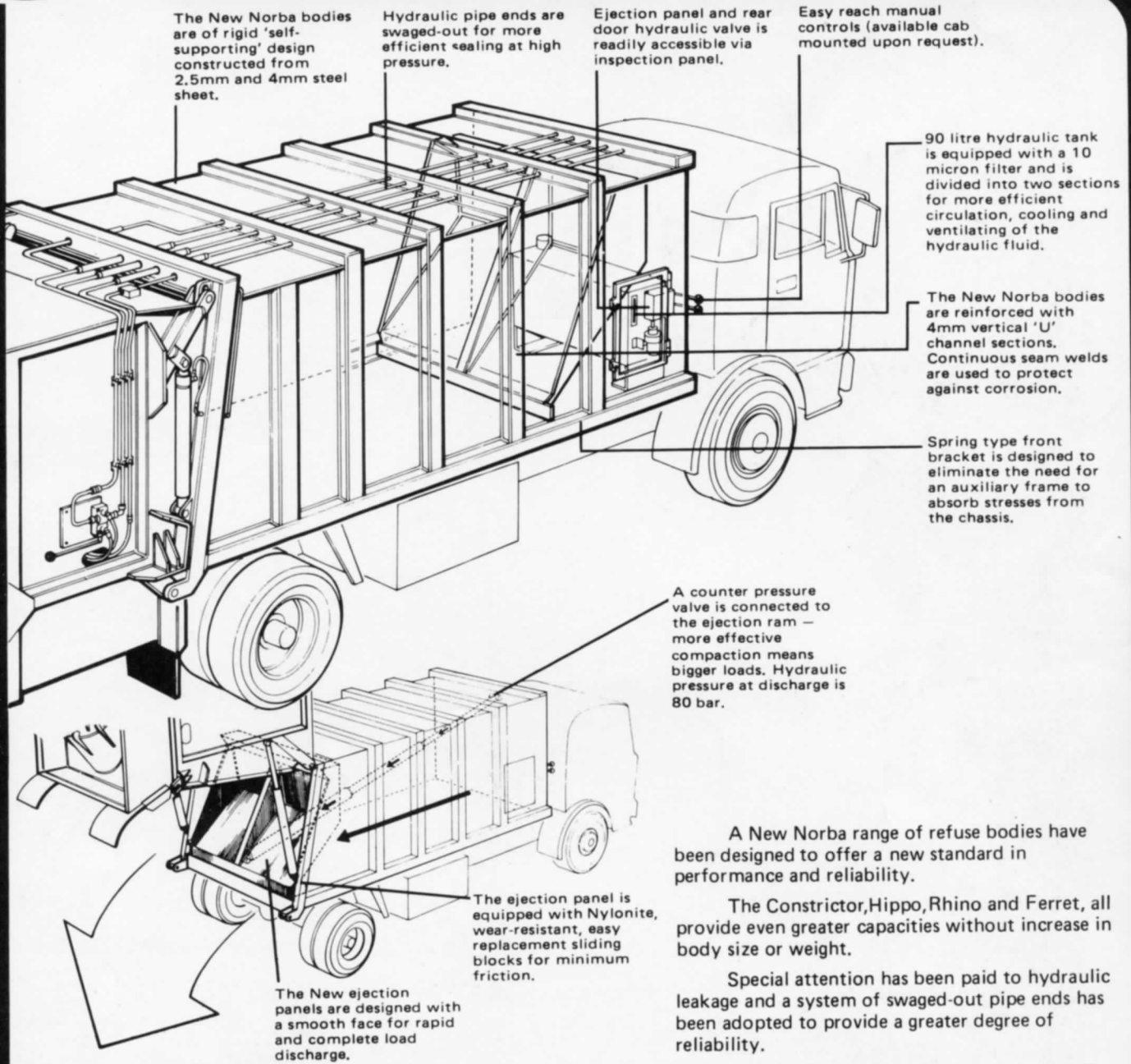


3

New Norba Bodies



A New Norba range of refuse bodies have been designed to offer a new standard in performance and reliability.

The Constrictor, Hippo, Rhino and Ferret, all provide even greater capacities without increase in body size or weight.

Special attention has been paid to hydraulic leakage and a system of swaged-out pipe ends has been adopted to provide a greater degree of reliability.

Body structural changes have been made to increase strength and continuous seam welds used to guard against corrosion and body deterioration.

The popular Norba ejection panels take on a new smoother finish, speeding up the complete discharge of loads.

