

# **AERZEN BULK VEHICLE BLOWER**



**AERZEN**

**AERZENER MASCHINENFABRIK  
GMBH**

G1-071 | 05 | EN

2000

7.2003

## Fields of application and principle of operation

Aerzen bulk vehicle blowers have been specifically designed to meet the operating requirements of bulk and silo vehicles in the generation of pressure or vacuum needed for the pneumatic loading and unloading of these specialized transport vehicles. Aerzener is Europe's largest manufacturer of rotary piston blowers. The design and construction details of the bulk vehicle blowers reflect the experience and know-how acquired over years of product development in this particular field of machine engineering.

Aerzen bulk vehicle blowers meet the requirements of all pneumatic loading and unloading applications involving bulk or silo vehicles, both in pressure and vacuum duty.

Being positive displacement machines with reserve pressure capacity, rotary piston blowers guarantee continuous pneumatic conveying: blocking of the conveying line due to material buildup is thereby prevented.

Two blower sizes having a capacity range of up to 1600 m<sup>3</sup>/h producing a pressure of max. 1200 mbar or a vacuum of max. -500 mbar are available.

Specific advantages offered:

- a guarantee that the air is conveyed oil-free
- high conveying capacity and efficiency in both pressure and vacuum operation
- compact design resulting in minimal weight and space-saving dimensions
- choice of installation for both horizontal or vertical flow configurations, as well as two flow directions in each case
- universal and uncomplicated installation
- sturdy construction
- minimal maintenance
- good service.

Aerzen bulk vehicle blowers are easy to service. In the case of breakdown, our blower exchange service guarantees that your bulk vehicle remains available for operation.



GM 13.5 with oil dipstick, viewed from gear side



GM 13.f7-1, viewed from drive shaft side

## Performance data

The flow volume conveyed by the bulk vehicle blower depends on its operating speed which, in turn, is determined by the speed of the vehicle's power take-off drive shaft and the speed ratio selected.

The following table provides an overview.

		Flow volume at inlet and power as a function of blower operating speed and differential pressure (in pressure duty)											
Blower model	$\Delta p$ (mbar)	500		600		700		800		1000		■ 1200	
	operating speed 1/min	$Q_1$ m <sup>3</sup> /min	P kW	$Q_1$ m <sup>3</sup> /min	P kW	$Q_1$ m <sup>3</sup> /min	P kW	$Q_1$ m <sup>3</sup> /min	P kW	$Q_1$ m <sup>3</sup> /min	P kW	$Q_1$ m <sup>3</sup> /min	P kW
GM 13.5	2400	9,5	12	9,3	14	8,9	16	8,6	18	8,2	23	7,6	27
	2600	10,6	13	10,4	15	10,0	17	9,7	20	9,2	25	8,8	29
	2800	11,7	14	11,4	16	11,1	18	10,8	22	10,3	27	9,7	31
	3000	12,8	15	13,0	17	12,2	20	11,9	23	11,4	28	10,9	34
	3200	13,9	16	13,6	18	13,2	22	13,0	25	12,5	30	12,0	36
GM 13.f7-1	1600	12,8	17	12,3	20	11,8	23	11,4	26	10,5	30,7		
	1800	15,1	19	14,6	22	14,0	26	13,6	29	12,8	34,6		
	2000	17,3	21	16,8	25	16,4	29	15,9	32	15,1	38,5		
	2200	19,6	23	19,2	27	18,6	31	18,2	35	17,4	42,5		
	2400	22,9	25	21,4	30	20,8	34	20,4	38	19,6	46,5		
	2600	24,2	27	23,6	32	23,2	37	22,6	42	21,9	50,3		
	2800	26,5	29	26,0	35	25,4	40	25,0	45	24,2	54,6		
	3000	28,6	31	28,2	37	27,6	43	27,2	48	26,5	58,8		

$Q_1$  = flow volume at inlet (air at  $p_1 = 1,2 \text{ kg/m}^3$  ·  $\Delta p$  = differential pressure · P = power required at blower shaft · ■ = peak pressure, not for continuous operation

The values in the table are valid for pressure duty. The blowers can also be used for vacuum duty up to -500 mbar.

The temperature rise  $\Delta t$  of the air conveyed by the blower is mainly determined by the differential pressure and can reach a maximum of 140 °C (with the addition of the inlet temperature).

