OPERATIONS.

The steel industry has grown immensely in the past 30 years. Efficient and highly productive facilities ensure competitiveness in the fiercely competitive global steel industry.

Without high-quality and flexible transportation logistics, steelworks can not achieve the efficiency of a smooth production process. Because during steel production a wide variety of transportation tasks arise. Every year millions of tonnes of raw materials such as scrap, or semi-finished and finished products, e.g. slabs, billets or coils and steel bars, have to be moved safely and quickly without affecting steel mill operation.

For this you need innovative and cost effective transportation systems. Systems that already take the extreme conditions under which man and machine have to work in the steel mill into account in the development and project phase. Whether steel mill-specific conditions such as high ambient temperatures, maximum payloads, three-shift operation and restrictions on the roadways. Or conditions related to many different locations on site, such as height and width limitations, restricted loading conditions or non-standardised receptacles.

→ QINFO

So what characterises the best transportation systems in steel mill operations? What are the key factors?

→ Essentially:

- high operational reliability and safety
- maximum flexibility
- continuous availability
- economic efficiency

→ More precisely:

- robust and conservative design of the entire vehicle
- knowledge of the conditions on site
- flexible concepts for direct implementation of customer requirements
- the highest level of operational reliability and safety together with ease of use
- maximum availability and low repair and maintenance costs
- first-class after-sales service and fast spare parts supply

For all these situations and tasks, we have developed the Multi Flexus.

The articulated carriers of this series have been used worldwide for many years by all major operators. We offer intelligent solutions for the applications:

– Scrap transport:

from the port to the scrap yard, from interim storage to the steel mill and on to the furnace operation

– Scrap basket transport:

from the scrap yard to the furnace

– Transport of liquid steel or pig iron:

from the furnace operation to the continuous casting machine

– Transport of finished and semi-finished products:

from the rolling mill to interim storage or the port

THE MULTI FLEXUS. THE MULTIFUNCTIONAL MODULAR SYSTEM.

THE TECHNICAL CONCEPT.

THE PRINCIPLE OF PREMIUM CONSULTING

We have consulting and practical experience from hundreds of projects in the areas of crane construction, materials handling and vehicle systems. So we know: for competent, first-class project handling an intensive technical consultation is needed. In this consultation the specific requirements and details of the infrastructure and the process chain on site need to be investigated. In addition to the technical and logistical circumstances this also includes factors such



↑
Multi Flexus F carrying a scrap basket on a special pallet

as climate, heat or cold, contamination, road conditions, load cycles as well as legal requirements for indoor operation.

Based on this information, our experienced specialists in sales and design can advise you further – and then precisely develop your specific Multi Flexus: a transport system that on the one hand meets the highest standards of reliability and operational safety while at the same time taking your process environment and your specific purposes and needs precisely into consideration. In this respect we are familiar with demands for extreme flexibility in application and for specific additional equipment. Or we develop completely new products to meet your needs. Thus the ideal innovative system solution for your needs, your specific Multi Flexus, is always created on the basis of our many years of project know-how and in close cooperation and coordination with you.

In order to meet the widest range of requirements to be fulfilled, we have developed a modular system. There are four versions of the Multi Flexus:

- Multi Flexus F
- Multi Flexus D
- Multi Flexus B
- Multi Flexus L



↑
Multi Flexus F: typical scrap transport in the steel mill

THE MULTI FLEXUS F. THE ARTICULATED PALLET CARRIER.

THE TECHNICAL CONCEPT.

The Multi Flexus F is the ideal machine for almost any transport job in the steel mill. No matter whether raw material, slabs, billets, pipes and tubes or coils need to be carried – it can handle it. It has also been proven in use worldwide for scrap handling with tilting scrap skips and other special tasks. Here loading on the pallet is carried out independently of the vehicle. This way the Multi Flexus achieves optimal utilisation efficiency. Working with a base pallet concept, it can simultaneously be designed for multiple transport tasks. Sophisticated concepts are also available for the carrying of scrap baskets as well as pig iron and liquid steel ladles.

The Multi Flexus F goes everywhere it happens to be needed. The vehicle is protected from bumps and knocks as it is not required during the actual loading process. Unlike conventional HGVs or dumpers. From a safety perspective in particular, vehicle-independent loading is always recommended.

The Multi Flexus F covers the payload range from 60 to 200 tonnes. The savings achieved in terms of equipment and personnel as well as its flexible application options mean it pays for itself very quickly.

THE MULTI FLEXUS F PALLET CONCEPT:

MODULAR AND VERSATILE

Thanks to the modular pallet concept, almost any transport job at the steel mill can be carried out. The challenge for our engineers: a concept with optimum customer benefit, with which different types of transport can be carried out using one and the same vehicle. And additionally: future, as yet unknown requirements at the time of purchasing the vehicle can also be implemented quickly and easily without major engineering costs.



