NGV

The planetary gearbox for AGVs.
Compact and highly resilient.

OUR GEARBOX SOLUTIONS: AS INDIVIDUAL AS YOUR AGV.

+ Ideal for high radial loads
+ Extremely space-saving
+ Ease of installation
+ Available in single or multiple units
+ Best price-performance ratio

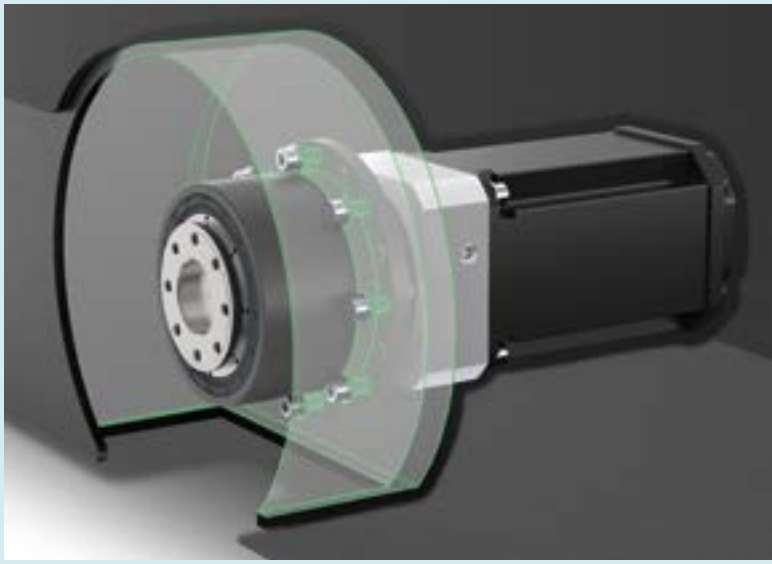
Whatever the demands that you make of your AGV drive: we can provide you with the ideal gearbox solution for your vehicle.

Every detail counts, so that a gearbox can fulfill application-specific requirements in an optimum way.

AGVs are designed to transport heavy loads on a continuous basis. The specific structural and mechanical demands are extremely high. However, we fulfill them in a reliable way with our NGV planetary gearboxes. Because the gearboxes impress with their compact design, efficiency and durability. And we have specifically optimized them for use in AGVs.

Efficient management of heavy loads.
With AGVs the gearbox usually sits directly in the wheel. In other words, it supports the entire weight of the vehicle and the weight of the payload. When this occurs, extremely high axial loads are applied to the output bearing. In the case of the NGV bearing, it has been positioned so that it reliably withstands these loads. We also use pre-tensioned inclined roller bearings, which can withstand extremely high force levels. The advantage: the wheel does not have to be supported separately, since the bearings support the load directly.

High efficiency is decisive as far as AGVs are concerned.
The more energy-efficiently an AGV operates, the longer its range will be. This is particularly relevant with battery-operated vehicles. And the higher the efficiency of the drive train, the smaller the energy store of the AGV can be. In this case the NGV gearbox excels thanks to its high-efficiency planetary gearbox concept.



Installation configuration of the NGV gearbox with wheel and motor

Big ideas, compact size.
From a structural point of view, AGVs do not have much room for gearboxes. It is therefore important for them to be very compact. With NGVs, specially developed wheels enclose the gearbox almost completely. In other words, the gearbox is basically outside the vehicle in the wheel, which saves space. If the structural length of the drive train is to be reduced even further, the gearbox can also be installed using so-called direct motor connection. In this case, the sun pinion is attached directly to the motor shaft, and the gearbox housing is bolted directly to the motor. The omission of the motor adapter plate.means that the overall length can be reduced.

Ideal for installation.
Our engineers have also optimized the interface between the chassis and the gearbox. This means that the installation flange is so close to the chassis that the gearbox can be fitted there directly. The adapter and the additional bolted connections are not required. This also reduces the costs and the weight. For ease of installation, the gearbox is inserted directly from the inside through the chassis, and bolted on from there. The motor and the gearbox can be installed as a preassembled unit. When doing this, the diameter of the motor can also be significantly bigger than that of the gearbox itself.

Fits any motor.
Having a wide range of adapters makes it possible to attach the NGV gearbox to almost any motor. The advantage for you: you can use motors and controllers that are optimum for your application, because Neugart provides its solutions as a manufacturer that only makes gearboxes, independent of the motor and the controller, available in single or multiple units.