## Design and construction

The design has been adapted to the particular blower operating requirements encountered in the pneumatic unloading of bulk and silo vehicles (short-time operation).

### Materials

The housing components consist of grey cast iron, while rotors and shafts are drop-forged steel (i.e. C 45 N) in one single piece. Timing gear and step-up gearbox covers are made of light metal.

### Housing

The heavily ribbed surfaces ensure rigidity and ample heat dissipation. Additional cooling is therefore unnecessary. Tapped Holes acc. to DIN in the mating surfaces of the blowers and the integrally cast feet of the GM 13.5 and GM 13.f7-1 models guarantee universal fastening and installation possibilities.

### Piping connections

Connection to inlet and discharge piping (or silencers) is stress-free via (screwed-on) stub flanges and rubber sleeves, or via DIN/bulk vehicle flanged adaptor piece.

### Sealing

The conveying chamber is sealed by piston rings in combination with oil slingers (on the oil lubricated side) adjacent to the vent space at each of the (4) shaft passages. The vent spaces are open to atmosphere. The drive shaft is sealed by means of a radial seal disk.

### Timing gears

The hardened and ground timing gears are helical for smooth operation, and are fastened to the shafts by means of a taper interference fit.

### Bearings

Smooth running and generously sized anti-friction bearings.

### Step-up gearbox

As an option, the GM 13.5 blower model can be supplied with an integrated gearbox having a step-up ratio of 2.1.

### Lubrication

Timing gear (floating bearing) side is splash oil lubricated, fixed bearing side is grease lubricated. In case of the GM 13.5 model with integrated gearbox, both sides are splash oil lubricated.

The oil level is checked via oil dipstick or oil level sight glass.

### Position of the drive shaft

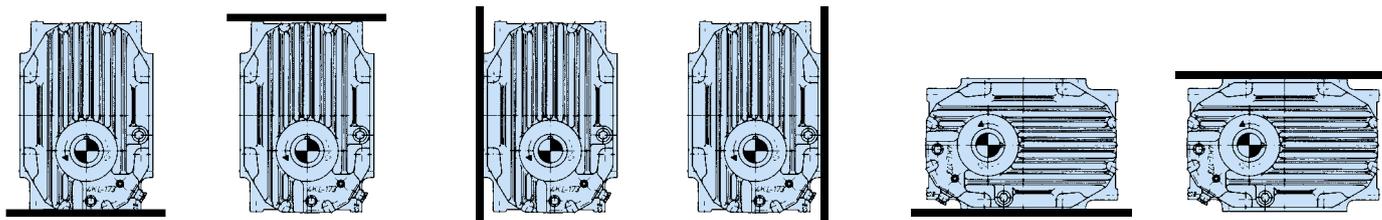
(viewed facing the blower drive shaft)

Normal selection is at the bottom, or left. In special cases, it can be modified for positioning at the top, or right; gearbox configuration (GM 13.5), at the bottom or left only.

### Drive

Direct or via narrow V-belt. In the case of narrow V-belt drive, the blower pulley should have a minimum diameter of 160 mm, and a maximum pulley width of 65 mm for both GM 13.5 and GM 13.f7-1 models. If drive takes place via universal joint, no idler shaft is required.

## Installation configurations of blower models CM 13.5 and 13.f7-1



In the case of horizontal flow, the blower can be installed stress-free on a flat surface in the following manner: supported, suspended, hanging from the left or right. The use of V-belt drive is not possible with a suspended blower in the horizontal flow configuration. In the case of vertical flow, the blower can be either supported, or suspended.

### Accessories

The accessories we offer are adapted to the special operating conditions found in tank vehicle applications. The fact that installation space is typically limited in silo vehicles has been taken into account.

The following individual accessories are available:

- blower nozzle adaptor piece with tank vehicle flange or stub
- inlet filter
- inlet silencer
- discharge silencer with integrated
- check-valve
- vacuum or pressure safety relief valve.
- uncertified flexible rubber sleeve with clamps

### Maintenance

Aerzen bulk vehicle blowers are made to withstand severe operating conditions. Maintenance is confined to periodic greasing and/or oil level checks.

### Service

Aerzen bulk vehicle blowers are easy to service. In the case of breakdown, our blower exchange service guarantees that your bulk vehicle remains available for operation.