Multi Flexus F tipping a scrap skip

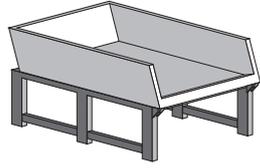
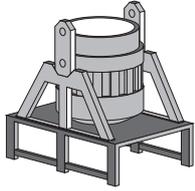
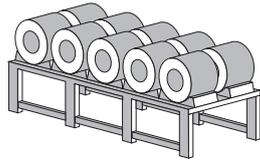
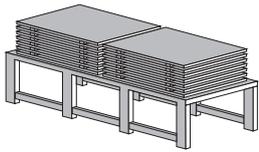
The result: a variety of transport-specific attachments or extensions that are tailored exactly to the cargo can be fitted onto a customised base pallet. Thus, for example, all kinds of flat materials such as slabs or billets, many different sheet metal materials such as flat sheets or coils, long materials such as pipes and tubes or rods and bars, different types of scrap or liquid materials such as slag, pig iron or liquid steel are taken into consideration. For all these transport goods we have developed many project-specific solutions, so you can use your Multi Flexus F for a variety of tasks with a high degree of utilisation efficiency.

As a matter of principle we distinguish between compact transports and long transports.

For compact transports the base pallets and the vehicle are designed wide. Typical applications: scrap baskets, steel and pig iron ladles and slag pots.



Liquid steel transport in the steel mill



- + payload capacity up to 220 t
- + highly manoeuvrable, can be used for:
 - scrap carrying with scrap basket or dump body
 - long material, slabs or plates
 - coils
 - pig iron and liquid steel
 - special transports configured on request, e.g. tundish transport
- + versatile
- + flexible
- + space saving

↑Q
The Multi Flexus F pallet concept

For transporting long material the base pallets and the vehicle have a narrow design. Typical applications: slabs, billets, pipes and tubes, rods and bars, dump bodies for scrap and slag, coils or also tundishes.

ation the initial investment will quickly pay for itself through the saving of other vehicles as well as optimised personnel capacities. For your specific transport requirements our engineers will also find the ideal pallet concept that perfectly harmonises with the Multi Flexus F.

By using a small number of vehicles with different pallets for a wide variety of transport jobs, in two- or three-shift oper-

As a rule, an existing pallet infrastructure can also be easily integrated.



↑
Drive-in and pick-up procedure with a slag dumper pallet



↑ Loading of the pallet independently from the vehicle

THE MULTI FLEXUS D. THE ARTICULATED SKIP DUMPER.

THE TECHNICAL CONCEPT.



↑
Multi Flexus D picking up a dump body for scrap

The Multi Flexus D is a universal multi-purpose vehicle, ideal for many transport requirements in the steel mill where loads are to be picked up directly from the ground. No matter whether different types of scrap, slab ends, coils or waste such as scale, slag or sludge need to be transported – it can handle it.

The Multi Flexus D goes everywhere it happens to be needed. The vehicle is protected from bumps and knocks as it is not required during the actual loading process – unlike conventional HGVs or



↑
Multi Flexus D's lift and tilt system

dumpers. From a safety perspective in particular, vehicle-independent loading is always recommended.

Built in a U-frame design, the Multi Flexus D can lower its integrated lift and tilt frame right down to the ground and pick up simple scrap containers, scrap chutes or flat pallets. The version with two large wheels for the rear axles is also perfect for use on uneven or sealed terrain.

The Multi Flexus D covers the lower payload range from 40 to 60 tonnes. The savings achieved in terms of equipment and personnel mean it pays for itself very quickly.



↑ Example of loading and pick-up process with a scrap skip

THE MULTI FLEXUS D LOAD PICK-UP CONCEPT: EFFICIENT AND VERSATILE

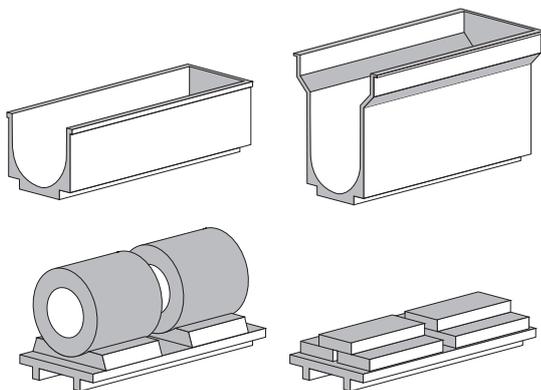
In contrast to the Multi Flexus F, using a simple transport means, loads can be picked up directly from the ground. For this purpose the Multi Flexus D has a special lift-and-tilt mechanism in U-frame design, which engages the load from below and can be tilted up to 60°.