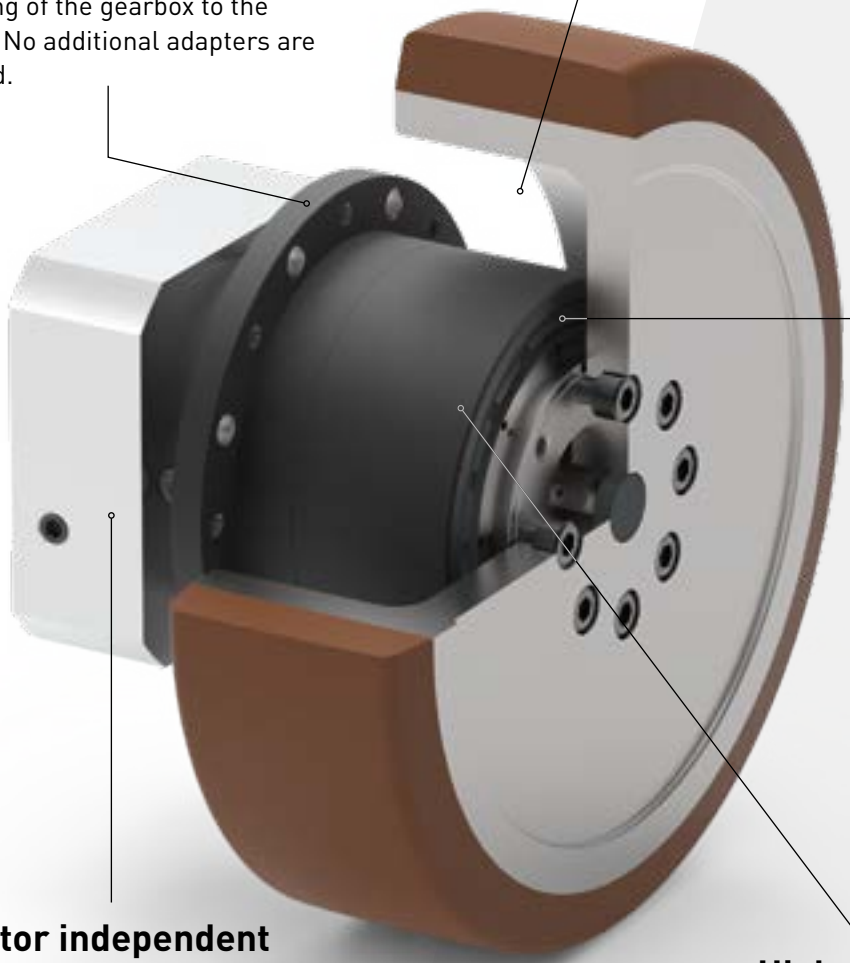
NGV: The perfect gearbox for AGVs.

+ Direct mounting

The mounting interface allows direct mounting of the gearbox to the vehicle. No additional adapters are required.

+ Reduction of installation space

The gearbox is almost completely enclosed by the wheel. The required installation space in the vehicle is therefore reduced to a minimum.



+ High load capacity

The preloaded, double-designed angular contact roller bearings permit very high radial forces.

+ Motor independent

By using different motor adapters it is possible to mount almost any motor. Direct assembly of the motor is also possible.

+ High efficiency and reliability

The proven gearbox type from the Neugart Economy series is characterized by a high efficiency. Thanks to its lifetime lubrication, it is also maintenance-free and extremely reliable, even in continuous operation.

We supply the NGV gearbox in three sizes, with maximum support loads from 350 kg to 1075 kg per gearbox. For each gearbox size there is a specially developed heavy-duty wheel with a diameter of 160 mm, 200 mm or 250 mm. Maximum speeds of up to 2 m/s (7.2 km/h) are possible.

+ High load capacity:
Angular contact roller bearing with optimized load application point.

+ Reliability:
Thanks to lifetime lubrication, the NGV gearbox is maintenance-free.

+ Efficient and effective:
The 2-stage planetary gearboxes originate from our economy model series, which has been proving itself for decades. This combines the best efficiency, a long service life and high precision of ≤ 12 arcmin with an outstanding price/performance ratio.

+ Resistance to water and soiling:
The NGV gearbox is equipped with a special radial shaft seal, and provides IP65 protection class at the output side.

