



BIN Sp. z o.o.

87-700 Aleksandrów Kujawski, ul. Narutowicza 12

tel./fax. (0-54) 282 22 55: (0-54) 282 88 00

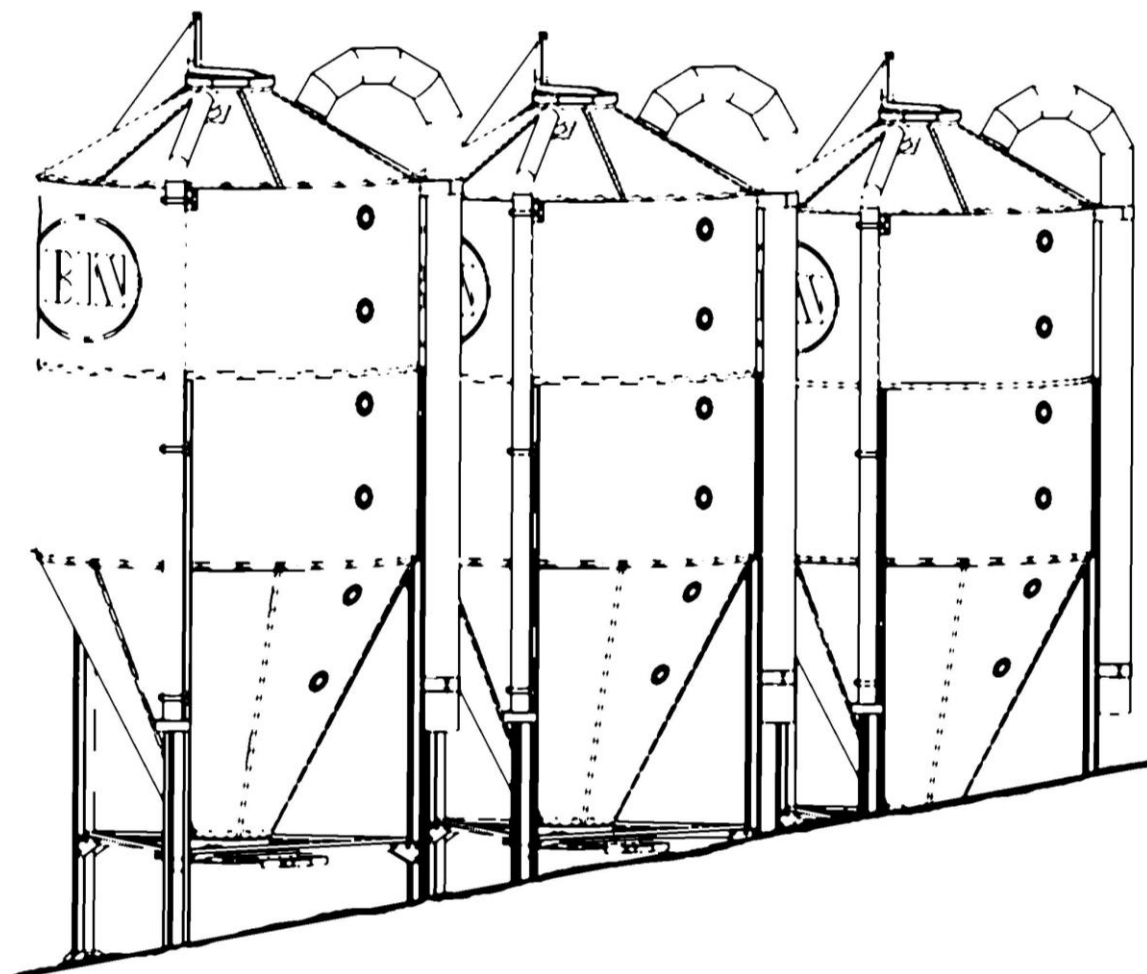
fax (0-54) 282 88 63

www.bin.agro.pl e-mail bin@bin.agro.pl

FEED SILOS

TYPE: PBIN

OPERATING MANUAL



Drawings and descriptions included in this manual may contain optional and special components, not provided in the standard version. Before placing an order, the Customer may obtain comprehensive and up-to-date information on the products to be ordered. We reserve the right to make changes in our products. All rights reserved. Copying and partial copying allowed only with our consent.



Aleksandrów Kujawski/A4 format



INTRODUCTION

Thank you for purchasing a silo from BIN. This equipment is provided with safety devices to protect operators and the silo during its normal use and operations. However, these devices cannot ensure safety in all circumstances, and, therefore, before operators start to use it, they must thoroughly read this Operating Manual and understand it. This way errors during the machine installation, and during operation itself can be avoided. Please, do not attempt to use the machine before you get acquainted with all sections of this manual, and not understand each of its functions and all procedures.

The aim of this operating manual is to acquaint the user with proper operation of the purchased product. It contains practical guidelines that must be known to a user during silo operation.

