South African Class GMA 4-8-2+2-8-4

The **South African Railways Class GMA 4-8-2+2-8-4** of 1954 was an articulated steam locomotive.

Between 1954 and 1958, the South African Railways placed 120 Class GMA Garratt articulated steam locomotives with a 4-8-2+2-8-4 Double Mountain type wheel arrangement in service. All the locomotives could be configured as either a Class GMA branch line or a Class GMAM mainline engine. This was the most numerous Garratt class in the world.[1][2][3][4][5]

Contents

Manufacturers

The light rail branch line Class GMA and mainline Class GMAM Garratt locomotive, a single Class which could be configured for either branch line or mainline working, was a development of the large Class GM branch line locomotive which was introduced on the South African Railways (SAR) in 1938. Like the Class GM, the Class GMA was a tank-and-tender Garratt which ran with a semi-permanently coupled auxiliary water tender to augment its meagre water capacity.[1][3][6]

The locomotive was designed in 1952 under the supervision of L.C. Grubb, Chief Mechanical Engineer (CME) of the SAR from 1949 to 1954. An order for the first 25 of these locomotives was placed with Henschel and Son in Germany. They were built in 1953 and were delivered and placed in service in 1954, numbered in the range from 4051 to 4075. These first 25 locomotives were

South African Class GMA & GMAM 4-8-2+2-8-4

Class GMAM no. 4079 *Lindie Lou*, Capital Park, 30 September 2006

Type and origin	
♠ Configured as Class GMA ♥ Configured as Class GMAM	
Power type	Steam
Designer	South African Railways (L.C. Grubb)
Builder	Henschel and Son Beyer, Peacock and Company North British Locomotive Company
Serial number	Henschel 28680-28704, 29600-29629 BP 7550-7552, 7677-7681, 7750-7776, 7826-7855 NBL 27691-27702, 27769-27778, 27783-27792
Model	Class GMA

L.C. Grubb

equipped with Type X-17 water tenders, built by the SAR in its Pietermaritzburg shops in 1953.[7][8][9][10]

A second batch of 35 locomotives was delivered by Beyer, Peacock and Company (BP) in 1956. Of these, 23 were built by BP and numbered in the range from 4076 to 4098, while the other twelve, numbered in the range from 4099 to 4110, had been subcontracted by BP to the North British Locomotive Company (NBL). These twelve engines therefore bore works plates showing BP as well as NBL as builders.[7][11][12][13]

BP & NBL works plate off no. 4140

This was followed by a third and final batch of sixty locomotives in 1958. Of these, thirty were delivered by BP, of which only ten, numbered in the range from 4121 to 4130, had actually been built by BP. The other twenty, numbered in the ranges from 4111 to 4120 and 4131 to 4140, had once again been subcontracted by BP to NBL. These twenty therefore also bore works plates showing BP as well as NBL as builders. Number 4140 turned out to be the last steam locomotive built by North British. The other thirty locomotives of the third batch, numbered in the range from 4141 to 4170, were again built by Henschel in Germany.[1][7][8][11][12][13]

The locomotives of the second and third batches were equipped with Type X-20 water tenders, built in the Pietermaritzburg shops between 1956 and 1958.[1][9][14]

Characteristics

The light rail branch line Class GMA and the mainline Class GMAM were the same locomotive of which the water and coal capacities could be adjusted to suit by installing or removing plates in the coal and water spaces. As a result, it is virtually impossible to list the GMA and GMAM versions separately since they could easily be converted back and forth between the two versions and

Build date	1953-1958
Total produced	120
Specifications	
Configuration:	
• **Whyte**	4-8-2+2-8-4 (Double Mountain)
• **UIC**	2'D1'+1'D2'h4t
Driver	3rd & 6th coupled axles
Gauge	3 ft 6 in (1,067 mm) Cape gauge
Leading dia.	30 in (762 mm)
Coupled dia.	54 in (1,372 mm)
Trailing dia.	30 in (762 mm)
Tender wheels	34 in (864 mm)
Minimum curve	275 ft (84 m)
Wheelbase	86 ft 4 in (26,314 mm)
• **Engine**	30 ft 4 in (9,246 mm) each
• **Leading**	6 ft 10 in (2,083 mm) each
• **Coupled**	14 ft 5 in (4,394 mm) each
• **Tender**	35 ft 9 in (10,897 mm)
• **Tender bogie**	5 ft 9 in (1,753 mm)
Pivot centres	45 ft (13,716 mm)
Wheel spacing (Asymmetrical)	**1-2:** 4 ft 10 in (1,473 mm) each **2-3:** 4 ft 9 in (1,448 mm) each

often were. Up until about 1962, for example, the division was 20 Class GMA and 100 Class GMAM, but by 1969 there were 69 Class GMA and 39 Class GMAM, two locomotives having by then been scrapped after accident damage. By 1975, on the other hand, there were only 25 Class GMA against 93 Class GMAM.[1][3][4]

