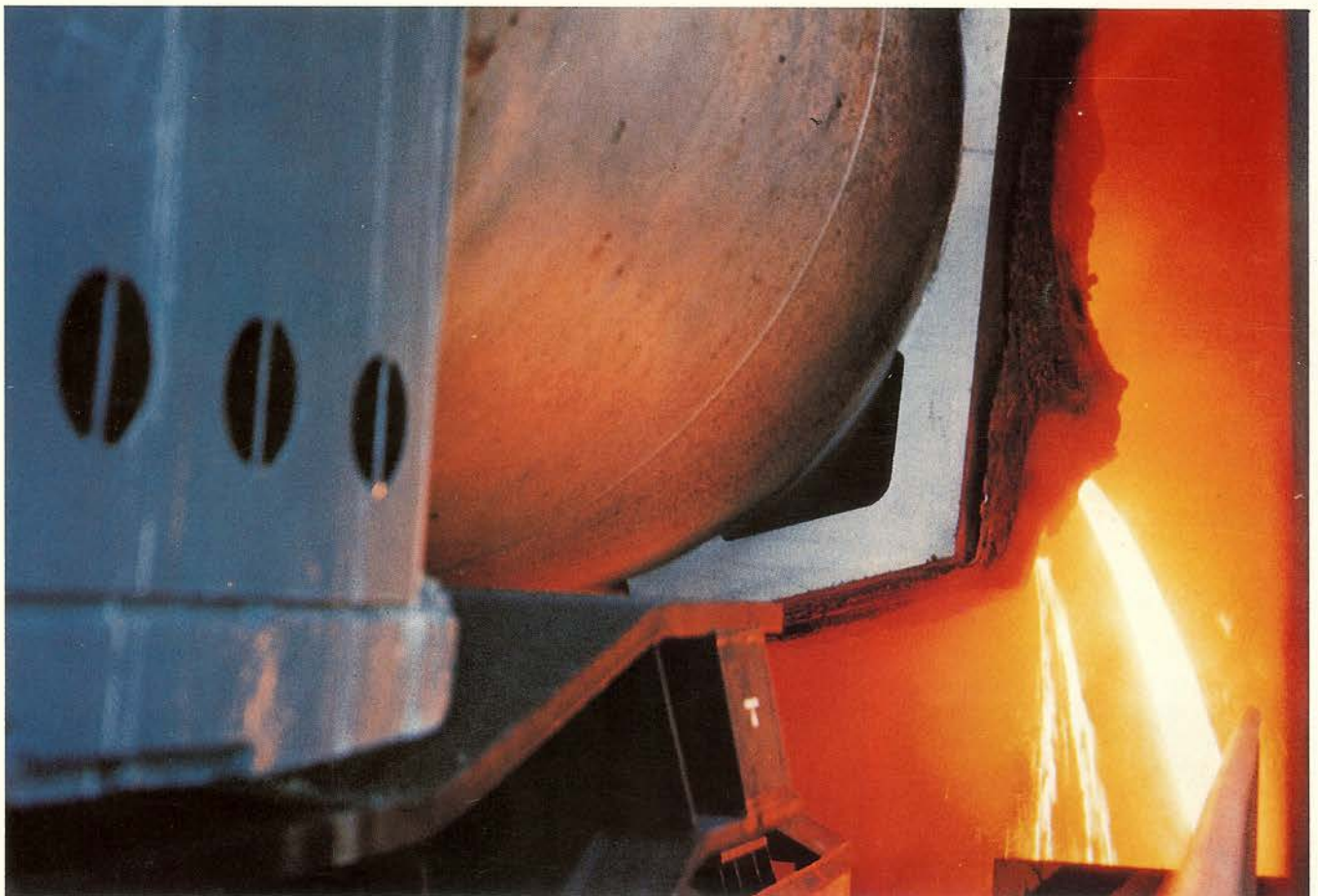


Hot metal cars



General

Mannesmann Demag plant and machinery for the iron and steel industry hold a leading position on the world market. Mannesmann Demag Metallgewinnung develops, designs, manufactures and supplies plant, machinery and systems for the production of iron, steel and non-ferrous metals.

Mannesmann Demag offers a comprehensive range of vehicles for handling iron and steel, such as hot-metal mixer cars, slag transfer cars, casting ladle cars, ingot buggies, mould cars, and steel transfer cars.