If any content of this OPERATING MANUAL is not understood by or unclear for the user, please, contact the producer or its representative.



This operating manual forms an integral part of the product.



“Keep for future use”



Before starting to operate the silo, read this operating manual, and, in particular, the chapter concerning safety at work.



Each use of the equipment for purposes other than those specified in the operating manual will be treated as the misuse. The product manufacturer shall not be held liable for any resultant damages in that case. The user bears all related risk. All and any unauthorised changes to the product design exclude the manufacturer's responsibility regarding any resultant damages.



The warning sign in the operating manual indicates that the special caution must be exercised because of the danger to people and possibility of product damage.



It is strictly forbidden to make additional openings and holes in the silo conical bottom or shell (walls) for unloading or installation of additional unloading equipment. Making of such openings and holes in the silo shell or floor may result in deformation or even bursting of the silo shell during unloading.

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1. SAFETY

1.1. Basic safety rules

1. People operating, performing maintenance or overhauls of silos are obliged to adhere to general occupational safety regulations.
2. The user is obliged to read and understand operating manuals for silos and for all other auxiliary equipment, and to strictly adhere to them.
3. The silo can only be operated by able-bodied adults. These people must be fully aware of conducted operations.
4. In particular, the following is forbidden:
 - operation by any “third” persons, who are not familiar with the Operating Manual;
 - operation by ill or intoxicated people;
5. the silo should be secured against access of children.
6. A silo owner is obliged to provide the silo with detailed occupational health and safety instructions.
7. It is recommended for people operating and using silos to be equipped with antistatic tools (spades, brooms, hammers, spanners, etc.), clothes and footwear.
8. Always keep the silo and its surroundings tidy and clean.
9. It is strictly forbidden to enter the silo, either filled with stored material or empty. The silo is not equipped with measures facilitating entering it. All activities requiring entering the silo should be entrusted to silo manufacturer or its authorised representative.
10. The material stored in the silo should be inspected through inspection openings installed in the silo shell and bottom.
11. Adhere to a rule forbidding use of a naked flame, smoking, and performance of welding or similar works in the silo vicinity, at a distance resulting from current legislation or specified by persons holding necessary licenses.
12. Before loading or unloading equipment is started, make sure there are no people in the silo.
13. The silo is adapted to installation of filtrating, dust removing and venting equipment. It is forbidden to load/unload the silo without installed and correctly operated filtration system.
14. When an unloading conveyor is equipped with a shutter at its inlet, then the shutter provided with the silo must be dismounted.
15. All guards and security devices representing the factory equipment of the silo must be installed.
16. In the event of any power outage, switch off all silo auxiliary equipment.
17. The silo and its surroundings must be used and maintained in a way preventing fire, and it should be provided with manual fire extinguishing equipment, including a dry powder or carbon-dioxide extinguisher.
18. In the event of the fire:
 - - evacuate people from the danger zone;
 - - call the fire brigade;
 - - disconnect the equipment from the power supply;
 - start extinguishing fire.
19. Extinguishing electrical systems fires with a water or a foam extinguisher is forbidden.
20. When a situation posing a direct threat to human life or health is noticed, immediately stop loading or unloading of the silo.
21. When any defects or damages to the silo are found, which may affect human safety or safety of materials stored in the silo, the investor is obliged to immediately notify them in writing to the silo manufacturer.
22. The repair and maintenance operations can only be conducted by able-bodied adults holding relevant qualifications.
23. It is forbidden to use the silo that is not correctly anchored to the ground.
24. The silo can be installed in a building, provided a sufficient space is ensured for its installation and subsequent operation. The room should be provided with appropriate ventilation, general lighting, and ensure correct anchoring of the silo.
25. Conditions for outdoor or indoor installation of the silo and requirements for rooms and anchoring are provided in the Construction Design for Multiple Applications for BIN silos, which should then be adapted to the individual investment conditions by a person holding a relevant licence.
26. When the silo is located outside, do not attempt any works in adverse weather conditions (rain, heavy frost, ice, strong wind, lightnings, poor visibility).
27. Disinfection, pest control, and similar operations in the silo or on the stored grain should be ordered at specialist companies. After these activities, relevant OHS regulations concerning use of chemicals in confined spaces should be strictly adhered to.