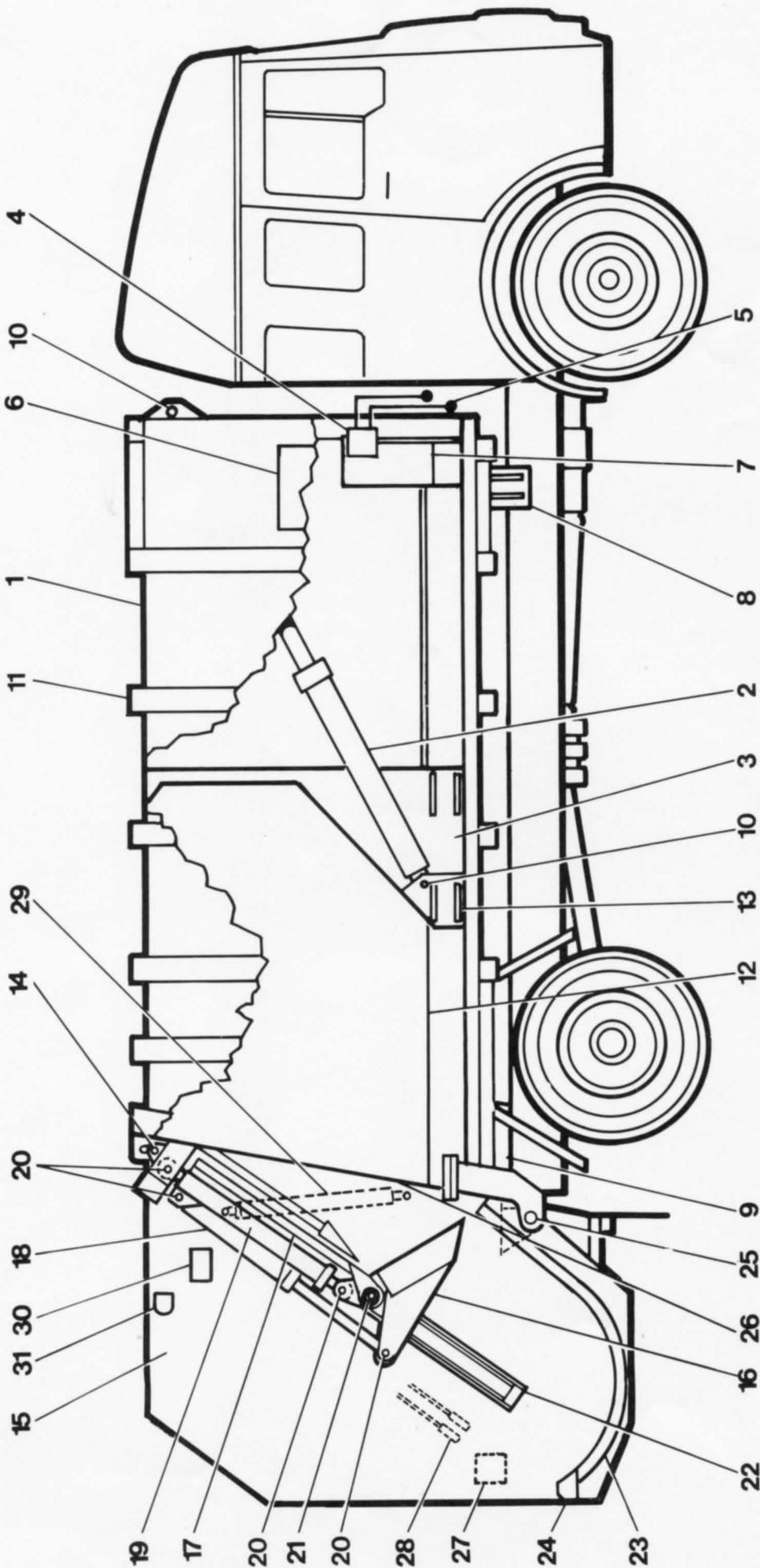
Ask to see the New Norba's, what was a first class range of refuse vehicles is now even better.