Torpedo ladle cars for transferring hot metal from blast furnace to steelworks are now standard items of equipment throughout the world; Mannesmann Demag has played a leading role in this development.

The new hot metal transporter substantially rationalizes material flow systems by cutting the lining time by approx. 50%, so greatly increasing availability.

Hot metal car with a capacity of 160 t and a charge of 90% for the transportation of melt on public railways

Length inclusive of buffers	30,000 mm
Max. height with cover	4,540 mm
Total weight of car with charge	344.4 t
Max. axle load	21.5 t
Load per m (car with charge)	11.48 t/m
Max. travelling speed	
with full vessel	80 km/h
with empty vessel	90 km/h



Planning, application, maintenance and advantages

Hot-metal mixer cars increase the availability of hot-metal handling equipment, and improve material flow efficiency. Production units continue to grow in size and consequently have faster tap-to-tap

times; accordingly, larger quantities of hot metal must be handled over shorter time intervals. In high-capacity steelworks, hot metal transporters of the appropriate size nowadays replace stationary

mixers as the "buffer" between blast furnace and steelworks. Demag hot-metal ladle cars have holding capacities of up to 600 t, due consideration being given to the clearance profiles for specific locations.



This new Demag design also permits desulphurization operations, a solution having been found to the fundamental problem of the correct ratio between vessel length and vessel diameter.

Customer feedback permitted precise dimensioning of the vessel. Hot metal leaks can be prevented by using efficient linings.

Lining times are considerably reduced by the removable end covers, and work can be wholly or partially mechanized. The working lining is replaced normally after a throughput volume of approx. 150 000 t hot metal. The time for breaking out, cooling down, lining and heating up the tubular vessel is reduced by some 50% as compared with the conventional torpedo ladles. This means faster availability and considerable all-round cost savings.