## Blower noise rating:

Noise frequency analysis by octave bands of 1/1 octave carried out on a GM 13.5 bulk vehicle blower.

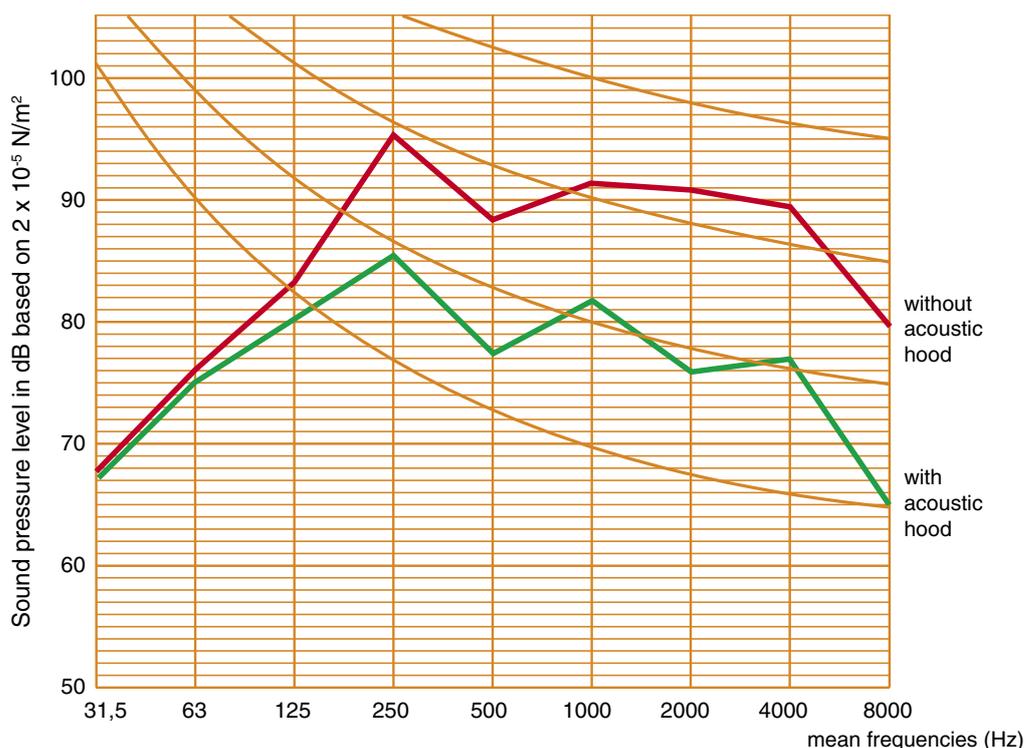
Measurement in free field conditions

at a distance of = 1,0 m

at a height of = 1,5 m

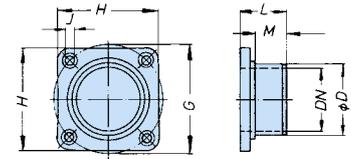
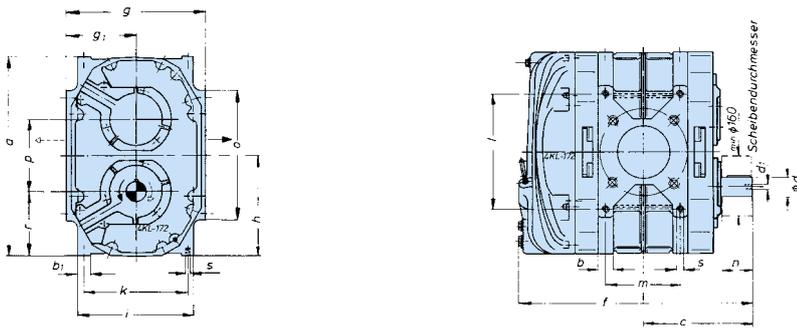
$\Delta p$  = 1000 mbar