28. Adhere to principles of complete control over auxiliary equipment connected to the mains.
29. It is forbidden to make any changes in design or to change the intended use of the equipment without the producer's consent in writing.
30. Any design changes in the finished product require the new technical acceptance by the manufacturer or its authorised representative.
31. It is strictly forbidden to make unauthorised additional openings and holes in the silo conical bottom or shell (walls) for unloading or installation of additional unloading equipment. Making of such openings and holes in the silo shell or floor may result in deformation or even bursting of the silo shell during unloading.
32. Use of the silo, particularly unloading, may result in reduced thickness of the metal sheet of the conical bottom. During periodic inspections metal sheet thickness should be checked, by determining the weight of zinc coating (g/m^2) on the inner side of the conical silo bottom. No zinc coating means the conical silo bottom should be replaced with a new one.
33. All equipment and systems connected to the silo (e.g., feeding pipes of conveyors) must be constructed in such way that they do not damage the silo.
34. Without a written agreement with the silo manufacturer no devices, subassemblies or components (conveyors, supports, catwalks, etc.) should be attached to any silo component. The sole exception are unloading conveyors designated for connecting to the inlet of the conical silo bottom and dust removing and venting or filtrating equipment connected to the silo venting pipe.
35. The manufacturer accepts a possibility for equipping the silo in equipment or sets of devices from other manufacturers provided they are "CE" marked and have the "CE declaration of conformity". This forms a basis for using correct operating manuals for these devices as a part of their correct operation, including control, switching on/off, lubrication, operation of electrical accessories, etc.
36. The silos are marked with safety marks. Each user is obliged to become acquainted with their meaning.
37. Warning signs, nominal plates and other information provided on the equipment must be kept legible and clean. When the signs or marks mentioned above are damaged, destroyed or a part containing them is replaced, new plates should be purchased from BIN Company and installed on the product.
38. When the device is delivered without a nominal plate or the nominal plate is destroyed, the user should notify this to the producer to receive its copy.
39. The maintenance manhole installed in the conical silo bottom can be removed only when the silo is emptied completely. It is forbidden to loosen screws fixing the manhole before the silo is emptied.
40. It is forbidden to enter the silo through the maintenance manhole.
41. The maintenance and operational activities requiring removal of the maintenance manhole should be ordered at specialist companies or persons holding required qualifications.

1.2. Information and warning signs



**READ
OPERATING
MANUAL**



**ATTENTION!
DANGER**



**USE PROTECTIVE
GLOVES**



**USE
PROTECTIVE
FOOTWEAR**



**NO USE OF NAKED FLAME
OR SMOKING**

Nominal plate

Model: PBINX/PCINX/M

Year of production:

Serial number:

Weight:

Usable properties declaration No.:

Harmonised standard:

ZKP certificate No.:

ZKP certifying body No. :

**Further information: Operating Manual
and declaration**

Year of the first-time product labelling: 17

Construction class:

	BIN Sp. z o.o. 87-700 Aleksandrów Kujawski ul. Narutowicza 12 POLSKA www.bin.agro.pl
Model: PBINX / PBINX/M	
Rok produkcji: XXXX	
Nr seryjny: XXXX - XXX	
Masa: XXXX kg	
Nr deklaracji właściwości użytkowych: SZJ/029/XXXXXX	
Norma zharmonizowana: PN-EN 1090-1+A1:2012	
Nr certyfikatu ZKP: 1405-CPR-025	
Nr jednostki certyfikującej ZKP: 1405	
Dalsze informacje: instrukcja obsługi i deklaracja	
Rok oznakowania wyrobu po raz pierwszy: 17	
Klasa wykonania: EXC1, EXC2	
	

All signs and the nominal plate are installed on the conical silo bottom at the height of ca. 1.8m near a cable of the universal loading inlet.



Note! Warning signs, nominal plates and other information provided on the equipment must be kept legible and clean. When the signs or marks mentioned above are damaged, destroyed or a part containing them is replaced, new plates should be purchased from BIN Company and installed on the product.

2. General product description

2.1. Product intended use

- storage of wheat, rye, barley, or maize middlings, and their mixtures,
- storage of ready to use dry feed mixes (granulated and bulk),
- storage of grain, oilseed seeds and maize,
- storage of fuel pellets of wood or cereal straw.

The stored material should not be caked or contaminated. Caking or contamination of the material may reduce its quality during storage and make silo unloading impossible. It is forbidden to store in the silo materials other than listed, and in particular, materials of density exceeding 900 kg/m³. When the silo is used contrary to its intended use, the manufacturer shall not be held responsible for any resultant damage.

2.2. Basic silo technical data

TABLE 1. Technical specification of PBIN silos

Silo model	Usable volume ¹⁾ m ³	Loading volume for feed mixes ²⁾ t	Diameter r m	Silo weight ³⁾ kg
PBIN3, PBIN3/M	5.	3.25	1.91	310
PBIN5, PBIN5/M	7.7.	5	1.91	360
PBIN9, PBIN9/M	14.1.	9.2	2.48	840
PBIN12, PBIN12/M	18.7.	12.2	2.48	930
PBIN15, PBIN15/M	23.2.	15.2	2.48	1020
PBIN21, PBIN21/M	32.6.	21.2	3.18	1420
PBIN26, PBIN26/M	40.1.	26.1	3.18	1550
PBIN31, PBIN31/M	47.7.	31	3.18	1660

In no device included in this Operating Manual the equivalent acoustic pressure level exceeds 70dB(A), as measured in accordance with PN-EN ISO 11201:1999 and PN-N-01307:1994.