The transport means used can vary considerably, but the interface to the lift-and-tilt mechanism always remains the same. This opens up completely new avenues for carrying smaller payloads using one and the same vehicle.

The result: thanks to this unified interface, for example, scrap skips and chutes can be designed with different volumes, e.g. for heavy and light scrap types. Other transport goods such as slab ends from the continuous casting machine, scrap occurring in the rolling mill, scale, sludge or waste pieces from slag processing can also be carried and tipped in these skips. It is also possible to provide simple flat pallets used to carry individual coils, slab ends, heavy or bulky scrap and the like. For all these transport goods we have developed many project-specific solutions, so you can use your Multi Flexus D for a variety of tasks with a high degree of utilisation efficiency.

With a small number of vehicles and different pallets for numerous transport jobs, in two- or three-shift operation the initial investment will quickly pay for itself through the saving of other vehicles and optimised personnel capacities.

For your specific transport requirements our engineers will also find the ideal transport concept that perfectly harmonises with the Multi Flexus D. It goes without saying of course: the load pick-up concept can also be tailored to existing transport means.

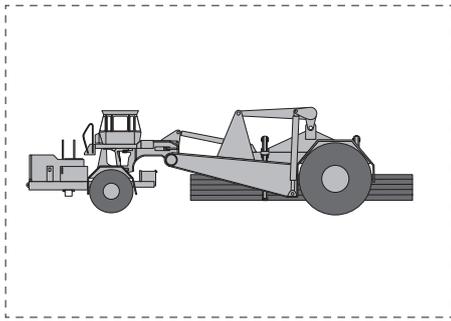


- + payload capacity up to 60 t
- + highly manoeuvrable
- + extremely flexible
- + space saving
- + versatile
 - scrap transport with dump bodies
 - transport of scale, sludge, etc. in large-capacity dump bodies
 - transport of coils on flat pallets
 - transport of slab ends on flat pallets
 - special transports configured on request

↑ The Multi Flexus D dump body skip and pallet concept

THE MULTI FLEXUS B. THE ARTICULATED SLAB CARRIER.

The Multi Flexus B is designed for carrying hot and cold slabs. Using special slab tongs it moves stacks of slabs in various dimensions from the continuous casting machine to the storage area or within the storage area.



↑
Multi Flexus type B slab carrier

The slabs are picked up directly from the ground with the slab tongs, and all common slab cross-sections and lengths can be transported. As a rule, not only single slabs, but whole stacks of slabs can be picked up. The lifting device for the slab tongs also makes it possible to pick up partial stacks or individual slabs from a stack. The interim slab storage spaces can therefore be designed to save space and can be optimally served.

The vehicle is very manoeuvrable and can be used extremely flexibly for internal transport logistics. As with the other vehicles of this carrier family, the Multi Flexus B is also extremely robust and designed for heavy duty in

two- or three-shift operation. Proven components and assemblies from systematic standardisation guarantee high reliability in daily operation.

The Multi Flexus B covers the payload range from 70 to 140 tonnes. Time savings, reliability and the technology of the Kirow articulated family proven in the field over many years are the decisive arguments for the Multi Flexus B.

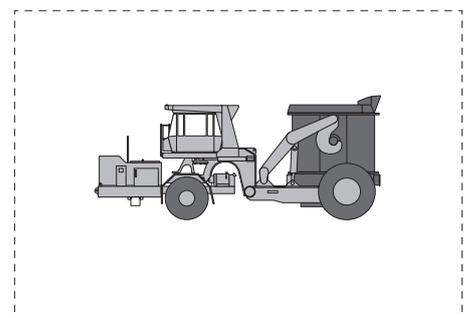
THE MULTI FLEXUS L. THE ARTICULATED LADLE CARRIER.

The Multi Flexus L is specially designed for carrying pig iron or steel ladles. Without the use of a pallet, it picks up ladles quickly and effectively directly from the ground or from a raised transfer point.