The locomotive was thoroughly modern in design, with a one-piece cast steel frame with Franklin spring-loaded wedge horns, manufactured by Commonwealth Steel Castings Corporation in the United States of America. Like the Class 25 locomotive, it had roller bearing axle boxes on all wheels, but not on the crank-pins, with cannon boxes on all axles, except those of the inner Bissel trucks which had outside bearings. It had mechanical lubrication throughout, self-adjusting pivots, a U-shaped foundation ring welded to the inner and outer firebox bottom edges, and an all-welded firebox. The engine units also had Commonwealth cast steel type frames.[1][3][4][5][15]

The boiler's inside diameter was 6 feet 11½ inches (2,121 millimetres) at the first ring and 7 feet 1¼ inches (2,165 millimetres) at the firebox end. The boiler had an inspection manhole, fitted to the top of the boiler aft of the dome. The locomotive was superheated, with a mechanical stoker and Walschaerts valve gear. It could negotiate curves of 275 feet (84 metres) radius with a gauge widening of not more than ¾ inch (19 millimetres) and a superelevation of 4½ inches (114 millimetres).[1][3]

Some of these locomotives, intended for working in areas where there were tunnels such as on the East London mainline, were initially equipped with steam-operated smoke deflecting cowls over their chimneys. When the smoke cowls were later removed, these specific locomotives could still be identified by their almost non-existent chimneys which had to be shorter in order to enable the cowls to fit within the loading gauge.[1][5]

As was done with the predecessor Class GM, the new locomotive carried water only in its front tank, but with the capacity increased from the Class GM's 1,600 imperial gallons (7,270 litres) to either 1,650 imperial gallons (7,500 litres) for the Class GMA or 2,100 imperial gallons (9,550 litres) for the Class GMAM. Likewise, the rear bunker carried only coal, but with the capacity increased from the Class GM's 10 long tons (10,160 kilograms) to either 11 long tons 12 hundredweight (11,790 kilograms) for the Class GMA or 14 long tons (14,220 kilograms) for the Class GMAM.[1][4]

As with the Class GM, the Class GMA's water supply was augmented by semi-permanently coupling a purpose-built auxiliary water tender. The first batch of 25 locomotives were tended by the

	3-4: 4 ft 10 in (1,473 mm) each
Length:	
• **Over couplers**	93 ft 10 in (28,600 mm) engine 43 ft 10⅘ in (13,381 mm) tender 137 ft 8⅘ in (41,981 mm) total
Height	13 ft (3,962 mm)
Frame type	Cast
Axle load	♠ 15 LT 7 cwt (15,600 kg) ♥ 15 LT 14 cwt (15,950 kg)
• **Leading**	♠ 20 LT 16 cwt (21,130 kg) front 20 LT 16 cwt (21,130 kg) rear ♥ 21 LT 16 cwt (22,150 kg) front 21 LT 9 cwt (21,790 kg) rear
• **1st coupled**	♠ 14 LT 14 cwt (14,940 kg) ♥ 14 LT 18 cwt (15,140 kg)
• **2nd coupled**	♠ 15 LT 5 cwt (15,490 kg) ♥ 15 LT 8 cwt (15,650 kg)
• **3rd coupled**	♠ 15 LT 2 cwt (15,340 kg) ♥ 15 LT 6 cwt (15,550 kg)
• **4th coupled**	♠ 14 LT 13 cwt (14,890 kg) ♥ 14 LT 17 cwt (15,090 kg)
• **5th coupled**	♠ 14 LT 16 cwt (15,040 kg)

Type X-17 water tender

Type X-20 water tender no. 4128

same Type X-17 water tender which was used with the Class GM, with a capacity of between 6,750 and 6,815 imperial gallons (30,700 and 31,000 litres). The rest of the locomotives were tended by Type X-20 water tenders with a capacity of 6,790 imperial gallons (30,900 litres). The tenders were numbered for their engines and were painted black with red buffer beams.[1][5]