¹⁾ – total volume of the silo inner space,

²⁾ - in relation to the usable capacity, for feed mix of bulk density of 650 kg/m³

- an actual volume of material stored in the silo depends on the following factors: loading method, pour parameters of the feed, acceptable silo max. filling level, etc.,

³⁾ – technological silo weight (silo weight without packaging, transport pallets and other sales-related and installation and transport components)

2.3 Recommended methods for silo loading and unloading

TABLE 2. Recommended methods for PBIN silo loading and unloading

No.	Silo		
1.	PBIN3, PBIN3/M PBIN5, PBIN5/M PBIN9, PBIN9/M PBIN12, PBIN12/M PBIN15, PBIN15/M PBIN21, PBIN21/M PBIN26, PBIN26/M PBIN31, PBIN31/M	Loading	pneumatic - motor vehicles for feed transport
			universal screw, spiral, scrapper conveyor
		Unloading	universal screw, spiral, scrapper conveyor
			wheelbarrows, feed carts

2.4 Design description

Fig. 1 shows a silo in form of a cylindrical tank with a conical (funnel) bottom (e), a shell (a) made of flat galvanised metal, and a self-supported roof (b) with a universal loading inlet (c). Pneumatic loading is also conducted through a loading pipe (g). Screw connections of the shell, the conical bottom and the roof are sealed with an elastic gluing and sealing mass and a self-adhesive seal of polyurethane foam. In all silos special inspection openings are installed to monitor silo filling. The conical (funnel) bottom (e), made of galvanised metal sheet, ensures complete gravitational unloading of the silo. For this purpose, an outlet opening with a shutter (d) was installed in the bottom. The conical bottom (e) of the silo is equipped with a maintenance manhole.

During installation, the whole structure is bound with the foundation slab (f) with anchors and steel rawlplugs. A brief characteristic of the most important units and devices installed in PBIN silos is presented below. Views and basic silo dimensions are presented in Figures 9, 10 and 11.