NORBA BODY SIZES

MODEL	REF.	AIR VOLUME		LOADING POTENTIAL		BODY LENGTH	
		CU. M.	CU. YD.	CU. M.	CU. YD.	MM.	INS.
CONSTRUCTOR	115	11.5	15.0	46	60	3350	132"
CONSTRUCTOR	125	12.5	16.4	50	66	3575	141"
CONSTRUCTOR	140	14.0	18.3	56	74	3975	156"
CONSTRUCTOR	145	14.5	19.0	58	76	4150	164"
CONSTRUCTOR	190	19.0	24.9	76	100	5225	206"
FERRET	80	8.0	10.5	32	42	3230	127"
FERRET	90	9.0	11.8	36	47	3650	144"
HIPPO	120	12.0	15.7	48	63	3350	132"
HIPPO	135	13.5	17.7	54	70	3575	141"
HIPPO	150	15.0	19.6	60	78	3975	156"
HIPPO	155	15.5	20.3	62	80	4150	164"
RHINO	120	12.0	15.7	48	63	3350	132"
RHINO	135	13.5	17.7	54	70	3575	141"
RHINO	150	15.0	19.6	60	78	3975	156"
RHINO	155	15.5	20.3	62	80	4150	164"



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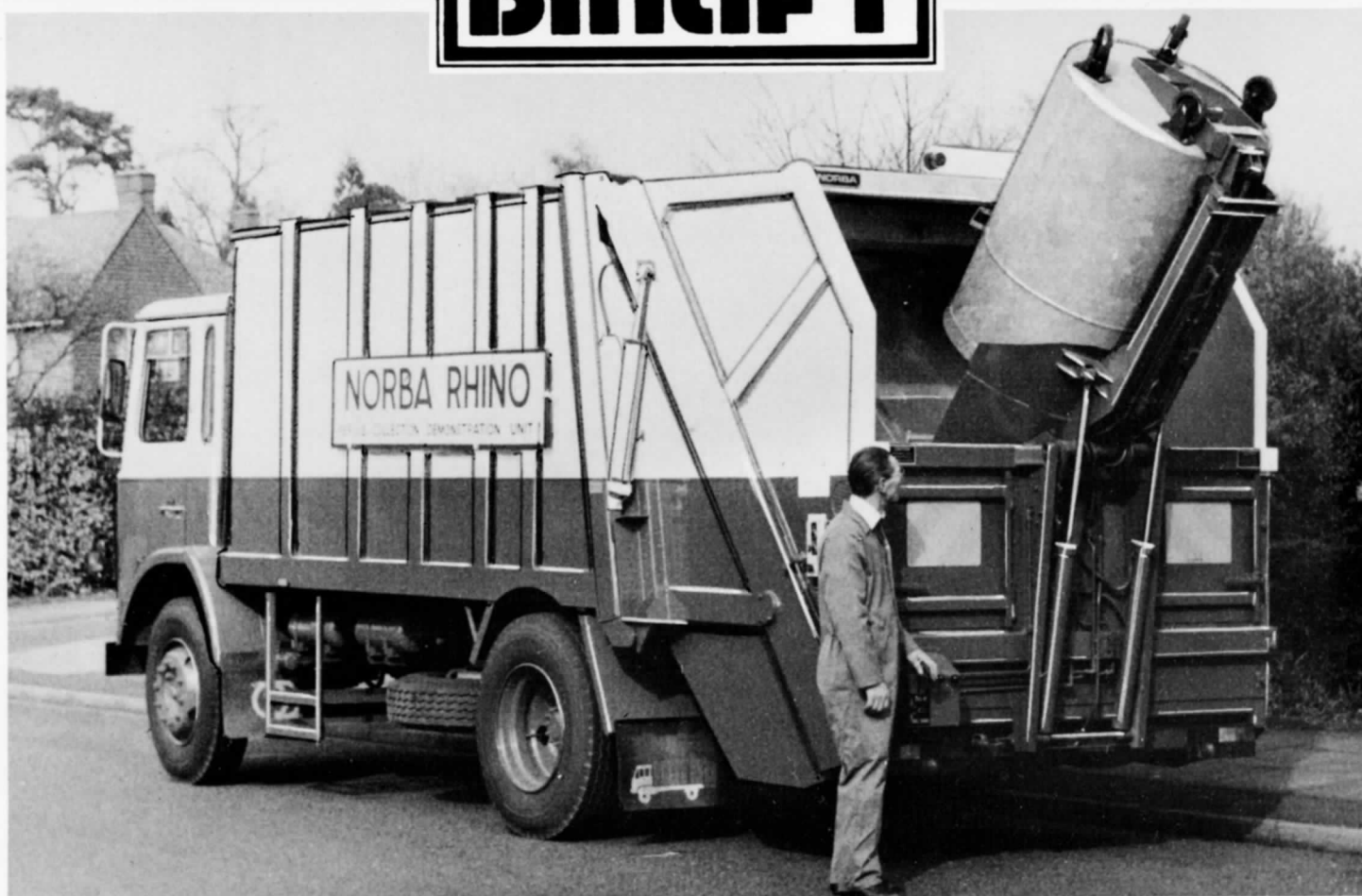