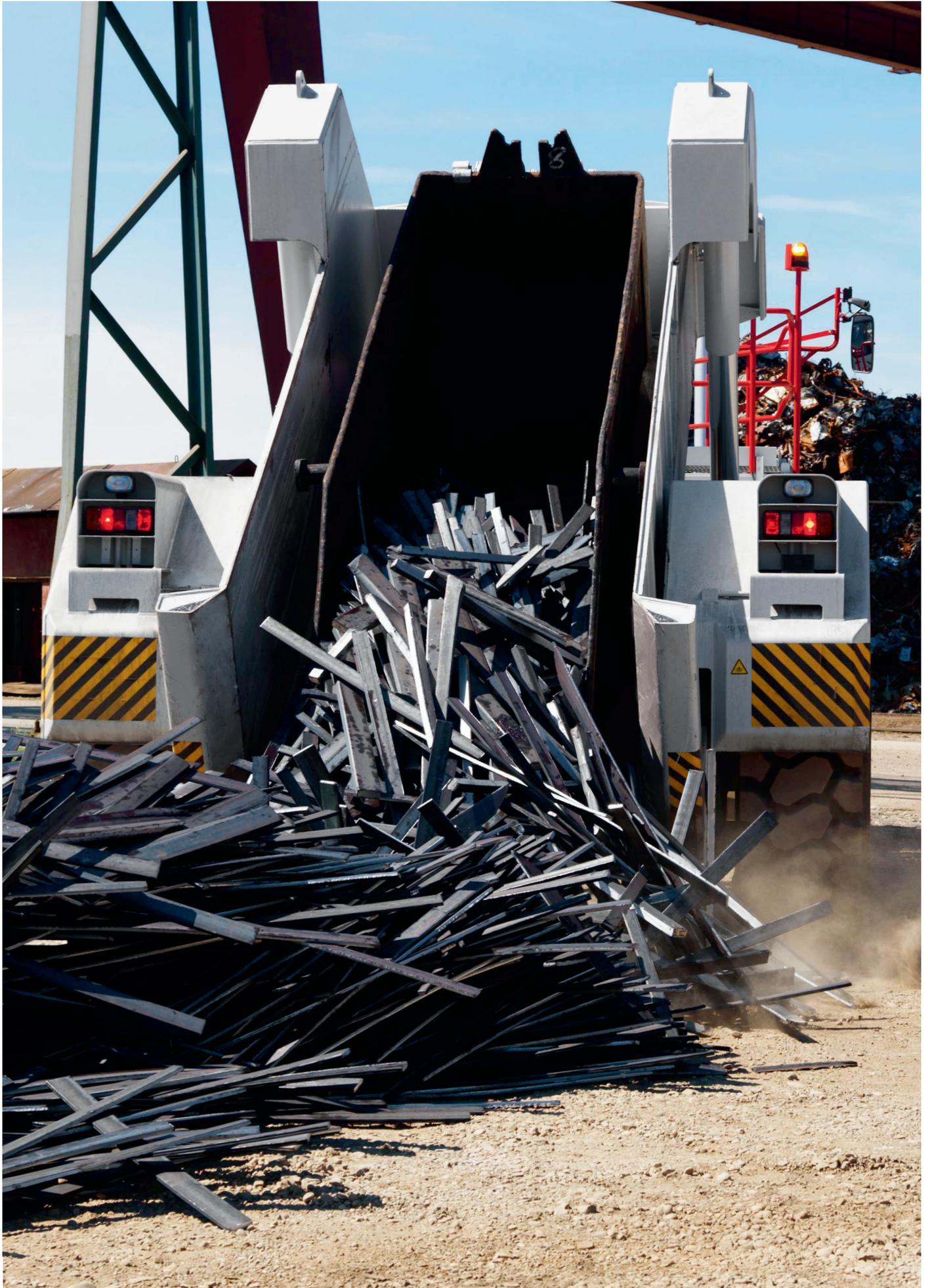
It is also extremely manoeuvrable, can therefore be used in narrow halls and thus reduces time-consuming handling with an indoor crane. In addition, empty ladles can be quickly driven to be checked and lined.

Like the other vehicles of this carrier family, the Multi Flexus L is very robust and designed for heavy duty in two- or three-shift operation. Proven components and assemblies from systematic standardisation ensure high reliability in daily operation.

The Multi Flexus L covers the payload range from 60 to 150 tonnes. Time savings, reliability and the technology of the Kirow articulated family proven in the field over many years are the decisive arguments for the Multi Flexus L concept.



↑
Multi Flexus type L ladle carrier



↑
Multi Flexus D tipping scrap

THERE ARE MANY REASONS FOR CHOOSING **THE MULTI FLEXUS:** SAFETY FIRST.

THE TECHNICAL HIGHLIGHTS.

In developing the entire Multi Flexus series our engineers have paid particular attention to operational safety, reliability and ergonomics. With a conservative design of the steel structure, the use of high-quality components and the implementation of many innovative ideas a new generation of carriers has been created.