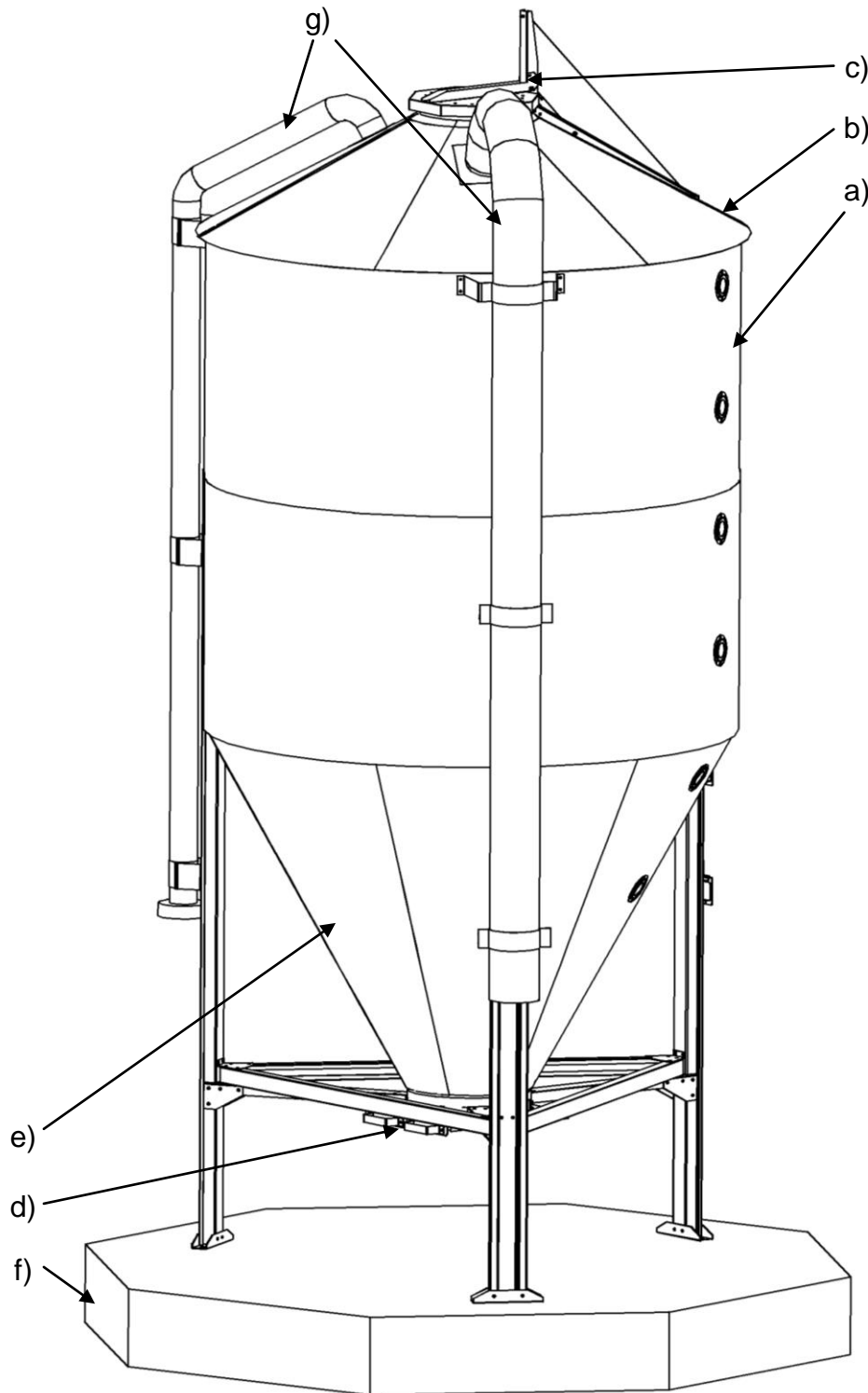


Fig. 1 PBIN silo design

a) SILO SHELL

The silo shell means its side cylindrical side walls constructed of hot-dip galvanised steel. The shell consists of components (sheets) joined with steel screws with anti-corrosion coating or of stainless steel. The shell sheets are joined with an overlap, and additional self-adhesive seals of polyurethane foam are installed on joints, to ensure the highest possible tightness of the structure. Special inspection openings are installed in the silo shell to monitor silo filling. The upper part of the shell is shaped in a way facilitating its connection with the silo roof.

In its bottom part, the shell is connected to the conical bottom and piles of the supporting structure. The piles ensure correct silo installation on the foundation slab.

b) SILO ROOF

Roofs in all PBIN silos are conical, of hot-dip galvanised steel. Individual roof components (sections) are joined with steel screws with anti-corrosion coating. Sealing of elastic sealing-gluing mass is installed at the joints to ensure the highest possible tightness of the structure. An universal loading inlet with a flap and connections for the feeding and the venting pipes are installed in the silo roof.

c) SILO LOADING

- pneumatic silo loading

Silo loading directly from a vehicle for feed transport is one of the most common methods for loading feed silos. A pipe for pneumatic loading with a connection and a venting pipe are standard equipment of PBIN3, PBIN3/M, PBIN5, PBIN5/M, PBIN9, PBIN9/M, PBIN12, PBIN12/M, PBIN15 and PBIN15/M silos. PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M silos can be optionally equipped with a pipe for pneumatic loading with a connection and a venting pipe. An inlet for the feeding pipe of 100 mm in diameter is installed in the silo roof with a connection at the height of 1200–1250 mm from the foundation surface. The venting pipe of 180 mm in diameter is used for connection of venting and dust extraction or filtrating equipment.

- universal loading inlet

Standard equipment of PBIN3, PBIN3/M, PBIN5, PBIN5/M, PBIN9, PBIN9/M, PBIN12, PBIN12/M, PBIN15 and PBIN15/M silos includes a universal loading inlet with a flap. Installed in the roof, the universal central loading inlet forms a connection of ca. 390 mm in diameter. The central loading inlet is open and closed with a flap. The universal loading inlet is used to load the silo with various loading equipment, including screw, spiral or scrapping conveyors.