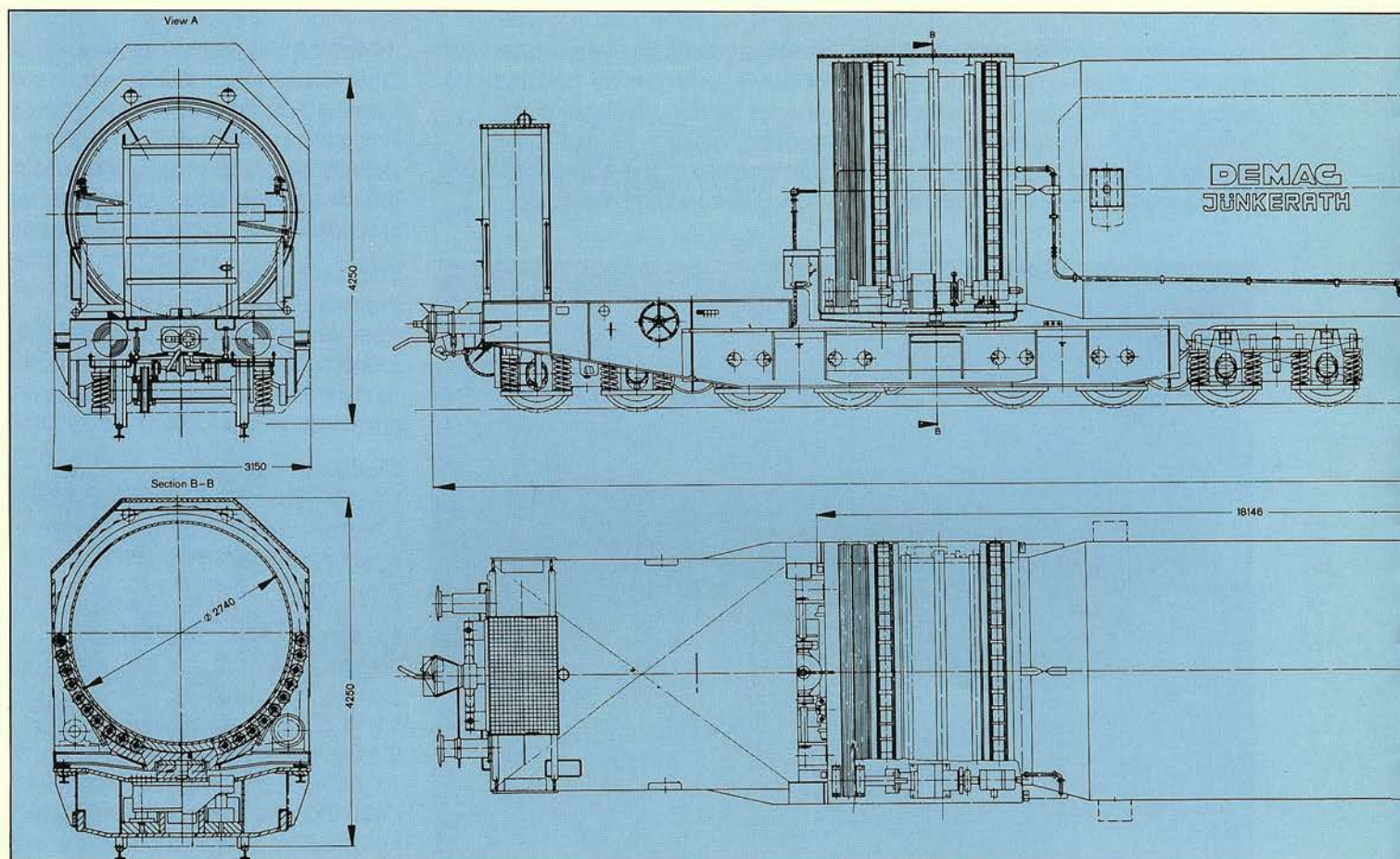


Advantages:

1. Faster cool-down rate through removal of the end covers
2. Easier, lower-risk and quicker breaking out of the old lining (work can be carried out simultaneously from two points)
3. Improved working conditions during break-out and relining work
4. Easy removal of iron scabs and skulls
5. Replaceable vessel body
6. Mechanical lining and break-out operations possible

Hot metal transporter · Capacity: 300 t

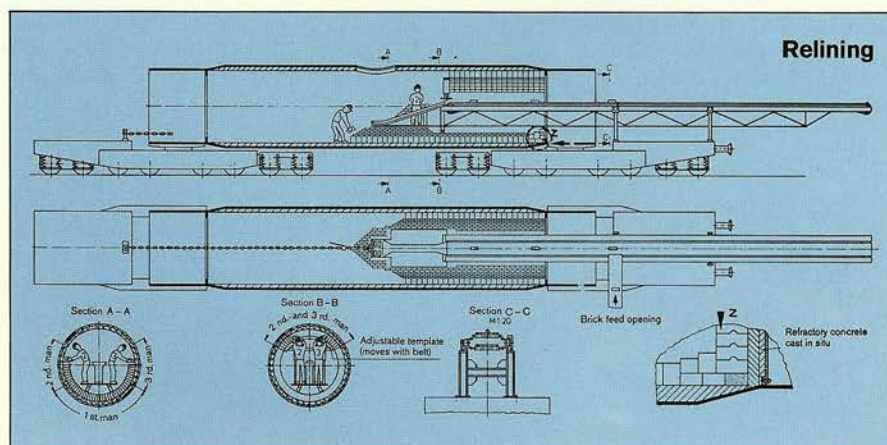
Details



Saving of time when lining new design hot metal transporters as against orthodox torpedo ladle cars