KISS – THE KIROW INTEGRATED SAFETY SYSTEM

An integral part of every Multi Flexus is the patented KISS – Kirow Integrated Safety System. KISS means: on the basis of a highly reliable industrial PLC, all vehicle functions are controlled centrally. Operational reliability and safety are increased significantly and possible malfunctions and damage prevented. This prevents, for example, that certain functions can be operated



↑
KISS display with driver information

in unauthorised areas of work, as this could lead to serious accidents during operation.

And here is how the driver uses the active load indicator in the cab for safe operation: when picking up the load he is informed of the actual, current weight, or he gets a warning or lock when critical loads are exceeded.

Of course, we specify the control concept together with you to your exact requirements. Since the software is modular, we can adapt it to any application. Any subsequent changes can also be implemented easily.

Your advantages:

- high operational safety due to extensive electronic safeguards
- integrated overload protection system with active load indicator in the cab
- simple troubleshooting and diagnostic capabilities
- flexible for any application



↑
The Multi Flexus F with single rocker arms for the rear axle



↑ The Multi Flexus F with single rocker arms for the rear axle

THE SINGLE ROCKER ARM CONCEPT FOR THE REAR AXLE SUSPENSION

With the Multi Flexus F the single rocker concept makes a major contribution to the operational safety and reliability of the vehicle. Each individual axle is moved by a hydraulic cylinder. This makes it possible to interconnect the rear axles on the left and right side to form so-called lifting groups and thereby produce hydraulic axle load compensation.

In contrast to rigid axles, no unacceptable wheel or axle overloads occur when driving over uneven terrain, or when cornering with high centres of gravity, as is usual e.g. when carrying scrap baskets.

The single rocker arm concept with hydraulic axle load compensation has established itself as the state of the art in harsh steel mill operations. It is a fundamental requirement for the continuous reliable and safe operation of the Multi Flexus F.

THE FULLY HYDRAULIC BRAKES

The Multi Flexus is equipped with an unrivalled safe braking system. It is superior to conventional air brake systems in all respects. Three independent and purely hydraulically actuated brake circuits ensure minimal malfunction risk and maximum reliability and safety during operation.

For the service brake the front and the rear axles are divided into two separate brake circuits. The third brake circuit is for the spring-loaded parking brake. Hydropneumatic accumulators ensure sufficient supply pressure.

The use of closed, hydraulic multiple disc brakes minimises the risk of malfunction while increasing operational

safety and reliability substantially. Due to the fully enclosed design of the brake discs in an oil bath, the brake can also withstand the highest levels of soiling. Its cooling system is also hydraulic via circulation cooling. An additional advantage of this almost wear-free braking technology compared with drum or disc brakes are significantly reduced maintenance and repair costs.



↑ Wet multi disc brakes in fully enclosed design



↑ Hydropneumatic accumulators for the brake system



↑ Multi Flexus F – tipping process with 80 m³ dump body



THERE ARE MANY REASONS FOR CHOOSING THE **MULTI FLEXUS**: MAXIMUM RELIABILITY AND EXCELLENT ERGONOMICS.

THE TECHNICAL HIGHLIGHTS



↑
The Multi Flexus prime mover: extremely reliable and manoeuvrable

THE ARTICULATED STEERING

The articulated steering is one of the most important components of a carrier in the steel mill. In the case of the Multi Flexus it is a perfect piece of high tech. Steering angles up to ± 90 degrees assure excellent manoeuvrability. The oscillation angle of ± 10 degrees assures the optimal ground contact of the front axle and prevents overloading.

All bearings are in failproof pin and bushing design. Wear on the bearing elements cannot cause a standstill of the vehicle as can occur with spherical bearings or slewing rings. Repair work can be effected on schedule and, above all, quickly. The extremely robust design of the steel structure and the use of original Caterpillar components means: unique reliability and worldwide availability of spare parts. Another important

aspect for the reliability of the Multi Flexus is the optimised and permanent installation of the hoses. This reduces downtimes, maintenance and repair costs to a minimum.



↑
Multi Flexus F: version with vertical stroke for pallet transport

THE PRIME MOVERS – PROVEN AND TESTED FOR MANY YEARS

The drive system of the Multi Flexus has been designed especially for the hard three-shift operation in steel mills. Components perfectly tuned to one another assure a high degree of efficiency and low operating costs.

In the design and layout, the utmost attention has been paid to easy repair and access of all components. As the power centre of the Multi Flexus the hydromechanical drive contains only high-quality components from well-known manufacturers. This means you are assured of excellent availability of spare parts.

The extremely durable frame is the perfect base for all attachments: the entire powertrain, the rubber-cushioned steel hydraulic tank and the hydraulically locking engine hood. With this drive system the Multi Flexus sets lasting standards for reliability in tough conditions.