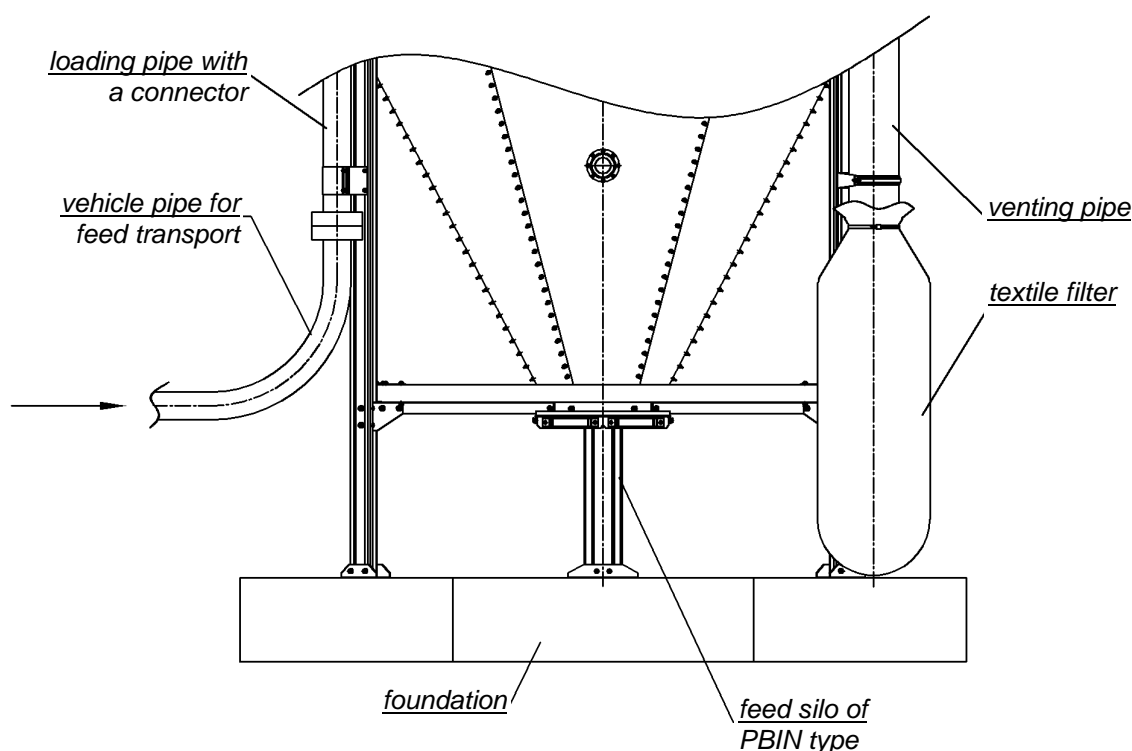


Fig. 2 A diagram showing pneumatic loading of a PBIN silo.

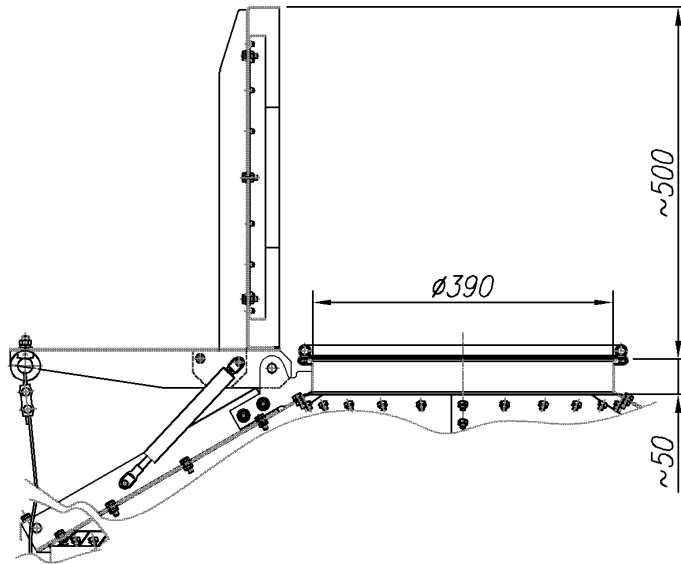


Fig. 3 A diagram showing a universal loading inlet together with conditions and options for connecting loading equipment.

- central loading inlet

PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M silos are equipped with a central inlet for direct connection of elbows and downpipes or directly the loading equipment.

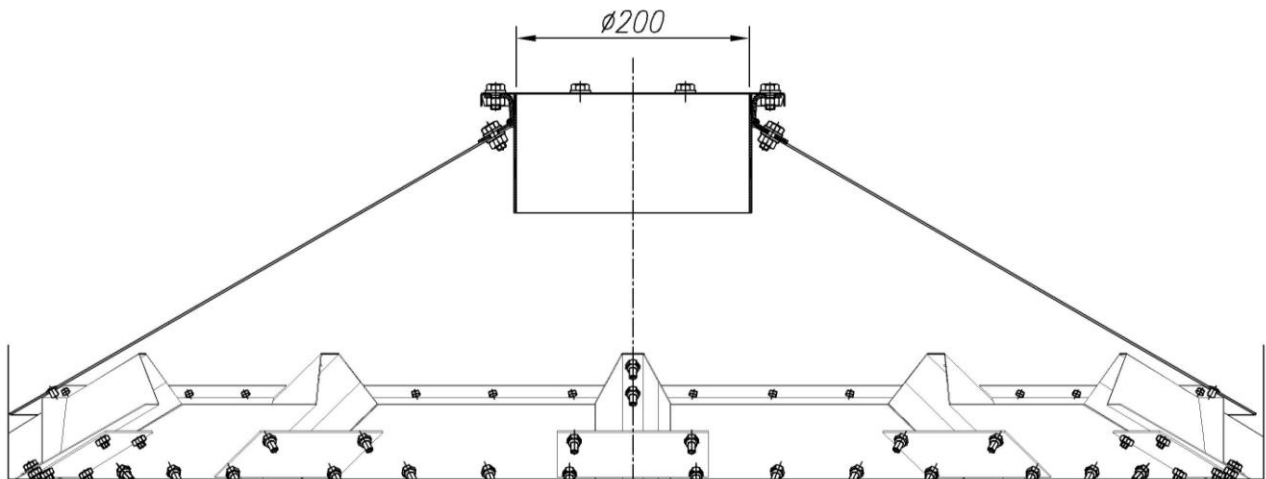


Fig. 4 A diagram showing a central loading inlet together with conditions and options for connecting loading equipment.