Torpedo car

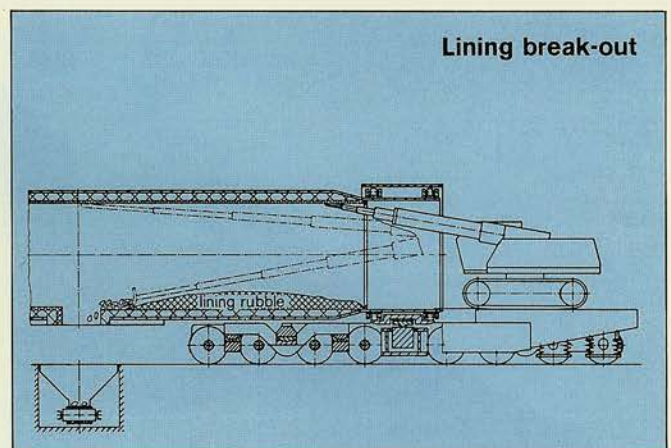
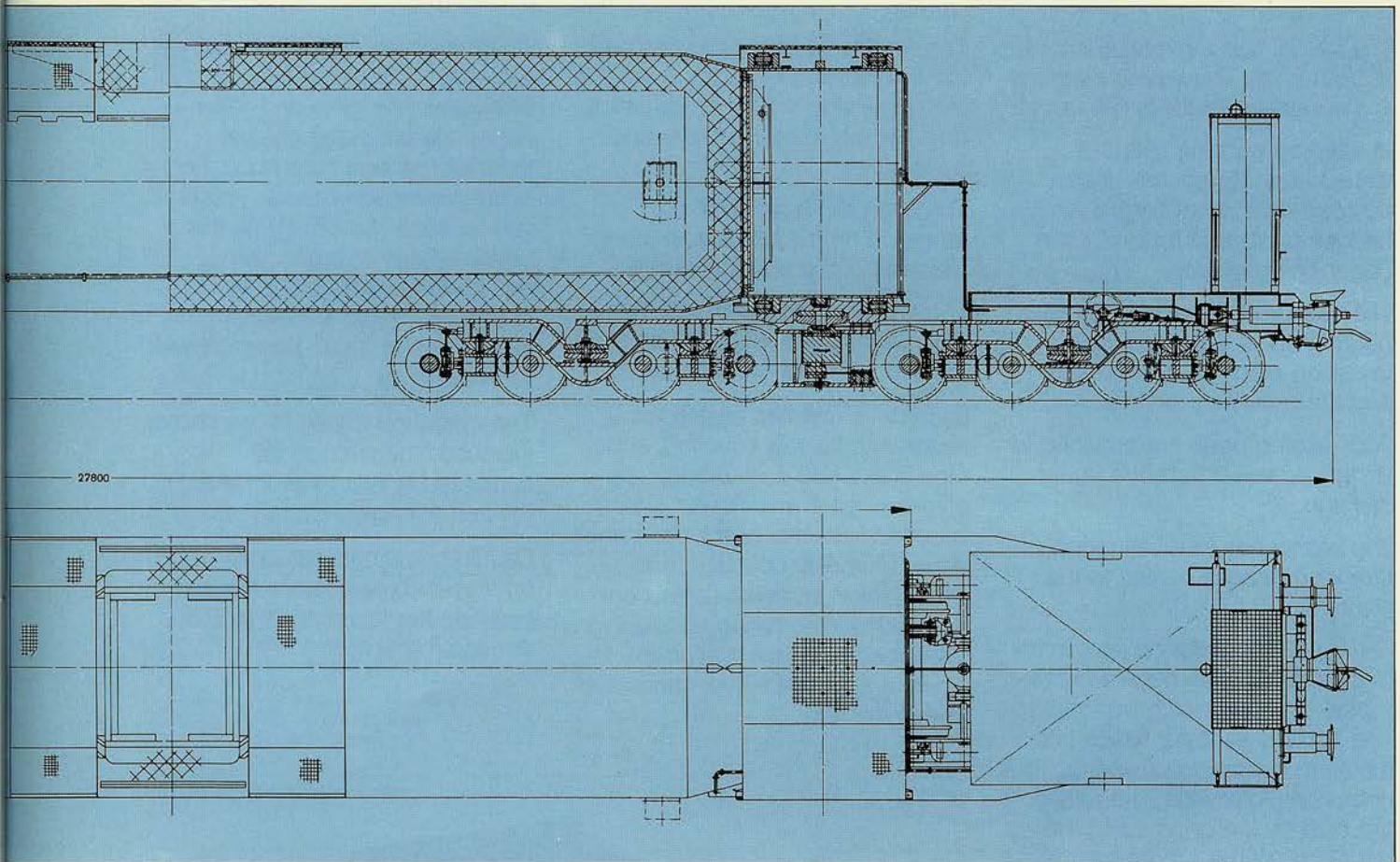
Cooling down	3 days by means of blower	72 hours
Wrecking	2 days work done in 3 shifts 3-4 men	48 hours
Relining	3 days work done in 3 shifts 3-4 men	72 hours
Heating up	2 days	48 hours
	10 days	240 hours



Hot metal transporter

Cooling down	none	
Wreckage incl. removal of front doors	1 day by machine	8 hours

Relining	1-3 days work done in 3 shifts 3-4 men	24-72 hours
Heating up	2 days	48 hours
	4-6 days	96-128 hours



Technical description

Hot metal transporter, 300-t-capacity

The vessel has removable covers at both ends. The vessel diameter is the same over the entire length.

In keeping with the previous torpedo car design, the undercarriage consists of bogies and bridges up to and including the upper pivot sockets.