- | | | | | | |
|----|---------------------------------------|----|------------------------------|----|-------------------------|
| 1 | Body | 12 | Ejector Plate Guide | 24 | Rave 3ar |
| 2 | Ejector Plate Ram | 13 | Ejector Plate Slipper Blocks | 25 | Automatic Locks |
| 3 | Ejector Plate | 14 | Tailgate Sliding Pivot | 26 | Tailgate Seal |
| 4 | Body Control Valve | 15 | Tailgate | 27 | Control Box |
| 5 | Body Control Valve Levers | 16 | Packer Plate | 28 | Manual Override Levers |
| 6 | Inspection Door | 17 | Carriage Plate | 29 | Tailgate Lift Rams |
| 7 | Hydraulic Oil Tank | 18 | Packer Plate Ram | 30 | Tailgate Hydraulic Pack |
| 8 | Front Body Mounting | 19 | Carriage Plate Ram | 31 | Hopper Light |
| 9 | Rear Body Mounting | 20 | Spherical Bearings | | |
| 10 | Ram Pivot | 21 | Packer Plate Pivot | | |
| 11 | Pressed U Section Strengthening Beams | 22 | Carriage Plate Guide | | |
| | | 23 | Hopper | | |



Multilift announce the New Norba Rhino Binlift

BINLIFT



THINK TWICE and look to the Rhino for a double advantage

Since its introduction in January 1980 the Norba Rhino has met with considerable success. It has been recognised as a new tougher breed of refuse collector, ideally suited to the handling of both domestic and commercial waste.

The New Binlift attachment now increases the flexibility of the Rhino to accommodate the handling of cylindrical containers. And as with the Rhino itself the Binlift brings new standards of reliability and easy operation.

To start with, the angle of tip is extremely good and ensures a clean discharge into the hopper, the hopper capacity is large and the fast packing cycle will clear the hopper before a second bin can be discharged.

This fast loading sequence is provided by two double acting hydraulic rams that are positioned to give maximum stability.

We have also built-in two large access doors, one either side of the hoist mechanism, for manual loading.

In operation the true value of Norba's engineering

becomes obvious, the mechanism clamps to the bin at both the top and the bottom, holding it rigidly in position without any distortion. The lift controls incorporate an interlock device that prevents the bin being accidentally released in its raised position and as with the Rhino itself all hydraulic components are of the highest standards and fully protected against accidental damage.

When not in use the entire Binlift attachment can be quickly removed returning the Rhino to normal open back manual loading.

The Binlift needs to be seen. Contact Multilift Limited, Norba Division, Bury Mead Road, Hitchin, Herts SG5 1RG. Or ring Hitchin (0462) 4594.



the NEW Norba Rhino is put through its paces

Following detailed market analysis the decision was taken to add to the Norba range of refuse collectors. A sizeable development budget was allocated with the sole aim to produce a vehicle offering an unequalled degree of safety, versatility and reliability.

The New collector is known as the Rhino and like its namesake will prove an extremely tough vehicle indeed. It utilises a static hopper for safety and an intermittent packing cycle for fuel economy but unlike most intermittent packing models the New Rhino offers almost uninterrupted loading for speed of operation.

Almost £½M has now been spent on the research and development of this new vehicle both in Sweden and here in the U.K. Exhaustive trials have been carried out over many months using prototypes in both Local Municipalities and selected operators in the private sector. Steps were taken to ensure that all types of refuse was handled and under all conditions being fed both by hand and by container lift.

Throughout the prototype testing a design engineer and technical assistant worked with each machine, each bag, bin and item of waste was carefully recorded and each load weighed and analysed.

Our trials included the design and construction of a test rig for the packing mechanism. Large quantities of broken concrete, timber and tyres were put into the rig and the packing mechanism was run day and night for many months at full working pressure.

Thousands of operating cycles were completed before the hopper was stripped down for examination. All wear surfaces of the hopper are lined with the same grade of steel as that used for lining excavator buckets, and wear caused on the test rig was negligible. We are confident that the Rhino will prove extremely tough indeed, and will set a new standard for the industry that will be difficult to equal.