+ Ease of installation:
The gearbox can be fitted directly to the chassis of the vehicle without an adapter. This makes pre-assembly of the motor outside the vehicle possible, and the design of the motor is independently selectable.

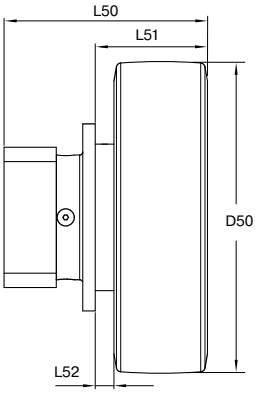
Customer-specific AGV gearbox solutions.

Because of the comprehensive engineering and manufacturing know-how, Neugart is your competent partner for the development and manufacture of customized gearboxes. Also for your vehicle.

Example of a customer-specific gearbox design.

Gearbox incl. wheel

Characteristics (gearbox incl. wheel)			NGV064	NGV090	NGV110
Maximum dynamic load capacity [1]		kg (lb_m)	350 (772)	675 (1488)	1075 (2370)
Max. speed	v	m/s (in/s)	2 (78.7)		
Positioning precision		mm (in)	0.3 (0.012)	0.4 (0.016)	0.4 (0.016)
Total weight		kg (lb)	3.9 (8.6)	7.7 (17.0)	16.4 (36.2)



Geometry			NGV064	NGV090	NGV110
Wheel diameter	D50	mm (in)	160 (6.299)	200 (7.874)	250 (9.843)
Min. total length	L50		98.5 (3.878)	130.5 (5.138)	158.0 (6.22)
Distance between flange and outer edge	L51		58.0 (2.283)	72.0 (2.835)	94.0 (3.701)
Distance between flange and inner edge	L52		8.0 (0.315)	12.0 (0.472)	14.0 (0.551)

Gearbox

Code	Gearbox characteristics			NGV064	NGV090	NGV110	p[2]
	Service life[3]	L_h	h	20,000			
	Efficiency[4]	n	%	97			
	Min. operating temperature	T_{min}	°C (°F)	-25 (-13)			
	Max. operating temperature	T_{max}		90 (194)			
	Protection class			IP65			
S	Standard lubrication			Grease (lifetime lubrication)			
F	Food grade lubrication			Grease (lifetime lubrication)			
	Installation position			Any			
S	Standard backlash	φ	arcmin	< 12	< 9	< 9	
	Torsional stiffness[4]	C_{2t}	Nm /arcmin (lb_f.in/arcmin)	7.3 - 11.5 (65 - 102)	19.5 - 38.5 (173 - 341)	52.0 - 95.0 (460 - 841)	
	Gearbox weight[4]	m	kg (lb_m)	1.6 - 1.7 (3.6 - 3.7)	3.9 - 4.0 (8.7 - 8.9)	8.5 - 8.9 (18.8 - 19.6)	
S	Standard surface			Housing: Steel – heat-treated and post-oxidized (black)			
B	Painted surface			RAL 9005 Jet black			
	Running noise[3]	L_{pA}	dB(A)	60	62	65	

Output shaft loads			NGV064	NGV090	NGV110	p[2]
Maximum radial force	$F_{r\,max}$	N (lb_f)	2700 (607)	4950 (1113)	7200 (1619)	
Maximum axial force	$F_{a\,max}$		2850 (641)	5450 (1225)	6450 (1450)	
Maximum tilting moment	$M_{K\,max}$	Nm / (lb_f.in)	129 (1141)	336 (2973)	569 (5038)	

Input characteristics			NGV064	NGV090	NGV110	p[2]
Clamping system diameter input (Code)	D26	mm	11 (C)	19 (E)[5]	24 (F)[5]	
			14 (D)[5]	24 (F)	35 (G)	
			19 (E)	-	-	
Mass moment of inertia input[4][5]	J_1	$kgcm^2$ (lb_f.in.$s^2 10^{-4}$)	0,087 - 0,152 (0.770 - 1.345)	0,367 - 0,667 (3.248 - 5.903)	1,416 - 2,432 (12.533 - 21.525)	
Average idle torque[4][5]	T_0	Nm (lb_f.in)	0,15 - 0,30 (1 - 3)	0,20 - 0,55 (2 - 5)	0,35 - 1,15 (3 - 10)	
Max. bending moment based on the gearbox input flange	M_{b1}		12 (106)	16 (142)	40 (354)	