d) SILO UNLOADING

PBIN silos are equipped with components and devices for their unloading, and facilitate installation of various unloading machines, including screw, spiral, scrapper or belt conveyors. Each silo can be equipped with a shutter at the outlet of its bottom. A silo equipped with a shutter can be unloaded directly to feed carts or wheelbarrows. The BIN range includes two types of shutters, and a sack-filling device:

- PBIN-ZASUWA – (Ø400) a shutter dedicated for bulk feeds and feed mixes. Intended for spiral and scrapper conveyors.
- PBIN-ZASUWA2 – (Ø220) a shutter dedicated for granulated feeds and feed mixes, and for cereal grain. Intended for screw, spiral and scrapper conveyors.
- PBIN-WORKOWNIK – a sack-filling device for all types of feeds and feed mixes, as well as for cereal grain. It is used to facilitate pouring into sacks, wheelbarrows, carts, etc.

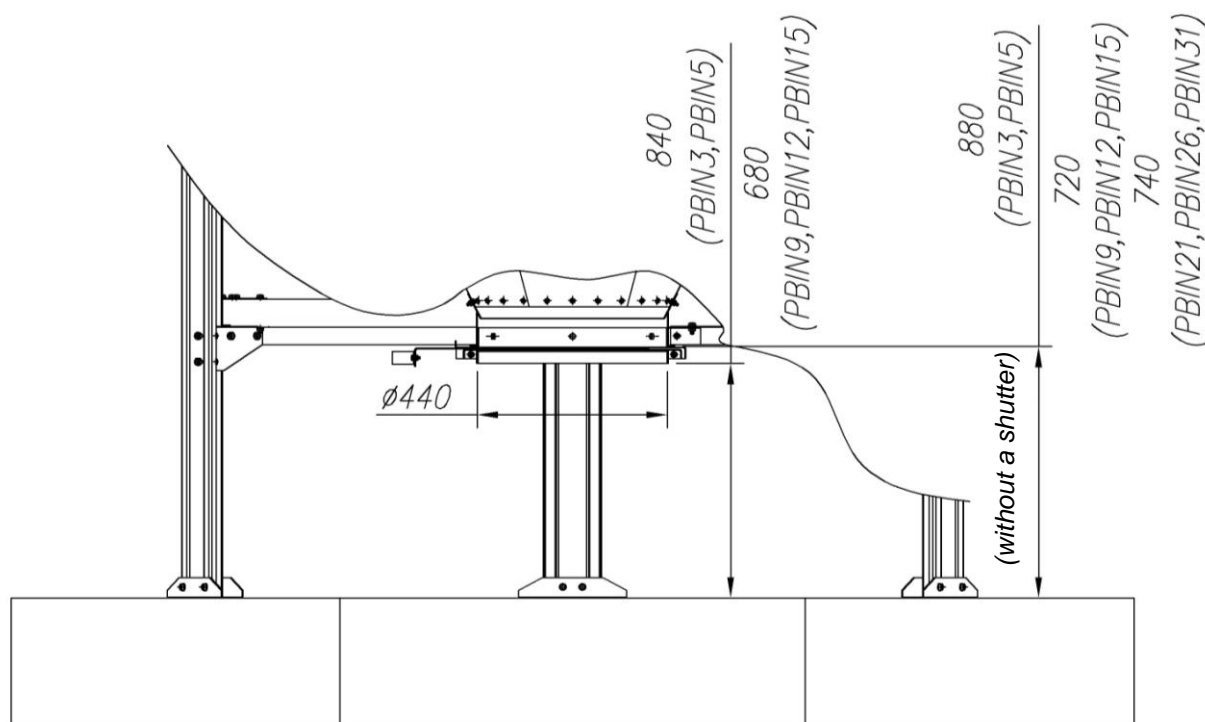


Fig. 5 A diagram showing the outlet opening with a shutter together with conditions and options for connecting loading equipment.

e) CONICAL SILO BOTTOM

The conical silo bottom is the structural component on which the stored material is laid. It is shaped like a cone with a central outlet opening in its lower part. It is made of hot-dip galvanised metal sheet and attached to the silo shell and the supporting piles. The main components of the supporting structure are piles for supporting and anchoring the silo. The conical bottom consists of segments screwed together with steel screws covered with anti-corrosion coating. The conical shape of the bottom facilitates gravitational unloading of the whole silo volume.

f) FOUNDATION SLAB

A correctly designed and constructed foundation slabs is one of preconditions for correct installation, and safe and failure-free operation of a silo.