The following trial examples show how effective our design thinking has proved.

Typical Results Achieved on U.K. Trials

Test A Manual loading (Domestic only). Stevenage B. C. Driver plus 4 loaders, load — plastic sacks plus equivalent to 20 extra sacks loose waste. Cycle time 22 seconds. Full load 714 + 20 (loose waste) =

734 sacks. Packing cycle completed 36 times. Average number of sacks in hopper — 20. Number loaded before spillage occurred — 26 approx. Crew reaction — loading height and cycle time better than on their usual vehicle.

Test B Manual loading (Domestic plus some shops). Enfield L. B. C. Driver plus 6 loaders. Load completed in 2½ hours. 600 sacks loaded plus approximately 1 ton loose material. Payload achieved 6.1 tons. Packing cycle completed 34 times. Average sacks in hopper per cycle — 21. Crew reaction — most impressed with vehicle. Before full load achieved they went further than existing competitive machine. The packing rate was faster and they finished one hour earlier than normal.

Test C Manual loading. Civic Amenity Waste. Enfield L. B. C. Driver plus 2 loaders. A total of nine special collections were made, 3 of which were to multi-storey flats. Items collected included upright piano, sink unit, carpets, lino, doors, metal tank, plaster and tiles, cookers, cistern tank, concrete washing line post, mattresses, beds, washing machines, fridges, prams, metal trunk, car wheels, tyres, settees, sideboard, mangle, T.V.'s, fencing, paint drums, car engine etc. etc. Packing cycle operated 47 times, only difficulty manoeuvring piano into position but no problems on packing. Crew reaction — delighted because normally using fore/aft tipper and the round usually takes 3-4 loads to tip. The Rhino completed the load in one and nett payload was even then only 3¼ tons.

Typical Results Achieved on Swedish Trials

Test A Manual loading (Domestic only). 48 recorded loads grossing 321,600 Kgs. Average payload 6,700 Kgs.

Test B Container lift operation (Civic Amenity and Domestic). 95 recorded loads grossing 579,500 Kgs. Average payload 6,100 Kgs.

In all well over 10,000 tons of refuse were handled on test sacks as shown above.

The Rhino incorporates many new design features to improve strength, reliability, and safety. The Norba Rhino has been designed and built to survive the toughest jungle of all.



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The Norba Rhino Technical Description, Design Features, Method of Operation

The Rhino range has been specifically designed to offer a very simple and reliable method of collecting and compacting waste. Our designers were asked to ensure that no compromises be made regarding operational reliability coupled with features to eliminate costly down time wherever possible. An example of this is the manual override of the normal electrical control should difficulties arise.

With four sizes of body there is a wide capability to match the exact customer requirements. Standard bodies are designed for use on 2 axle chassis but larger sizes could be supplied to a 3 axle version.

The principles involved in the operation of the Rhino are quite straightforward. Loading waste into the static hopper, with a loading height of approx. 1040mm, will show the benefits of a full width rake bar, and large loading capacity. Compaction of the waste is accomplished by a packer plate which pre-compacts against the ejector plate which in turn retracts under a controlled back pressure.

The unobstructed loading space allows all types of refuse to be handled including domestic, commercial and light industrial. Provision has been made in the design of the tailgate to easily install a range of bin and container lifts, these include a manual clamp type, a top and bottom hydraulic clamp type, for cylindrical containers. Rectangular bins and large sacks can also be handled.

Individual component parts of the Rhino have been very carefully selected and developed, many months of arduous testing have proved stress loading, wear characteristics and operational reliability. A basic requirement was in the quality and strength of the sheet steel used in both the body and tailgate construction. The body has a 4mm thick steel floor and 2.5mm sides, reinforced by 4mm pressed 'U' section strengthening beams. The roof is 2.5mm with 4mm at the rear, again supported by external strengthening beams. All beams are continuously seam welded to the body panels eliminating rust traps and ensuring maximum strength.

Extremely hard wearing special steel has been obtained for the construction of the tailgate assembly. Steel with a Brinell hardness of 360 has been incorporated in the 6mm floor and sides of the hopper. The packer plate itself has the same wear resistant steel on its working faces. Finally, the carriage plate guides are slipper blocks of a high grade aluminium/bronze, of symmetrical design for ease of fitting. All hydraulic cylinder bores are hard chrome steel to eliminate wear. An improved design ejector plate is fitted with a clean smooth face so that all refuse is completely discharged. This has been achieved by re-positioning the telescopic ejector ram at an angle behind the ejector plate.