The locomotive was designed to operate on 60 pounds per yard (30 kilograms per metre) rail despite the maximum axle loading of 15 long tons 14 hundredweight (15,950 kilograms) of the Class GMAM. This had been accomplished by restricting the weight on the leading and trailing bogies to 22 long tons (22,350 kilograms) and balancing the coupled wheels so that the hammer blow was equal for all wheels and did not exceed one ton on any wheel at 45 miles per hour (72 kilometres per hour).[1]

Although the SAR specifications called for a 15 long tons 14 hundredweight (15,950 kilograms) maximum axle loading, the Class GMAM spent its entire career running on track that could take 18 long tons (18,290 kilograms) or more. Without the restriction of the coal bunker and onboard water tank capacity to 14 long tons (14,220 kilograms) and 2,100 imperial gallons (9,500 litres) respectively and the necessity to haul along a water tender, the class would have been much more useful and their service lives could possibly have been prolonged. Their shortcomings as traffic machines was possibly one of the root causes of the rapid mainline dieselisation of the SAR in the 1960s.[15]

Service

	♥ 15 LT 4 cwt (15,440 kg)
• **6th coupled**	♠ 15 LT 5 cwt (15,490 kg) ♥ 15 LT 12 cwt (15,850 kg)
• **7th coupled**	♠ 15 LT 7 cwt (15,600 kg) ♥ 15 LT 14 cwt (15,950 kg)
• **8th coupled**	♠ 14 LT 17 cwt (15,090 kg) ♥ 15 LT 4 cwt (15,440 kg)
• **Trailing**	♠ 12 LT 14 cwt (12,900 kg) front 12 LT 17 cwt (13,060 kg) rear ♥ 12 LT 17 cwt (13,060 kg) front 13 LT 3 cwt (13,360 kg) rear
• **Tender bogie**	25 LT 4 cwt 2 qtr (25,630 kg)
• **Tender axle**	12 LT 12 cwt 1 qtr (12,810 kg)
Adhesive weight	♠ 119 LT 19 cwt (121,900 kg) ♥ 122 LT 3 cwt (124,100 kg)
Loco weight	♠ 187 LT 1 cwt (190,100 kg) ♥ 191 LT 8 cwt (194,500 kg)
Tender weight	50 LT 9 cwt 1 qtr (51,270 kg)
Total weight	♠ 237 LT 10 cwt 1 qtr (241,300 kg) ♥ 241 LT 17 cwt 1 qtr (245,700 kg)
Tender type	X-17 (2-axle bogies) X-20 (2-axle

South African Railways

The 120 locomotives of this class made it the most numerous Garratt class in the world. The Class GMA and Class GMAM saw service on main- and secondary lines in many parts of South Africa. Prior to electrification, a number were employed in Transvaal on the Komatipoort line across the pass between Waterval Onder and Waterval Boven. Along with the Class GM, the Class GMA served on the line from Krugersdorp via Zeerust to Mafeking.[1][3][4][5][16][17]

They also served temporarily on the coal line from Witbank to Germiston until the electrification between Witbank and Welgedag was completed. The second and third batches of locomotives were ordered from 1956 to assist with moving large volumes of traffic, mostly coal, from the Transvaal to destinations in the Free State and Cape Province. Until the Class DE-1, the SAR's first road diesels, took over this task late in 1958, they were employed on block coal workings from Witbank to Kroonstad, a distance of 208 miles (335 kilometres). Since the track en route was built for 21 long tons (21,340 kilograms) axle loads, such a large order for locomotives with a 15 long tons 14 hundredweight (15,950 kilograms) axle loading was unusual.[17][18]

In Natal, the bulk of the Class was based at Pietermaritzburg, from where they worked most trains on the two heavily graded branch lines to Greytown and Franklin. Others worked on the Natal North Coast line between Stanger and Empangeni, while some joined the Class GL on the coal line between Vryheid and Glencoe.[1][3][4][5]

The Cape Western system's locomotives were stationed at Worcester, from where they worked the old New Cape Central Railway (NCCR) line via Riversdale to Mosselbaai until it was dieselised. Between 1981 and 1984, a number were allocated to the Cape Northern system to work the line from Vryburg to Mafeking, where they largely replaced the Class 19D locomotives which had earlier dominated on this line. This turned out to be their last term in mainline service since they were replaced by Class 25NC locomotives in 1984 when the line was relaid with heavier rail.[4][5]