↑
Multi Flexus: version without vertical stroke – also proven with the Slag Taurus

THE FIRST-CLASS COMPONENTS

Because the material of the Multi Flexus is subjected daily to maximum demands, we exclusively install premium components from well-known manufacturers such as Bosch-Rexroth, Caterpillar, Clark, Hydac, Kessler etc.

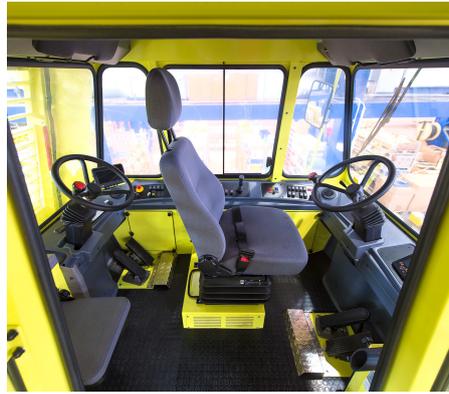
Consequent standardisation assures consistently high quality and the stocking of components. This specifically means for you as an operator: an excellent price-performance ratio, worldwide availability of spare parts, high availability and sustained low operational costs. In short: the security of a total system proven by many applications.



↑ Multi Flexus F with cab placed on the load unit

THE ARRANGEMENT OF THE CABIN

The driver's cabin is located high and safely on the trailing unit. For the driver this means he always has an optimal overview of his working area. Regardless of the steering movements of the prime mover, he always retains the same alignment to the load – and the visibility conditions also remain the same. This is a considerable advantage, in particular when reversing and picking up loads. When driving forwards, drivers find this arrangement very comfortable because lateral accelerations caused by steering movements hardly occur and are barely noticeable.



↑ Ergonomically designed cockpit

THE DRIVER'S CABIN

The dashboards and operating elements are arranged strictly in accordance with ergonomic principles. The driver's cabin of the Multi Flexus is equipped with one control stand in the front and one in the rear. The most important components, such as steering wheel and brake, are available in duplicate for driving forwards and backwards, which ensures optimal operation of the carrier. In addition, an effective soundproofing, an air-suspended driver's seat, the diesel heating system and the (optional) air conditioning system assure optimal comfort. For training purposes, a folding seat is available in the cab as standard. The KISS clear



↑ Large engine hood: optimal access for maintenance



↑ Safe and comfortable ascents

text display constantly keeps the driver informed about the current vehicle status and possible faults. A troubleshooting menu is always available for quick and simple detection of faults.

SAFE AND COMFORTABLE MOUNTING LADDERS

Ergonomic, safe and comfortable mounting ladders to the cab are self-evident on the Multi Flexus. High railings, footrests, handholds, guardrails as well as optimal illumination of the work area protect drivers and always permit comfortable, safe access to the working area. In cases of emergency, fire extinguishers are available at the top of the cabin and below (reachable from ground). Optionally, fire extinguishing systems can be integrated.

THE HYDRAULICALLY OPERATED ENGINE HOOD

Open access to the drive components is important in order to be able to carry out maintenance and repair work on the cooling unit, diesel engine, gearbox and hydraulic pumps without problems. To facilitate this, the hydraulically operated engine hood of the Multi Flexus can be quickly and effortlessly opened up to 80 degrees. Incidentally, the engine hood is fitted with soundproofing material on the inside, thus considerably reducing noise already.



↑
Technical Development Centre

WHY KIROW? SPECIALIST FOR HEAVY LOAD TRANSPORTERS.

→ **KNOW-HOW**

With more than 5,000 units delivered, Kirow is the world market leader for railway cranes. Since the mid-1990s we have also produced industrial transporters for shipyards, steel mills and the construction industry, thus establishing ourselves as specialists for heavy load transporters. Our products are based on extensive experience and a strong desire for innovation, demonstrated by 130 years of design engineering history and also by the awarding of the innovation prize of the State of Saxony. Our engineers consistently apply the proven rules of German engineering to ongoing further development and design work on all products. The goal is always the same: increased efficiency, safety and environmental friendliness of the machines. The various Multi Flexus models are perfectly coordinated products. They were developed in close cooperation with our customers and are based on our proven modular components and modular assembly kits. Naturally we adapt our machines to specific needs: whether to optimally fit them into the infrastructure on location; or to realise individual wishes for additional equipment.

→ **QUALITY**

To us quality means: a sophisticated product concept, substantiated know-how in the fields of design engineering and control as well as the highest degree of precision with regard to fabrication and execution. It is understood that our engineers test and check all mechanical,

hydraulic and electrical groups of components meticulously on the company-owned test field.