Turning now to the hydraulic system, several important features have been included. All hydraulic rams have hard chromed piston rods and adjustable seals, each is fully tested under pressure at our factory. In addition the hydraulic rams for the packing mechanism have spherical bearings at each end. All pipe ends are flared, this ensures a perfect seal even at high temperatures and eliminates the need for re-tightening.

The tank is fitted with three different filters combining to ensure that the oil is clean, this increases the service life of the hydraulic system, reduces down time, and allows the venting of air. The filter system consists of a 10 micron air filter, a 125 micron oil filter and a 10 micron high pressure oil filter. The latter is mounted on the outside of the oil tank and is easily accessible through the inspection hatch for cartridge replacement etc.

Following the success of our electrical controls on the Hippo we are using many of the same well proven components on the Rhino. The electrical system runs on 12 or 24 volts, is simple, robust and reliable. All cables are fitted with conduit protection. Nearside mounting of control box includes push buttons for start, stop and other functions; it is insulated against humidity and has a built in circuit light which radiates heat. The loading cycle is controlled by relays, micro-switches and pressure switches. A dual purpose control facility is provided, the normal electric semi-automatic system with an added manual override in the event of an electrical failure.

The National Swedish Board of Industrial Safety have given approval to the Rhino as it meets with all their stringent requirements. Amongst these, the automatic cycle does not operate until the packer plate has moved past the rake bar on the hopper. During the compaction cycle, the packer plate and the hopper form a completely enclosed protective wall. The conveniently located safety controls include a facility which is used to stop the packing mechanism instantly. Each hydraulic ram for lifting the tailgate has a fail-safe valve that prevents it from moving in the event of a pressure drop in the hydraulic system. Finally, the tailgate locks automatically to the body.

Technical Data

Body

Model		120	135	150	155
Air Volume:	cu. m.	12.0	13.5	15.0	15.5
	cu. yd.	15.7	17.7	19.6	20.3
Loading Potential:	cu. m.	48	54	60	62
	cu. yd.	63	70	78	80
Body Length:	mm	3350	3575	3975	4150
	ins	132	141	156	164
O/A Length: (Inc. tailgate)	mm	5060	5285	5685	5860
	ins	199	208	224	231
Total Weight: (Assembled)	kg	4650	4700	4800	4850
	tons	4.6	4.6	4.7	4.8

Width: mm 2440
ins 96

Height: 2020
(Above chassis frame) 80

Material: (Sides) 2.5mm Steel plate
(Top) 2.5mm Steel plate — 4mm at rear

Strengthening Beams: (Side) 4mm U Section
(Top) 4mm U Section
(Bottom) 5mm U Section

Tailgate:

Working Cycle: Approx. 22 seconds. Max. time required for operation of controls: approx. 8 seconds. (22 seconds for manual override operation).

Compaction Force: Approx. 10500 kgs. at outer edge of packer plate
Approx. 1900 kgs. in centre of panel

Hopper: Volume 1.70m³
2.20 yd³
Width Inside: 2.030mm
80 ins.

Material, sides and bottom 6mm high grade, wear resistant steel.
Loading height, min. 1040mm (41 ins) see separate specification.

Hydraulic System:

Pumps: See separate specification. Flow approx. 60 l/min.

Valves: Ejector plate, Packer plate and tailgate, electro pneumatic or manually controlled.

Hose & Pipe Connections: Flared pipes, no re-tightening required.

Hydraulic Pressure: Packer plate and tailgate: 18 MPa (180 bar)
Ejection Plate: 8 MPa (80 bar)
Carriage plate 5 and 18 MPa (50 and 180 bar)

Oil Volume: 100 dm³ (100 litres)

Filters: 10 micron air filter, 125 micron oil suction filter.
10 micron high pressure oil filter.

Hydraulic Rams:

Ejector Plate: Diameter 150/130/100mm
Stroke 2,547 – 3,675 depending on body size. Double action telescopic.

Packer Plate: Double Acting. Spherical bearings.

Carriage Plate: Double Acting. Spherical bearings.

Tailgate: Diameter 75mm stroke 700mm single acting.

Electrical System:

Voltage: 12 or 24 v.

Fuse: 12 v — 1 x 8A 1 x 25A 1 x 35A
24 v — 2 x 8A 1 x 16A

Control box for control of loading cycle. Limit position switches for rams for carriage and packer plates.