Most of the Class was then allocated to the Cape Midland System in 1984, with most of them initially stationed at Voorbaai where they replaced the Class GEA on trains from Mosselbaai to Riversdale and across the Montagu Pass to Oudtshoorn. Their

	bogies) X-17, X-20 permitted
Fuel type	Coal
Fuel capacity	♠ 11 LT 12 cwt (11.8 t) ♥ 14 LT (14.2 t)
Water cap	♠ 1,650 imp gal (7,500 l) ♥ 2,100 imp gal (9,500 l)
Tender cap.	6,790 imp gal (30,900 l)
Firebox type	Round-top
• **Firegrate area**	63.2 sq ft (5.87 m^2)
Boiler:	
• **Pitch**	8 ft 6 in (2,591 mm)
• **Diameter**	6 ft 11½ in (2,121 mm)
• **Tube plates**	13 ft 6½ in (4,128 mm)
• **Small tubes**	**282:** 2 in (51 mm)
• **Large tubes**	**50:** 5½ in (140 mm)
Boiler pressure	200 psi (1,379 kPa)
Safety valve	Ross-pop
Heating surface	3,211.2 sq ft (298.33 m^2)
• **Tubes**	2,974 sq ft (276.3 m^2)
• **Arch tubes**	25.2 sq ft (2.34 m^2)
• **Firebox**	212 sq ft (19.7 m^2)
Superheater:	
• **Heating area**	747 sq ft (69.4 m^2)
Cylinders	Four

allocation was later extended to the sheds at Sydenham in Port Elizabeth, Rosmead, Klipplaat and Graaff-Reinet, with the result that they worked most of the trains over the route from Port Elizabeth to Rosmead via Klipplaat and across the Lootsberg Pass from Graaff-Reinet.[4][5]

Towards the end of their service lives, the Eastern Transvaal system still had an allocation of them, where locomotives from the Waterval Boven and Breyten sheds worked the line down to Vryheid in Natal.[4][5]

They were the last class of Garratt to remain in service with the SAR. All but three were withdrawn from service by April 1988 and those three were also retired shortly afterwards.[3][4]

Cylinder size	20½ in (521 mm) bore 26 in (660 mm) stroke
Valve gear	Walschaerts
Valve type	Piston
Couplers	AAR knuckle
Performance figures	
Tractive effort	60,700 lbf (270 kN) @ 75%
Career	
Operators	South African Railways
Class	Class GMA & GMAM
Number in class	120
Numbers	4051-4170
Delivered	1954-1958
First run	1954
Withdrawn	1988

Zimbabwe and Mozambique

During the period from August 1979 to September 1981, altogether 26 locomotives of the Class were hired to Zimbabwe-Rhodesia, but not all at the same time since they were rotated with Capital Park in Pretoria as their nominal home for the occasions when they had to return to South Africa for major repairs. On the Rhodesia Railways (RR), later the National Railways of Zimbabwe, they worked from Bulawayo to Gwelo and to Wankie and beyond to Victoria Falls.[4][5][19][20][21]

Six of these locomotives were loaned by RR to the *Caminhos de Ferro de Moçambique* (CFM) for a short while to work the *CFM Centro* line from Beira to Umtali in Zimbabwe.[4][5][19][20]

GMAM no. 4065 with raised coal bunker sides at Bulawayo Locoshed, 15 April 1980

In Zimbabwe-Rhodesia, these locomotives normally worked chimney first with the water tank at the rear. Since the Rhodesian bush war was still ongoing in 1979, the locomotives were equipped with armour plating around the cab. Since this obscured the number plates, the engine numbers were then usually stencilled on the cabsides. The Class GMAM was similar in size with a similar coal capacity to the Rhodesia Railways 20th class 4-8-2+2-8-4 Garratt, but it had a voracious appetite for coal and frequently ran low on fuel with the result that trains often had to be dumped. In an attempt to solve this problem, RR extended the height of the Class GMAM's coal bunker by a foot to increase the capacity.[19][20][21]