[1] Max. load capacity of NGV gearbox with NGV wheel and dynamic load with cyclic torque (T_{2Z}). Application-specific design with NCP required.
[2] Number of stages
[3] Application specific configuration with NCP – www.neugart.com
[4] The ratio-dependent values can be retrieved in Tec Data Finder – www.neugart.com
[5] Reference clamping system diameter

Output torques			NGV064	NGV090	NGV110	i[1]	p[2]
Cyclic torque[3][4]	T_{2Z}	Nm (lb_f.in)	44 (389)	130 (1151)	210 (1859)	9	2
			44 (389)	120 (1062)	260 (2301)	12	
			44 (389)	110 (974)	230 (2036)	15	
			44 (389)	120 (1062)	260 (2301)	16	
			44 (389)	120 (1062)	260 (2301)	20	
			40 (354)	110 (974)	230 (2036)	25	
			44 (389)	120 (1062)	260 (2301)	32	
			40 (354)	110 (974)	230 (2036)	40	
			18 (159)	50 (443)	120 (1062)	64	
Maximum torque[3][4]	T_{2max}	Nm (lb_f.in)	70 (620)	192 (1699)	335 (2965)	9	
			65 (575)	192 (1699)	415 (3673)	12	
			70 (620)	176 (1558)	365 (3231)	15	
			65 (575)	192 (1699)	415 (3673)	16	
			65 (575)	192 (1699)	415 (3673)	20	
			61 (540)	176 (1558)	365 (3231)	25	
			65 (575)	192 (1699)	415 (3673)	32	
			61 (540)	176 (1558)	365 (3231)	40	
			28 (248)	80 (708)	192 (1699)	64	
Continuous torque[3]	T_{2D}	Nm (lb_f.in)	30 (266)	87 (770)	178 (1575)	9	
			32 (283)	102 (903)	220 (1947)	12	
			35 (310)	93 (823)	195 (1726)	15	
			35 (310)	102 (903)	220 (1947)	16	
			37 (327)	102 (903)	220 (1947)	20	
			34 (301)	93 (823)	195 (1726)	25	
			37 (327)	102 (903)	220 (1947)	32	
			34 (301)	93 (823)	195 (1726)	40	
			15 (133)	42 (372)	102 (903)	64	

Input speeds			NGV064	NGV090	NGV110	i[1]	p[2]
Continuous input speed[3][4]	n_{1D}	rpm	4500	4000	2050	9	2
			4500	4000	2200	12	
			4500	4000	2450	15	
			4500	4000	2400	16	
			4500	4000	2750	20	
			4500	4000	3500	25	
			4500	4000	3500	32	
			4500	4000	3500	40	
			4500	4000	3500	64	
Max. mechanical input speed[3]	n_{1max}	rpm	7500	7000	6500		

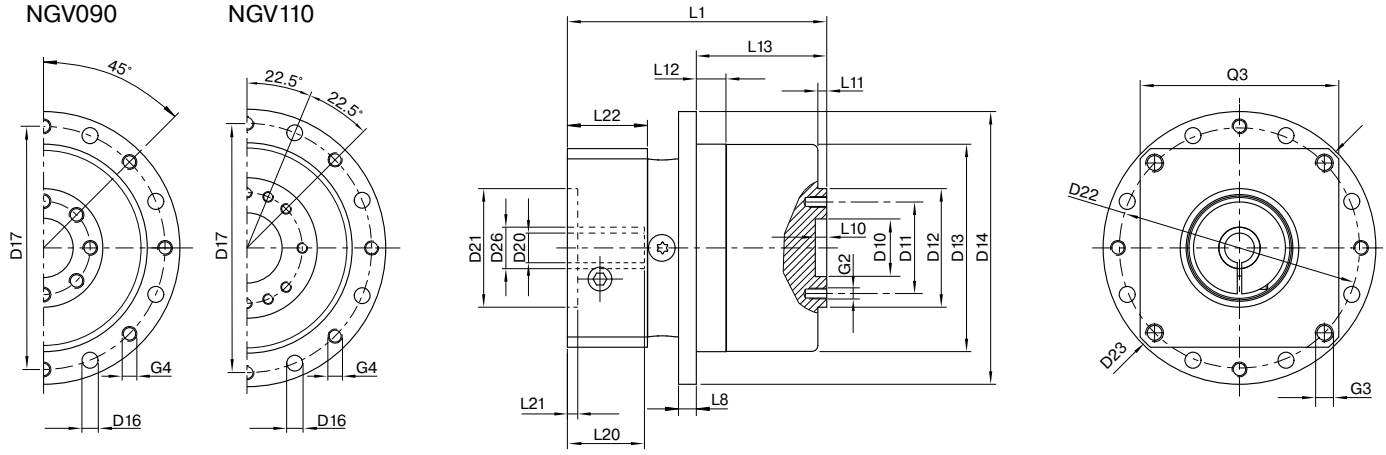
Output torques			NGV064	NGV090	NGV110	i[1]	p[2]
Emergency stop torque[4][5]	T_{2Stop}	Nm (lb_f.in)	88 (779)	260 (2301)	500 (4425)	9	2
			88 (779)	240 (2124)	520 (4602)	12	
			88 (779)	220 (1947)	500 (4425)	15	
			88 (779)	240 (2124)	520 (4602)	16	
			88 (779)	240 (2124)	520 (4602)	20	
			80 (708)	220 (1947)	500 (4425)	25	
			88 (779)	240 (2124)	520 (4602)	32	
			80 (708)	220 (1947)	500 (4425)	40	
			80 (708)	190 (1682)	380 (3363)	64	