blower speed = 3200 min<sup>-1</sup>



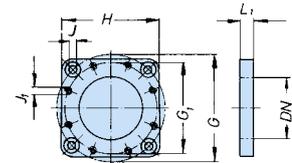
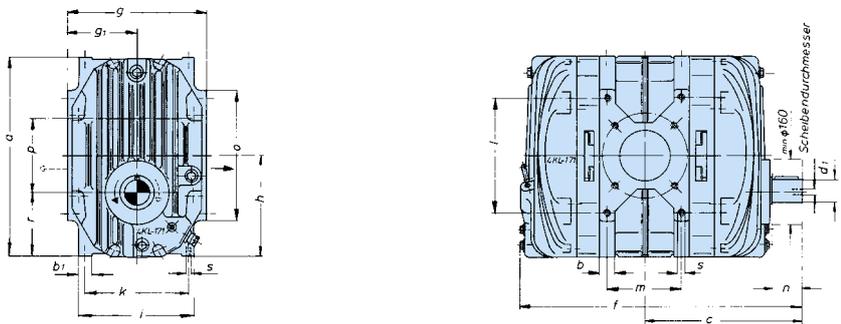
# Dimensions (horizontal and vertical flow configurations)

## GM 13.5 model without gearbox



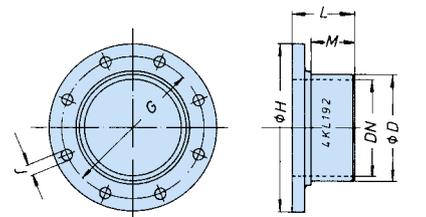
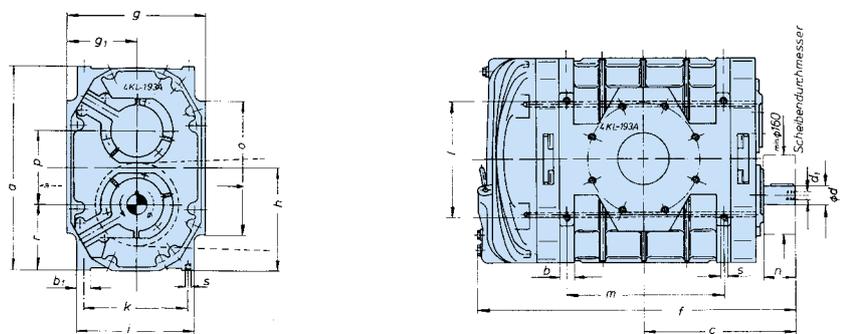
DIN 2531 flange - ISO nozzles for GM 13.5 with or without gearbox

## GM 13.5 model with gearbox

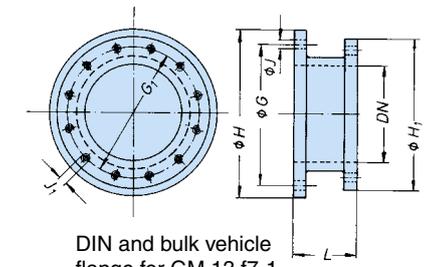


DIN and bulk vehicle flange for GM 13.5 with or without gearbox

## GM 13.f7-1 model



DIN 2531 flange - ISO nozzles for GM 13.f7-1



DIN and bulk vehicle flange for GM 13.f7-1

Model	a	b	b <sub>1</sub>	c	d <sub>k6</sub>	d <sub>1</sub>	f	g	g <sub>1</sub>	h	i	k	l	m	n	o	p	r	s	Weight approx. kg
GM 13.5	380	30	25	218	42	M 16	470	270	135	190	225	200	220	135	65	250	135	122.5	M 12	108
GM 13.5 with gearbox	380	30	25	318	55	M 20	570	270	135	190	225	200	220	135	65	250	135	122.5	M 12	123
GM 13.f7-1	380	30	25	307	42	M 16	650	270	135	190	225	200	220	310	65	250	135	122.5	M 12	180

Dimensions not binding!

Model	DN	PN	D	G	G <sub>1</sub>	H	H <sub>1</sub>	J	J <sub>1</sub>	L	L <sub>1</sub>	M
GM 13.5	100	6	114.3	170	150	160	-	18	M 12	75	24	45
GM 13.5 with gearbox	100	6	114.3	170	150	160	-	18	M 12	75	24	45
GM 13.f7-1	100	6	168.3	225	210	265	240	18	M 12	100	-	70

Dimensions not binding!

Model GM 13.5  
max. allowable belt tension 3000 N

Model GM 13.f7-1  
max. allowable belt tension 5000 N  
rotor force shall be at 90° of the belt pulling force.