All this provides decisive benefits:

- maximum capability and reliability of the vehicles
- low cost of operation
- long service life (even under the toughest operating conditions).

→ **SERVICE**

Excellent service means for us, among other things: to be present and available. After all, something unexpected can always happen. For example you can reach us via hotline around the clock. And we know: the availability of spare parts ex stock is eminently important for your smooth operating processes. For your safety and satisfaction, we only employ highly qualified engineers and technical service personnel in our after-sales service. And last but not least, we attach great importance to comprehensive and appropriate training and support of your personnel.



↑
The Kirow building in Leipzig

→ **PARTNER APPROACH**

The Multi Flexus is an extremely long-lasting product. Choosing it is simultaneously the beginning of a comprehensive customer/supplier relationship, which tends to be frequently confirmed in the form of repeat and follow-up orders. We therefore place great emphasis on making this relationship fair and of long-term value to both parties. By the way, for us this starts long before the signing of the contract. We are glad to advise you, please do not hesitate to contact us.



↑
Multi Flexus D in the test area

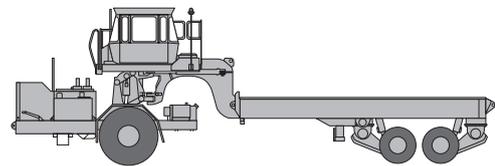


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Multi Flexus F in steel mill operation

THE MULTI FLEXUS – THE KEY TECHNICAL DATA.

MULTI FLEXUS F 60–200 PALLET CARRIER

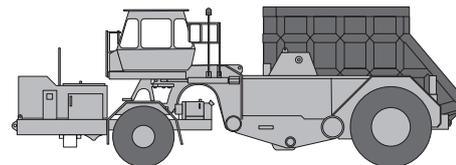
- **Q** payload range from 60 to 200 t
- **Q** flexible and universal applications for pallet transport
- **Q** single rocker arm concept for the rear axle suspension
- **Q** standardised, proven Kirow prime movers
- **Q** superelastic or industrial tyres for the rear axle



	Payload	Engine rating	Prime mover
F 60	60 t	224 KW / 300 HP	Kirow KT 40
F 100	100 t	224 KW / 300 HP	Kirow KT 40
F 150	150 t	269 KW / 360 HP	Kirow KT 50
F 200	200 t	269 KW / 360 HP	Kirow KT 55

MULTI FLEXUS D 40–60 SKIP DUMPER

- **Q** payload range from 40 to 60 t
- **Q** multifunctional equipment for almost any application
- **Q** active load pick-up from the ground
- **Q** low-wear wet multi disc brakes all round
- **Q** standardised, proven Kirow KT 40 prime movers
- **Q** two axle lines with steering angles up to +/- 90 degrees
- **Q** large earthmover tyres on the front and rear axle

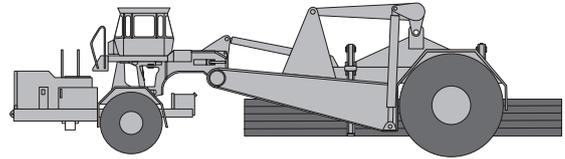


	Payload	Engine rating	Prime mover
D 40	40 t	224 KW / 300 HP	Kirow KT 40
D 50	50 t	224 KW / 300 HP	Kirow KT 40
D 60	60 t	224 KW / 300 HP	Kirow KT 40

MULTI FLEXUS B 70–140 SLAB CARRIER

- **Q** Payload range from 70 to 140 t
- **Q** Flexible and universal applications in slab carrying
- **Q** Low-wear wet multi disc brakes all round
- **Q** Standardised, proven Kirow prime movers
- **Q** Two axle lines with steering angles up to ± 90 degrees
- **Q** Large earthmover tyres on the front and rear axle