The ladle vessel has a central pouring spout and a conical transition piece to the end stubs and the mounting system.

Four jacking pads are provided for lifting the vessel from the undercarriage.

The vessel has four ball races arranged in pairs central to the pivots.

Four enclosed roller cages run in these ball races through which the vessel is supported in two saddles. The support saddles, which take the roller cages, cover approx. 90° of the circumference. The rollers are held by the cage along the remainder of the circumference.

The underside of the saddles carry the top part of the pivot socket and the upper lateral sliders, via which they are supported in the undercarriage.

The two part tilting drive is arranged on the lateral cantilever brackets of the support saddle.

The sturdy dimensioning of the drive permits the vessel to be tilted even in the most extreme cases.

Each drive unit has an electric motor with flexible coupling, shoe-type brake and a spur and planetary gear unit. Power is also supplied from the gear output shaft via a differential coupling to a chain pinion sprocket carried on both sides in self-aligning bearings. Via a toothed chain, the pinion drives a sprocket wheel connected to the vessel.

An emergency tilting drive can be actuated via a second motor shaft extension. The drive and roller cages are protected against external damage by a hood. For relining work, the tubular vessel can be lifted completely off the undercarriage at a specially equipped location, the drive remaining friction-locked with the vessel so that it can be employed for lining work.

The cylindrical shape of the vessel increases the capacity as compared with a torpedo ladle of the same length.

Desulphurization operations using an immersion lance are effected by inserting the lance at an incline through the spout.



Extract from reference list

Year	Customer	Quantity	Capacity
1967	SNS El Hadjar Algeria	2	150 t
1968/70	Hauts-Fourneaux Reunis de Saulnes et Uckange France	4	200 t
1968/69	Salzgitter Hüttenwerke AG Salzgitter-Drütte Fed. Rep. of Germany	8	200 t
1968	ATH Duisburg Fed. Rep. of Germany	1	200 t
1968/75	N.V. Sidmar S.A. Gent Belgium	8	222 t
1968/70	BSC-Dorman-Long South Tesside Lackenby Works U.K.	32	250 t
1969	BSC-Dorman-Long South Tesside Lackenby Works U.K.	6	100 t
1970	BSC Anchor Group Appleby Frodingham Works U.K.	20	250 t
1970	BSC Shotton Group Shotton Works U.K.	7	300 t
1970/73	BSC Ravenscraig U.K.	8	200 t
1971	Acieries de Paris et d'Outreau Boulogne sur Mer France	3	80 t
1972	BSC Port Talbot Glamorgan U.K.	2	300 t
1973/74	Norrbottns Järnverk Lulea Sweden	5	300 t
1974	Forges de Thy Marcinelle et Monceau, Charleroi Belgium	1	150 t
1974	Norrbottns Järnverk Lulea Sweden	3	250 t
1974	BSC Scunthorpe Group Normanby Park Works U.K.	8	250 t
1975	SICARTSA Mexico	7	230 t
1975	Hoesch Dortmund Fed. Rep. of Germany	18 *	175 t
1975/76	ATH Werk Hamborn Fed. Rep. of Germany	14 *	300 t

Year	Customer	Quantity	Capacity
1976	China Steel Corp. Taipei Far East	13	250 t
1976	Vöest Linz Austria	8 *	300 t
1976	Stahlwerke Peine-Salzgitter Peine Fed. Rep. of Germany	5 *	204 t
1977	BSC Redcar Cleveland U.K.	18 *	320 t
1977	Solmer France	2 *	450 t
1977	Hainaut-Sambre Couillet Belgium	6 *	250 t
1977	BSC Appleby Scunthorpe U.K.	6	250 t
1977	Hauts-Fourneaux Reunis de Saulnes et Uckange France	2 **	150 t
1978	Arbed Esch-Belval Luxembourg	6 **	130 t
1979	Ahmsa Mexico	3 *	250 t
1979	BSC Ravenscraig U.K.	4 *	200 t
1979	BSC Scunthorpe U.K.	6	250 t
1980	SSAB Lulea Sweden	1 *	300 t
1980	Röchling-Burbach Völklingen Fed. Rep. of Germany	8 **	160 t
1980	Sacilor France	3 **	150 t
1982	EKO Eisenhüttenstadt DDR	9 *	300 t
1984	Posco Kwangyang Steelworks — Kohema Seoul — Korea	24 *	320 t
1985	Rogesa Dillingen Fed. Rep. of Germany	15 **	160 t
1985	Sidmar Gent Belgium	2 *	220 t