## Application examples for GM 13.5 and 13.f7-1

►  
Aerzen  
bulk vehicle blower  
GM 13.5 used on a  
large capacity  
vacuum cleaner



◄  
Aerzen  
bulk vehicle blower  
GM 13.5 for the  
pneumatic conveying  
of sugar



►  
◄ Aerzen  
bulk vehicle blower  
GM 13.5 with gearbox  
and universal joint drive  
for the pneumatic con-  
veying of bulk materials

Aerzen bulk vehicle blower GM 13.f7-1 used on a mobile milling and mixing installation ▶  
▼



▲  
◀ Aerzen bulk vehicle blower GM 13.f7-1 used on a mobile milling and mixing installation producing feed

# A good address, everywhere

## Federal Republic of Germany

Aerzener Maschinenfabrik GmbH · Reherweg 28  
**31855 Aerzen** / Germany  
Tel. 0 51 54 8 10  
Fax 0 51 54 8 11 91

Vertriebsbüro Nord  
Weißer Kamp 23  
**29683 Bad Fallingbostal**  
Germany  
Tel. 0 51 62 98 13-0  
Fax 0 51 62 98 13 20

Vertriebsbüro Ost  
Klosterstraße 8-9,  
**13581 Berlin** / Germany  
Tel. 0 30 36 75 84-6  
Fax 0 30 36 75 84 80  
Zweigbüro:  
Residenz im Park Nr. 12  
**04824 Beucha** / Germany  
Tel. 0 3 42 92 7 52 35  
Fax 0 3 42 92 7 49 36

Vertriebsbüro Mitte  
Erfurter Straße 2  
**63796 Kahl** / Germany  
Tel. 0 61 88 91 04-0  
Fax 0 61 88 91 04 20

Vertriebsbüro Süd  
Föhrenweg 1  
**89275 Elchingen** / Germany  
Tel. 0 73 08 96 08-0  
Fax 0 73 08 96 08 20

Vertriebsbüro West  
Taubenstraße 12  
**42551 Velbert** / Germany  
Tel. 0 20 51 98 54-0  
Fax 0 20 51 98 54 18

Otto Zimmermann GmbH  
Untertürkheimer Straße 9  
**66117 Saarbrücken**  
Germany  
Tel. 0 6 81 5 80 07-0  
Fax 0 6 81 5 80 07 43

## Europe

Aerzen Belgium NV  
Zone Guldendelle  
A. De Coninckstraat 11  
**3070 Kortenberg** / Belgium  
Tel. ++ 32 2-7 57 22 78  
Fax ++ 32 2-7 57 22 83  
*for Belgium and Luxembourg*

Aerzen-France S.A.R.L.  
10, Avenue Léon Harmel  
**92168 Antony Cedex**  
France  
Tel. ++ 33 1-46 74 13 00  
Fax ++ 33 1-46 66 00 61

Aerzen Machines Ltd.  
Aerzen House, Langston Road  
**Loughton, Essex, IG10 3SQ**  
United Kingdom  
Tel. ++ 44 20 85 02 81 00  
Fax ++ 44 20 85 02 81 02

Aerzen Nederland B.V.  
Bedrijventerrein  
Nieuwgraaf 124  
**6921 RL Duiven**  
The Netherlands  
Tel. ++ 31 26-311-26 41  
Fax ++ 31 26-311-73 69

Aerzen (Schweiz) AG  
Zürcherstrasse 300  
**8500 Frauenfeld**  
Switzerland  
Tel. ++ 41 52-7 25 00 60  
Fax ++ 41 52-7 25 00 66  
*for Switzerland and Liechtenstein*

Aerzen Iberica S.A.  
c/Urogallo 13  
**28946 Fuenlabrada** / Spain  
Tel. ++ 34 91-6 42 44 50  
Fax ++ 34 91-6 42 29 03

Aerzen Iberica S.A.  
Rua: Sacadura Cabral, 216, 7º B  
**2765-349 S. João do Estoril**  
Portugal  
Tel. ++ 3 51 21 4 68 24 66  
Fax ++ 3 51 21 4 68 24 67

Aerzen Austria  
Handelsges. m.b.H.  
Obersdorferstr. 5  
**2201 Seyring** / Austria  
Tel. ++ 43 2 24 62 84 44  
Fax ++ 43 2 24 62 84 46