26 GMAM Garretts hired to Rhodesia/Zimbabwe between August 1979 to December 1981

+ 4059 Hired to Rhodesia/Zimbabwe 12/1979 to 07/1981

+ 4060 Hired to Rhodesia/Zimbabwe 08/1979 to 09/1981

+ 4064 Hired to Rhodesia/Zimbabwe 08/1979 to 05/1981

+ 4065 Hired to Rhodesia/Zimbabwe 08/1979 to 03/1981

+ 4070 Hired to Rhodesia/Zimbabwe 08/1980 to 02/1981

+ 4071 Hired to Rhodesia/Zimbabwe 12/1979 to 09/1980

+ 4087 Hired to Rhodesia/Zimbabwe 08/1979 to 09/1981

+ 4089 Hired to Rhodesia/Zimbabwe 08/1979 to 10/1981

+ 4090 Hired to Rhodesia/Zimbabwe 12/1979 to 09/1980

+ 4098 Hired to Rhodesia/Zimbabwe 01/1980 to 09/1981

+ 4099 Hired to Rhodesia/Zimbabwe 12/1979 to 03/1981

+ 4102 Hired to Rhodesia/Zimbabwe 09/1980 to 05/1981

+ 4103 Hired to Rhodesia/Zimbabwe 12/1979 to 02/1981

+ 4111 Hired to Rhodesia/Zimbabwe 02/1980 to 02/1981

+ 4112 Hired to Rhodesia/Zimbabwe 08/1979 to 10/1980

+ 4117 Hired to Rhodesia/Zimbabwe 06/1980 to 02/1981

+ 4120 Hired to Rhodesia/Zimbabwe 08/1979 to 10/1980

+ 4121 Hired to Rhodesia/Zimbabwe 12/1979 to 09/1981

+ 4125 Hired to Rhodesia/Zimbabwe 08/1979 to 04/1980

+ 4126 Hired to Rhodesia/Zimbabwe 12/1979 to 01/1980

+ 4129 Hired to Rhodesia/Zimbabwe 03/1979 to 10/1980

+ 4134 Hired to Rhodesia/Zimbabwe 08/1979 to 10/1980

+ 4135 Hired to Rhodesia/Zimbabwe 08/1979 to 02/1981

+ 4137 Hired to Rhodesia/Zimbabwe 08/1979 to 09/1980

+ 4139 Hired to Rhodesia/Zimbabwe 08/1979 to 08/1981

+ 4140 Hired to Rhodesia/Zimbabwe 12/1979 to 08/1981

Industrial, private ownership and preservation

Several locomotives of the class were sold into industrial service and some later were saved for preservation after being sold on into private ownership. The majority went to the Randfontein Estates Gold Mining Company (REGM). Two were sold to the Hotham Valley Railway in Western Australia where they were to haul tourists in ex SAR passenger coaches. These two locomotives, 4090 and 4129 however, never left South Africa and after standing at Bloemfontein loco for 20 years, they were scrapped in May 2016. 4074 was rebuilt after REGM service with the boiler cradle of 4126 and therefore is shown listed as such per the Beyer Peacock numbering protocol.[4][22]

REGM R12 Number plate, ex SAR no. 4136

- No. 4059 became REGM's no. R16 first named *Sarah* then later *Wendy*, now scrapped

- No. 4060 became REGM's first no. R15 *May*, now scrapped.
- No. 4073 became REGM's no. R17 *Doria*, now scrapped.
- No. 4079 became REGM's second no. R15 *May* later renumbered R1. Restored as *Lindie Lou* by Sandstone Estates. Today it is stored out of service at Reefsteamers, Germiston for Sandstone Estates.
- No. 4083 became REGM R3. Later, after rebuild at Dunn's it went to New Zealand for preservation with Mainline Steam. It is fitted with the front engine unit of no. 4126 and the rear of no. 4088.
- No. 4084 became REGM's no R9 then after 7/83 R10, Scrapped after a collision 4/85.
- No. 4088 became REGM R2. Sold to the Sandstone Estates but not delivered, it was scrapped on site at REGM.
- No. 4090 was to go to the Hotham Valley Railway in Western Australia. Scrapped at Bloemfontein Loco, May 2016.
- No. 4107 became REGM's first no. R14 *Cherrie*, now scrapped.
- No. 4108 went to Tweefontein Colliery , now scrapped.
- No. 4110 became REGM's no. R6, now scrapped.
- No. 4112 first went to England still in operating condition for preservation. It was later moved to the Summerlee Heritage Park in Coatbridge, Scotland. It has recently received a cosmetic overhaul.
- No. 4114 became REGM's no. R5. Stored at Bloemfontein for Sandstone Estate's.
- No. 4119 became REGM's second no. R14 *Cherrie*, now scrapped.
- No. 4123 became REGM's no. R11 *Vivienne*, now scrapped.
- No. 4125 was sold to Dunns, first hired to Durnacol and later to Tweefontein Colliery as their no. 2 *Margret*, now scrapped.
- No. 4126 went to Tweefontein Colliery. Sold to the Umgeni Steam Railway, it was then re-sold to Creighton municipality. Today (January 2019), it is the only GMA/M operable. Runs as 4074.
- No. 4128 became REGM's no. R9 *Kathy*. Later returned to Transnet for excursion service, now stored at Voorbaai.
- No. 4129 was to go to the Hothan Valley Railway in Western Australia. Scrapped at Bloemfontein Loco, May 2016.
- No. 4130 became REGM's no. R8, now scrapped.
- No. 4133 became REGM's second no. R10, now scrapped.
- No. 4135 became REGM's third no. R14 *Joan* later renumbered R4 and named *Barbara*. Stored at Hermanstad, Pretoria for Mainline Steam, New Zealand.
- No. 4136 became REGM's no. R12 *Barbara*.It is stored today at Bloemfontein for Mainline Steam, New Zealand.
- No. 4168 was sold to Dunns, first hired to Durnacol and later to Tweefontein Colliery as their no. 1, now scrapped.