[1] Ratios ($i=n_1/n_2$)
[2] Number of stages
[3] Application specific configuration with NCP – www.neugart.com
[4] Based on reference clamping system diameter
[5] Permitted 1000 times

Gearbox

NGV064
NGV090

NGV110



Drawing corresponds to a NGV090 / 2-stage / flange output shaft / 19 mm clamping system / motor adaptation – one part / B5 flange type motor

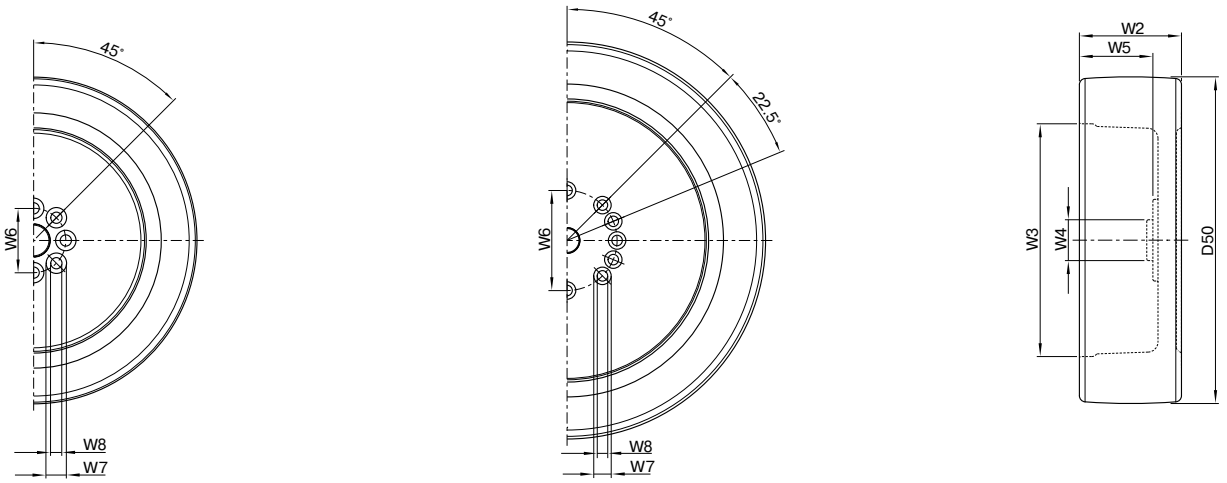
[1] The dimensions vary with the motor/gearbox flange. The input flange dimensions can be retrieved for each specific motor in Tec Data Finder at www.neugart.com