* New design = hot metal transporters with removable covers

** = admitted for National Railways

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**Torpedowagen · Rohrpfannenwagen
Torpedo cars · Hot metal transporter**

Referenzen
References

July 1989

Jahr Year	Auftraggeber Company	Roheisenwirtschaft Hot metal handling	Fassungs- vermögen Capacity
1958	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	1 × 200 t
1960	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	1 × 200 t
1960	Mannesmann Export GmbH, für Cia Siderúrgica Mannesmann Brazil	Torpedowagen Torpedo cars	2 × 150 t
1961	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	2 × 200 t
1962	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	2 × 200 t
1963	SA Cockerill-Ougrée-Providence et Esperance – Longdoz Seraing Belgium	Torpedowagen Torpedo cars	8 × 150 t
1964	SA Cockerill-Ougrée-Providence et Esperance – Longdoz Seraing Belgium	Torpedowagen Torpedo cars	3 × 150 t
1965	Aciéries & Minières de la Sambre S.A. Monceau-sur-Sambre Belgium	Torpedowagen Torpedo cars	2 × 150 t
1966	N. V. Sidmar S.A. Gent Belgium	Torpedowagen Torpedo cars	8 × 200 t
1966	Inchon Ironworks Co. Ltd. Seoul Korea	Torpedowagen Torpedo cars	2 × 150 t
1966	SA Cockerill-Ougrée-Providence et Esperance – Longdoz Seraing Belgium	Torpedowagen Torpedo cars	4 × 150 t

Jahr Year	Auftraggeber Company	Roheisenwirtschaft Hot metal handling	Fassungs- vermögen Capacity
1967	SNS, El Hadjar Algeria	Torpedowagen Torpedo cars	2 × 150 t
1968	Hauts Fourneaux réunis de Saulnes & Uckange, Uckange France	Torpedowagen Torpedo cars	3 × 200 t
1968	Stahlwerke Peine-Salzgitter AG, Salzgitter-Drütte Fed. Rep. of Germany	Torpedowagen Torpedo cars	5 × 200 t
1968	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	1 × 200 t
1968	N. V. Sidmar, S.A., Gent Belgium	Torpedowagen Torpedo cars	2 × 222 t
1968	British Steel Corporation – Dorman Long – South Teesside, Lackenby Works U. K.	Torpedowagen Torpedo cars	12 × 250 t
1969	B. S. C. – Dorman Long – South Teesside, Lackenby Works U. K.	Torpedowagen Torpedo cars	6 × 100 t
1969	Stahlwerke Peine-Salzgitter AG, Salzgitter-Drütte Fed. Rep. of Germany	Torpedowagen Torpedo cars	3 × 200 t
1970	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	5 × 200 t
1970	British Steel Corporation – Dorman Teesside, Lackenby Works U. K.	Torpedowagen Torpedo cars	4 × 250 t
1970	British Steel Corporation Scunthorpe Group Appleby Frodingham Works U. K.	Torpedowagen Torpedo cars	20 × 250 t

Jahr Year	Auftraggeber Company	Roheisenwirtschaft Hot metal handling	Fassungs- vermögen Capacity
1970	British Steel Corporation Shotton Group, Shotton Works U. K.	Torpedowagen Torpedo cars	7 × 300 t
1970	Hauts Fourneaux réunis de Saulnes & Uckange, Uckange France	Torpedowagen Torpedo cars	1 × 200 t
1971	Acieries de Paris et d'Outreau Boulogne sur Mer France	Torpedowagen Torpedo cars	3 × 80 t
1972	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	2 × 200 t
1972	Sidmar, S.A. Gent Belgium	Torpedowagen Torpedo cars	4 × 222 t
1972	British Steel Corporation Port Talbot, Glamorgan U. K.	Torpedowagen Torpedo cars	2 × 300 t
1973	Norrbottens Järnverk Luleå Sweden	Torpedowagen Torpedo cars	3 × 300 t
1974	Forges de Thy Marcinelle et Monceau, Charleroi Belgium	Torpedowagen Torpedo cars	1 × 150 t
1974	Thyssen AG, Werk Duisburg-Ruhrort Fed. Rep. of Germany	Torpedowagen Torpedo cars	2 × 200 t
1974	Norrbottens Järnverk, Luleå Sweden	Torpedowagen Torpedo cars	2 × 300 t
1974	Norrbottens Järnverk, Luleå Sweden	Torpedowagen Torpedo cars	3 × 250 t