Preservation

NUMBER	BUILDER/WORKS	THF / Private	LEASELEND / OWNER	CURRENT LOCATION	OUTSIDE SOUTH AFRICA	?
4056	Hensc 28685	THF	MAINLINE STEAM	WATERVAL BOVEN LOCOMOTIVE DEPOT		
4070	Hensc 28699	THF	MUSEUM	GEORGE TRANSPORT MUSEUM		
4074 (4126)	Hensc 28703	Private	CREIGHTON MUNICIPALITY	CREIGHTON		
4079	BP 7677	Private	SANDSTONE ESTATE	GERMISTON LOCOMOTIVE DEPOT		
4083	BP 7681	Private	MAINLINE STEAM	AUCKLAND	NEW ZEALAND	
4112	BP / NBL 7827 / 27770	Private	Summerlee Industrial Museum	Coatbridge	SCOTLAND	
4114	BP / NBL 7829 / 27772	Private	SANDSTONE ESTATE	BLOEMFONTEIN LOCOMOTIVE DEPOT		
4122	BP 7837	THF	CLASSIC RAIL	VOORBAAI LOCOMOTIVE DEPOT		
4128	BP 7843	THF	CLASSIC RAIL	VOORBAAI LOCOMOTIVE DEPOT		
4135	BP / NBL 7850 / 27787	Private	MAINLINE STEAM	HERMANSTAD (PRETORIA)		
4136	BP / NBL 7851 / 27787	THF	MAINLINE STEAM	BLOEMFONTEIN LOCOMOTIVE DEPOT		

Works numbers

The builders, works numbers and years built of these locomotives are listed in the table.[7][8][11][12][13]

Class GMA & GMAM
Builders and works numbers

SAR no.	Builders	Works no.	NBL Works no.	Year
4051	Henschel	28680		1953
4052	Henschel	28681		1953
4053	Henschel	28682		1953
4054	Henschel	28683		1953
4055	Henschel	28684		1953
4056	Henschel	28685		1953
4057	Henschel	28686		1953
4058	Henschel	28687		1953
4059	Henschel	28688		1953
4060	Henschel	28689		1953
4061	Henschel	28690		1953
4062	Henschel	28691		1953
4063	Henschel	28692		1953
4064	Henschel	28693		1953
4065	Henschel	28694		1953
4066	Henschel	28695		1953
4067	Henschel	28696		1953
4068	Henschel	28697		1953
4069	Henschel	28698		1953
4070	Henschel	28699		1953
4071	Henschel	28700		1953
4072	Henschel	28701		1953
4073	Henschel	28702		1953
4074	Henschel	28703		1953
4075	Henschel	28704		1953
4076	BP	7550		1956
4077	BP	7551		1956
4078	BP	7552		1956
4079	BP	7677		1956