Aerzen Svenska AB  
Östra Bangatan 20  
**19560 Märsta** / Sweden  
Tel. ++ 46 8-59 12 21 90  
Fax ++ 46 8-59 11 72 09

Aerzen Polska S.A.  
Ul. Marconich 9/17  
**02-954 Warszawa** / Poland  
Tel. ++ 48 22 642 29 09  
Fax ++ 48 22 642 33 08

Aerzen Slovakia S.R.O.  
Mariánska 17  
**90031 Stupava** / Slovakia  
Tel. ++ 4 21 2 65 93 46 94  
Fax ++ 4 21 2 65 45 71 01

Aerzen Hungária Kft.  
Bécsi út 52.III./4.  
**1136 Budapest** / Hungary  
Tel. ++ 36 14 39 22 00  
Fax ++ 36 14 39 19 22

Aerzen Cz s.r.o.  
Namesti TGM 729/7  
**69002 Breclav**  
Czech Republik  
Tel. ++ 42 05 19 32 66 57  
Fax ++ 42 05 19 32 66 58

Oy Ilmeco AB  
Mäntytiie 21  
**00270 Helsinki** / Finland  
Tel. ++ 3 58 9-4 77 21 22  
Fax ++ 3 58 9-4 77 22 25

Bran & Luebbe AS  
Sandviksveien 22  
**1363 Høvik** / Norway  
Tel. ++ 47 67 83 26 50  
Fax ++ 47 67 83 26 51  
*for Norway and Iceland*

Geveke Teknik A/S  
Roskildevej 8-10  
**2620 Albertslund** / Denmark  
Tel. ++ 45 43-68 50 00  
Fax ++ 45 43-68 50 50

MANGRINOX S.A.  
14, Grevenon Str.  
**11855 Athens** / Greece  
Tel. ++ 30 210-3 42 32 01-3  
Fax ++ 30 210-3 45 97 67

Alfonso Savoia Figli s.a.s.  
di Savoia Alberto & C.  
Via Vittor Pisani, 28  
**20124 Milano** / Italy  
Tel. ++ 39 02-67 07 52 77  
Fax ++ 39 02-67 07 50 03

Cankat Mümessillik  
ve Dis Ticaret Ltd. Sti  
Arayicibasi Sokak Nr. 10/12  
**81300-Kadiköy-Istanbul**  
Turkey  
Tel. ++ 90 2 16-3 45 02 63  
Fax ++ 90 2 16-3 36 94 85

HAFI  
Engineering & Consulting  
Gesellschaft m.b.H.  
Mühletorplatz 4-6  
**6800 Feldkirch** / Austria  
Tel. ++ 43 55 22-7 79 24-0  
Fax ++ 43 55 22-7 49 38  
*for the remaining countries in Eastern Europe*

## Brasil, Mexico, USA and Canada

Aerzen do Brasil Ltda.  
Rua Howard Archibaldi  
Acheson Jr. N° 615  
Jardim da Glória, Cep 06711  
**280 Cotia, SP** / Brasil  
Tel. ++ 55 11-46 12 40 21  
Fax ++ 55 11-46 12 02 32

Aerzen México  
Av. San Rafael 31  
Fraccionamiento Industrial  
Lerma  
**Lerma 52000 Estado de México (Toluca)** / México  
Tel. ++ 52 72 82 82 55 08  
Fax ++ 52 72 82 82 51 97

Aerzen USA Corporation  
645 Sands Court  
**Coatesville, PA 19320** / USA  
Tel. ++ 1 610-3 80 02 44  
Fax ++ 1 610-3 80 02 78

Aerzen Canada Blowers  
Compressors Inc.  
1995 Montée Labossière  
**Vaudreuil, Quebec J7V8P2**  
Canada  
Tel. ++ 1 450-4 24-39 66  
Fax ++ 1 450-4 24-39 85

We would be pleased to provide the addresses of our representatives in the remaining continents, upon request.



## Aerzener Maschinenfabrik GmbH

Reherweg 28 · 31855 Aerzen / Germany – P.O. Box 1163 · 31849 Aerzen / Germany

Phone ++ 49 51 54 / 8 10 · Fax ++ 49 51 54 / 8 11 91 · <http://www.aerzener.com> · E-mail: [info@aerzener.de](mailto:info@aerzener.de)