Jahr Year	Auftraggeber Company	Roheisenwirtschaft Hot metal handling	Fassungs- vermögen Capacity
1974	British Steel Corporation, Scunthorpe Group Normanby Park Works U. K.	Torpedowagen Torpedo cars	8 × 250 t
1975	Sicartsa, Mexico	Torpedowagen Torpedo cars	7 × 230 t
1975	N. V. Sidmar, S.A. Gent Belgium	Torpedowagen Torpedo cars	2 × 222 t
1975	Hoesch Hüttenwerke AG, Dortmund Fed. Rep. of Germany	Rohrpfannenwagen Hot metal transporter	18 × 175 t
1975	Thyssen AG, Werk Duisburg-Hamborn Fed. Rep. of Germany	Rohrpfannenwagen Hot metal transporter	5 × 300 t
1976	China Steel Corp., Kaohsiung Taiwan, R. O. C.	Torpedowagen Torpedo cars	13 × 250 t
1976	Vöest – Alpine AG, Linz Austria	Rohrpfannenwagen Hot metal transporter	8 × 300 t
1976	Thyssen AG, Werk Duisburg-Hamborn Fed. Rep. of Germany	Rohrpfannenwagen Hot metal transporter	5 × 300 t
1976	Stahlwerke Peine-Salzgitter AG, Salzgitter-Drütte Fed. Rep. of Germany	Rohrpfannenwagen Hot metal transporter	5 × 204 t
1976	Thyssen AG, Werk Duisburg-Hamborn Fed. Rep. of Germany	Rohrpfannenwagen Hot metal transporter	4 × 300 t
1977	British Steel Corporation, Redcar, Cleveland U. K.	Rohrpfannenwagen Hot metal transporter	18 × 320 t

Jahr Year	Auftraggeber Company	Roheisenwirtschaft Hot metal handling	Fassungs- vermögen Capacity
1977	Solmer, France	Rohrpfannenwagen Hot metal transporter	2 x 450 t
1977	Hainaut-Sambre Belgium	Rohrpfannenwagen Hot metal transporter	6 x 250 t
1977	British Steel Corporation, Appleby Works U. K.	Torpedowagen Torpedo cars	6 x 250 t
1977	Hauts Fourneaux réunis de Saulnes & Uckange, Uckange France	Torpedowagen Torpedo cars	2 x 150 t
1978	Arbed SA, Esch-Belval Luxembourg	Torpedowagen Torpedo cars	6 x 130 t
1979	Ahmsa, Mexico	Rohrpfannenwagen Hot metal transporter	3 x 250 t
1979	British Steel Corporation Ravenscraig Works U. K.	Rohrpfannenwagen Hot metal transporter	4 x 200 t
1980	Svenskt Stål AB Luleå Sweden	Rohrpfannenwagen Hot metal transporter	1 x 300 t
1980	Stahlwerke Röchling-Burbach GmbH Völklingen Fed. Rep. of Germany	Rohrpfannenwagen Hot metal transporter	8 x 160 t
1980	Sacilor Acéries et Laminoirs de Lorraine Hayange France	Rohrpfannenwagen Hot metal transporter	3 x 150 t
1982	EKO Eisenhüttenstadt DDR	Rohrpfannenwagen Hot metal transporter	9 x 300 t

Jahr Year	Auftraggeber Company	Roheisenwirtschaft Hot metal handling	Fassungs- vermögen Capacity
1984	POSCO Pohang Iron and Steel Co. Kwangyang Steel Works Korea	Rohrpfannenwagen Hot metal transporter	24 x 320 t
1985	Rogesa Dillingen Fed. Rep. of Germany	Rohrpfannenwagen Hot metal transporter	15 x 160 t
1985	Sidmar Gent Belgium	Rohrpfannenwagen Hot metal transporter	2 x 220 t
1987 / 1988	Vöest-Alpine AG Linz Austria	Rohrpfannenwagen Hot metal transporter	7 x 300 t
1988 / 1989	POSCO Pohang Iron & Steel Co. Kwangyang Steel Works Korea	Rohrpfannenwagen Hot metal transporter	22 x 320 t