4080	BP	7678		1956
4081	BP	7679		1956
4082	BP	7680		1956
4083	BP	7681		1956
4084	BP	7750		1956
4085	BP	7751		1956
4086	BP	7752		1956
4087	BP	7753		1956
4088	BP	7754		1956
4089	BP	7755		1956
4090	BP	7756		1956
4091	BP	7757		1956
4092	BP	7758		1956
4093	BP	7759		1956
4094	BP	7760		1956
4095	BP	7761		1956
4096	BP	7762		1956
4097	BP	7763		1956
4098	BP	7764		1956
4099	BP/NBL	7765	27691	1956
4100	BP/NBL	7766	27692	1956
4101	BP/NBL	7767	27693	1956
4102	BP/NBL	7768	27694	1956
4103	BP/NBL	7769	27695	1956
4104	BP/NBL	7770	27696	1956
4105	BP/NBL	7771	27697	1956
4106	BP/NBL	7772	27698	1956
4107	BP/NBL	7773	27699	1956
4108	BP/NBL	7774	27700	1956
4109	BP/NBL	7775	27701	1956
4110	BP/NBL	7776	27702	1956
4111	BP/NBL	7826	27769	1958

4112	BP/NBL	7827	27770	1958
4113	BP/NBL	7828	27771	1958
4114	BP/NBL	7829	27772	1958
4115	BP/NBL	7830	27773	1958
4116	BP/NBL	7831	27774	1958
4117	BP/NBL	7832	27775	1958
4118	BP/NBL	7833	27776	1958
4119	BP/NBL	7834	27777	1958
4120	BP/NBL	7835	27778	1958
4121	BP	7836		1958
4122	BP	7837		1958
4123	BP	7838		1958
4124	BP	7839		1958
4125	BP	7840		1958
4126	BP	7841		1958
4127	BP	7842		1958
4128	BP	7843		1958
4129	BP	7844		1958
4130	BP	7845		1958
4131	BP/NBL	7846	27783	1958
4132	BP/NBL	7847	27784	1958
4133	BP/NBL	7848	27785	1958
4134	BP/NBL	7849	27786	1958
4135	BP/NBL	7850	27787	1958
4136	BP/NBL	7851	27788	1958
4137	BP/NBL	7852	27789	1958
4138	BP/NBL	7853	27790	1958
4139	BP/NBL	7854	27791	1958
4140	BP/NBL	7855	27792	1958
4141	Henschel	29600		1958
4142	Henschel	29601		1958
4143	Henschel	29602		1958

4144	Henschel	29603		1958
4145	Henschel	29604		1958
4146	Henschel	29605		1958
4147	Henschel	29606		1958
4148	Henschel	29607		1958
4149	Henschel	29608		1958
4150	Henschel	29609		1958
4151	Henschel	29610		1958
4152	Henschel	29611		1958
4153	Henschel	29612		1958
4154	Henschel	29613		1958
4155	Henschel	29614		1958
4156	Henschel	29615		1958
4157	Henschel	29616		1958
4158	Henschel	29617		1958
4159	Henschel	29618		1958
4160	Henschel	29619		1958
4161	Henschel	29620		1958
4162	Henschel	29621		1958
4163	Henschel	29622		1958
4164	Henschel	29623		1958
4165	Henschel	29624		1958
4166	Henschel	29625		1958
4167	Henschel	29626		1958
4168	Henschel	29627		1958
4169	Henschel	29628		1958
4170	Henschel	29629		1958

Illustration

GMAM no. 4117 at Vryburg station, en route to Mafeking, 16 April 1983

Randfontein Estates Gold Mine's no. R1, c. 1993

Ex SAR no. 4059, REGM no. R16 *Sarah*, c. 1993

GMAM no. 4122 on a tourist special train at Santa, c. 1993

GMAM no. 4122 staged at Voorbaai awaiting restoration, 19 October 2009

GMAM no. 4079 at Rovos Rail in Capital Park, 28 September 2006

References

1. Holland, D. F. (1972). *Steam Locomotives of the South African Railways*. 2: 1910-1955 (1st ed.). Newton Abbott, Devon: David & Charles. pp. 110–113. ISBN 978-0-7153-5427-8.
2. South African Railways and Harbours Locomotive Diagram Book, 2'0" & 3'6" Gauge Steam Locomotives, 15 August 1941, as amended
3. Paxton, Leith; Bourne, David (1985). *Locomotives of the South African Railways* (1st ed.). Cape Town: Struik. pp. 95–96. ISBN 0869772112.
4. Durrant, A. E. (1989). *Twilight of South African Steam* (1st ed.). Newton Abbott, London: David & Charles. pp. 115–117. ISBN 0715386387.
5. Durrant, A.E. (1981). *Garratt Locomotives of the World*. David & Charles. pp. 131-135. ISBN 0-7153-7641-1.