Geometry[2]			**NGV064**	**NGV090**	**NGV110**	**p**[3]	**Code**
Centering diameter output shaft	D10	H7	20 (0.787)	31.5 (1.240)	40 (1.575)		
Pitch circle diameter output shaft	D11		31.5 (1.240)	50 (1.969)	63 (2.480)		
Centering diameter output shaft	D12	h7	40 (1.575)	63 (2.480)	80 (3.150)		
Centering diameter output flange	D13		70 (2.756)	94 (3.701)	120 (4.724)		
Flange diameter output	D14		92 (3.622)	120 (4.724)	158 (6.220)		
Mounting bore output	D16		5.4 8x45°	6.6 8x45°	9 8x45°		
Pitch circle diameter output flange	D17		82 (3.228)	108 (4.252)	142 (5.591)		
Min. total length	L1		84.5 (3.327)	118 (4.646)	144 (5.669)		
Flange thickness output	L8		6 (0.236)	8 (0.315)	10 (0.394)		
Centering depth output shaft	L10		4 (0.157)	6 (0.236)	6 (0.236)		
	L11		3 (0.118)	6 (0.236)	7 (0.256)		
Centering depth output flange	L12		10 (0.394)	15 (0.591)	21 (0.827)		
Output flange length	L13		44 (1.732)	59.5 (2.343)	80 (3.150)		
Motor shaft diameter j6/k6	D20		The dimensions vary with the motor/gearbox flange				
Clamping system diameter input	D26		More information on page 6				
Flange output shaft (similar ISO 9409-1)							**D**
Number x thread x depth	G2		8 x M5x7	8 x M6x10	12 x M6x12		
Number x thread	G4		8 x M5	8 x M6	8 x M8		

[2] Dimensions in mm
[3] Number of stages

NGV wheel

NGV wheel 160 NGV wheel 200 NGV wheel 250



Geometry NGV wheel[1]			NGV wheel 160	NGV wheel 200	NGV wheel 250
Art. No.			**100507551**	**100507802**	**100507976**
Outer diameter of wheel	D50		160 ± 1.2 (6.299 ± 0.047)	200 ± 1.2 (7.874 ± 0.047)	250 ± 1.2 (9.843 ± 0.047)
Width of wheel	W 2		50 ± 0.5 (1.969 ± 0.020)	60 ± 0.5 (2.362 ± 0.020)	80 ± 0.5 (3.150 ± 0.020)
Inner diameter of rim	W 3		114 (4.488)	155 (6.102)	183 (7.205)
Centering outside diameter	W 4	h7	20 (0.787)	31.5 (1.240)	40 (1.575)
Rim depth	W 5		36 (1.417)	47.5 (1.870)	66 (2.598)
Screw connection pitch circle diameter	W 6		31.5 (1.240)	50 (1.969)	63 (2.480)
Screw connection head diameter	W 7	H13	8 x Ø 10 (8 x Ø 0.394)	8 x Ø 11 (8 x Ø 0.433)	12 x Ø 11 (12 x Ø 0.472)
Screw connection diameter	W 8	H13	8 x Ø 5.5 (8 x Ø 0.217)	8 x Ø 6.6 (8 x Ø 0.260)	12 x Ø 6.6 (12 x Ø 0.260)

Scope of delivery: NGV wheel incl. screws and closure cap

Characteristics NGV wheel			NGV wheel 160	NGV wheel 200	NGV wheel 250
Weight		kg (lb_m)	ca. 2.3 (5.1)	ca. 3.7 (8.2)	ca. 7.6 (16.8)
Mass inertia	J_R	kgcm² ($lb_f.in.s^2 10^{-4}$)	74 (16.636)	203 (45.636)	644 (144.777)
Roll resistance [2]		N (lb_f)	65 (14.6)	95 (21.4)	165 (37.1)
Static friction coefficient[3]	μ		> 0.25		
Floor protection (corresponds to surface pressure of wheel)		N/mm² (lb_f/in^2)	8 (113.786)		
Temperature range			-30°C (-22°F) to +70°C (+158°F), up to +90°C (+194°F) for short periods. The load-bearing capacity is reduced at ambient temperatures higher than +40°C (+104°F).		
Tread			Blickle Besthane®		
Tread color			Brown		
Tread hardness			92° Shore A		
Wheel unit			Gray cast iron		
Wheel unit color			Silver		
Corrosion protection			Wheel unit, painted		
Tread characteristics (according to tread manufacturer)			Low-noise operation, extremely low rolling resistance, high dynamic loading capability, floor protecting, extremely abrasion resistant, high degree of cutting and tear resistance, traceless, contact coloration-free.		

[1] Dimensions in mm
[2] Empirical values. At 4 km/h and with maximum load.
[3] On grinded, dry steel rail as well as on smoth, dry concrete.

Do you have any questions or need further information?
We are happy to advise you on all topics relating to drive technology.
You can find your personal contact at: **www.neugart.com**

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