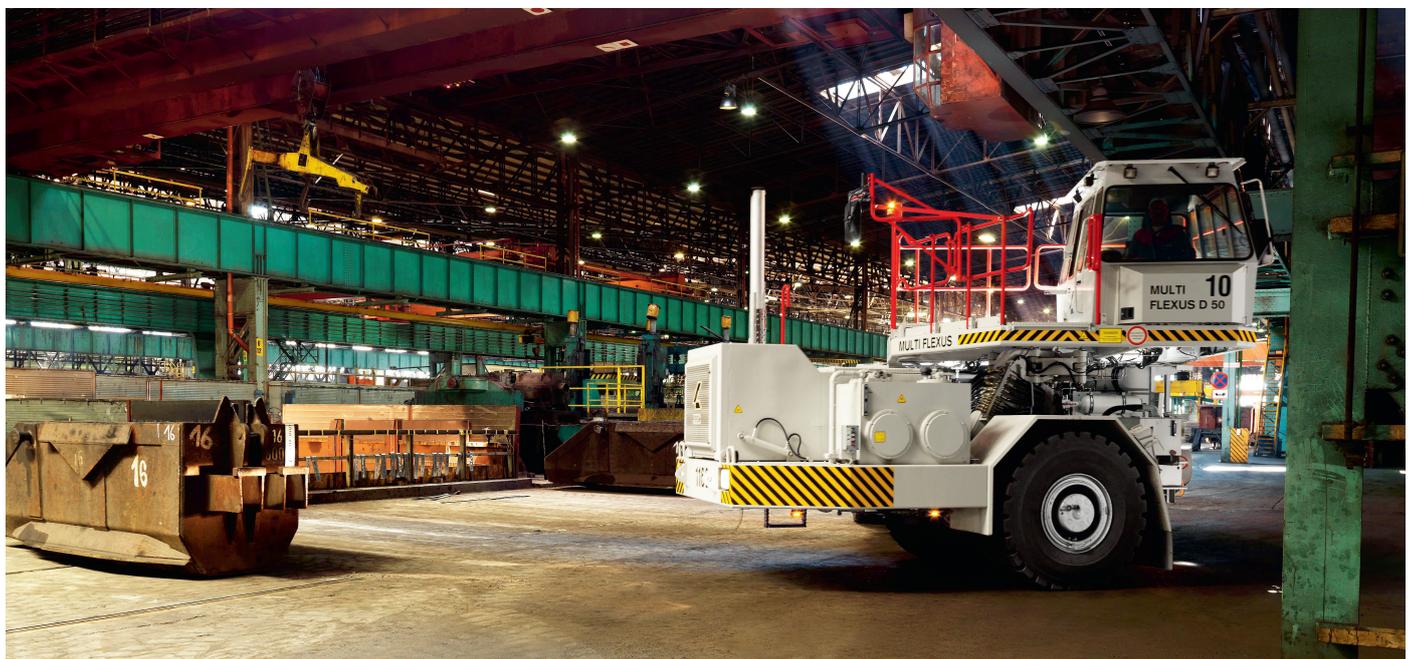
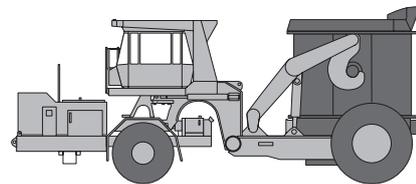
	Payload	Engine rating	Prime mover
B 70	70 t	269 KW/360 HP	Kirow KT 50
B 100	100 t	269 KW/360 HP	Kirow KT 50
B 140	140 t	269 KW/360 HP	Kirow KT 55

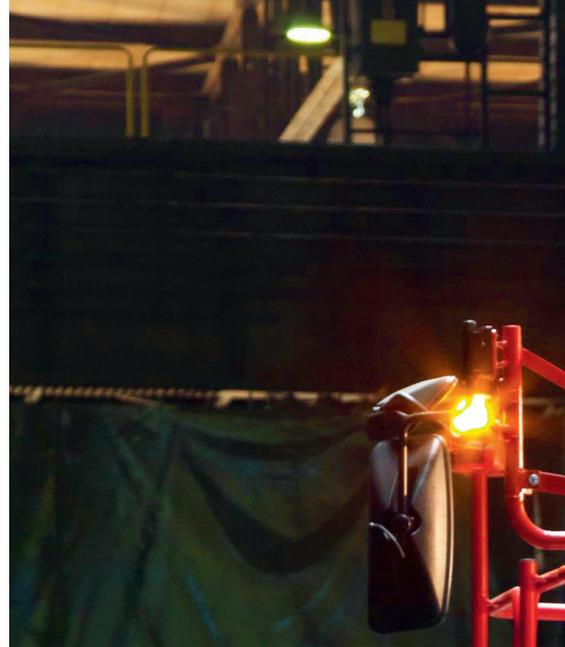


MULTI FLEXUS L 60–150 LADLE CARRIER

- **Q** Payload range from 60 to 150 t
- **Q** Flexible and universal applications for carrying pig iron and steel ladles
- **Q** Low-wear wet multi disc brakes all round
- **Q** Standardised, proven Kirow prime movers
- **Q** Two axle lines with steering angles up to ± 90 degrees
- **Q** Large earthmover tyres on the front and rear axle

	Payload	Engine rating	Prime mover
L 60	60 t	224 KW/300 HP	Kirow KT 40
L 100	100 t	269 KW/360 HP	Kirow KT 50
L 150	150 t	269 KW/360 HP	Kirow KT 55





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