6. Soul of A Railway, System 7, Western Transvaal, based in Johannesburg, Part 24: Krugersdorp-Zeerust-Mafeking (Home Signal), Part 1 by Les Pivnic. Caption 29. (https://sites.google.com/site/soulorailway/home/system-7-1/part-24-krugersdorp---zeerust---mafeking-home-signal-1) (Accessed on 5 May 2017)
7. Hamilton, Gavin N., *The Garratt Locomotive - Garratt Locomotives from Other Builders* (http://www.beyergarrattlocos.co.uk/other.html), retrieved 10 November 2012
8. Henschel-Lieferliste (Henschel & Son works list), compiled by Dietmar Stresow
9. South African Railways (1985). *Rolling Stock Diagrams*. Reference CXG 6/4/2/3. Issued 1 April 1985. SAR Head Office, Johannesburg.
10. Transnet (1991). *Transnet Index and Diagrams of Goods Vehicles, Part II, Tank Wagons.* Reference S/RM(WV) 15/8/5/5. 30 July 1991. Anker Building, Verwoerdburgstad. p. X-17.
11. Hamilton, Gavin N., *The Garratt Locomotive - Garratt Locomotives produced by Beyer, Peacock* (http://www.beyergarrattlocos.co.uk/bp.html), retrieved 10 November 2012
12. North British Locomotive Company works list, compiled by Austrian locomotive historian Bernhard Schmeiser
13. North British Locomotive Co. (from J. Lambert)
14. Transnet (1991). *Transnet Index and Diagrams of Goods Vehicles, Part II, Tank Wagons.* Reference S/RM(WV) 15/8/5/5. 30 July 1991. Anker Building, Verwoerdburgstad. p. X-20.
15. Soul of A Railway, System 3, Part 15: Bethesda Road to Rosmead, Lootsberg Pass. Caption 19. (https://sites.google.com/site/soulorailway/home/system-3-1/part-15---bethesda-road-to-rosmead-the-lootsberg-pass) (Accessed on 1 March 2017)
16. Soul of A Railway, System 7, Western Transvaal, based in Johannesburg, Part 6. Germiston, the Steam and Diesel Running Sheds by Les Pivnic. Caption 11. (https://sites.google.com/site/soulorailway/home/system-7-1/system-7-part-6-germiston-the-steam-and-diesel-running-sheds) (Accessed on 7 April 2017)
17. Soul of A Railway, System 7, Western Transvaal, based in Johannesburg, Part 21: Witbank Line by Les Pivnic, Eugene Armer, Peter Stow and Peter Micenko. Captions 9, 10. (https://sites.google.com/site/soulorailway/home/system-7-1/soul-of-a-railway-part-21-witbank-line-by-les-pivnic-eugene-armer-peter-stow-and-peter-micenko) (Accessed on 4 May 2017)
18. Soul of A Railway, System 7, Western Transvaal, based in Johannesburg, Part 18: Natalspruit to Vereeniging, Part 1 by Les Pivnic. Caption 32. (https://sites.google.com/site/soulorailway/home/system-7-1/natalspruit-to-vereeniging-part-1-by-les-pivnic) (Accessed on 28 April 2017)
19. Pattison, R.G. (2005). *Thundering Smoke*, (1st ed.). Ilminster, Somerset: Sable Publishing House. pp. 127-130. ISBN 0-9549488-1-5.
20. Durrant, A.E. (1997). *The Smoke that Thunders*, (1st ed.). Harare: African Publishing Group. ISBN 1-77901-134-2.
21. Hamer, E.D. (2001). *Locomotives Zimbabwe and Botswana*, (1st ed.). Malmö: Frank Stenvalls Förlag. pp. 60-61. ISBN 91-7266-152-6.
22. Middleton, John N. (2002). *Railways of Southern Africa Locomotive Guide - 2002 (as amended by Combined Amendment List 4, January 2009)* (2nd, Dec 2002 ed.). Herts, England: Beyer-Garratt Publications. pp. 29–30.

External links

External video

South African Steam - Garratts at Randfontein Estates Gold Mine 1994-1995. (https://www.youtube.com/watch?v=4OTD69Iyrsg) (30.16 minutes)