The data below concerning the foundation slab design is indicative and are not binding for an authorised person drawing up the construction design. It indicates to the investor and the authorised person drawing up the construction design the most important issues to be included, while considering local investment conditions.

- guidelines for designing foundation slabs

- geotechnical conditions - when designing foundation slabs for PBIN silos, local geotechnical conditions should be considered;
- minimum thickness and shape of the slab:
 - slab shape - octagonal;
 - slab thickness - at least 500 mm;
- foundation load (silo action on foundations):

Information is provided in the Construction Design for Multiple Applications for PBIN silos

- minimum concrete class– C20/25 (B25);
- Reinforcement - class AII (ribbed) steel, double cross-reinforced mesh of Ø8 every 150 mm, upper and lower covering 50mm, meshes rotated by 45°;

- Conditions for foundation slab construction and acceptance

- Foundation slabs should be constructed in accordance with principles of the construction practice, guidelines provided in the Construction Design for Multiple Applications and this Operating Manual;
- a topsoil layer and non-load bearing layers under the foundation slab must be removed;
- backfill the dug pit with sand laid in layers of ca. 30cm and compacted to $I_d=0.6 - 0.7$;
- construct sand and cement bedding under the foundation slab, of class 7.5–10 MPa (substrate of C8/10 lean concrete), at least 100mm thick;
- for silos installed in a row or in a cluster, foundations of individual silos must be separated with expansion joints;
- when pouring concrete for foundation slabs, it is important to maintain the slab dimensions and to correctly (horizontally) trowel the upper slab surface (a difference between the lowest and the highest point on the foundation slab cannot exceed 10mm), it is obligatory to vibrate the concrete;
- foundation slabs must be constructed in such way that a difference between the slab surface and the surrounding ground does not exceed 10cm. When the difference between the slab surface and the surrounding ground exceeds 10 cm, the investor is obliged to ensure an appropriate access level for the equipment installed in the silo. An appropriate access level must be constructed in accordance with current legislation.
- Considering the varying ground conditions in a given area, each time optimum foundation reinforcement and thickness are specified by a person authorised to develop construction designs.
- BIN Sp. z o.o. shall not be held responsible for any silo damage and other damage resulting from incorrect design and construction of the foundation slab.

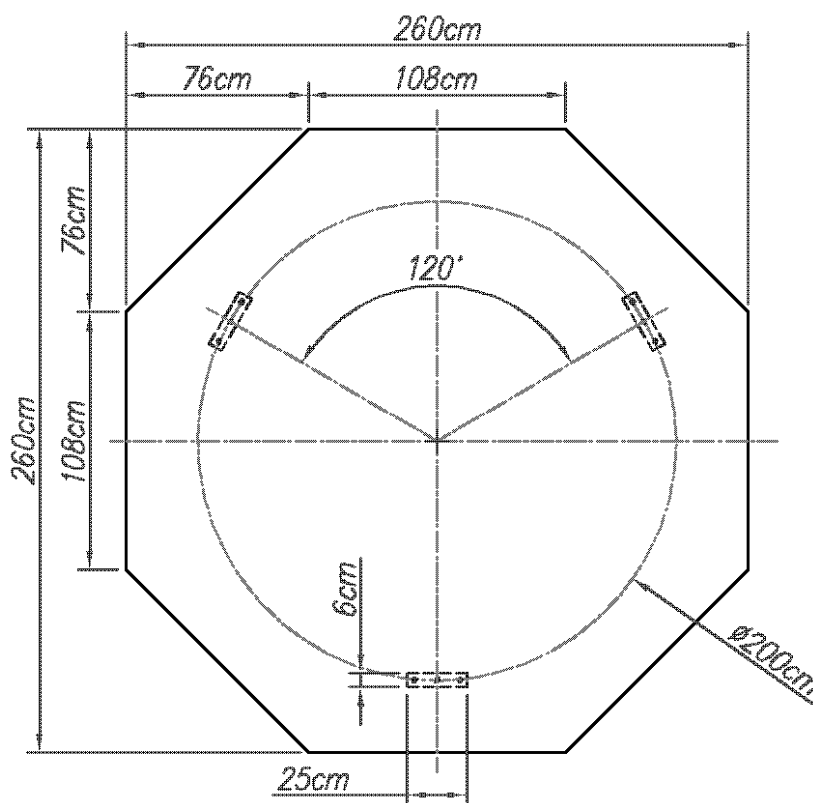


Fig.6 Foundation slab characteristics for PBIN3, PBIN3/M, PBIN5 and PBIN5/M silos.

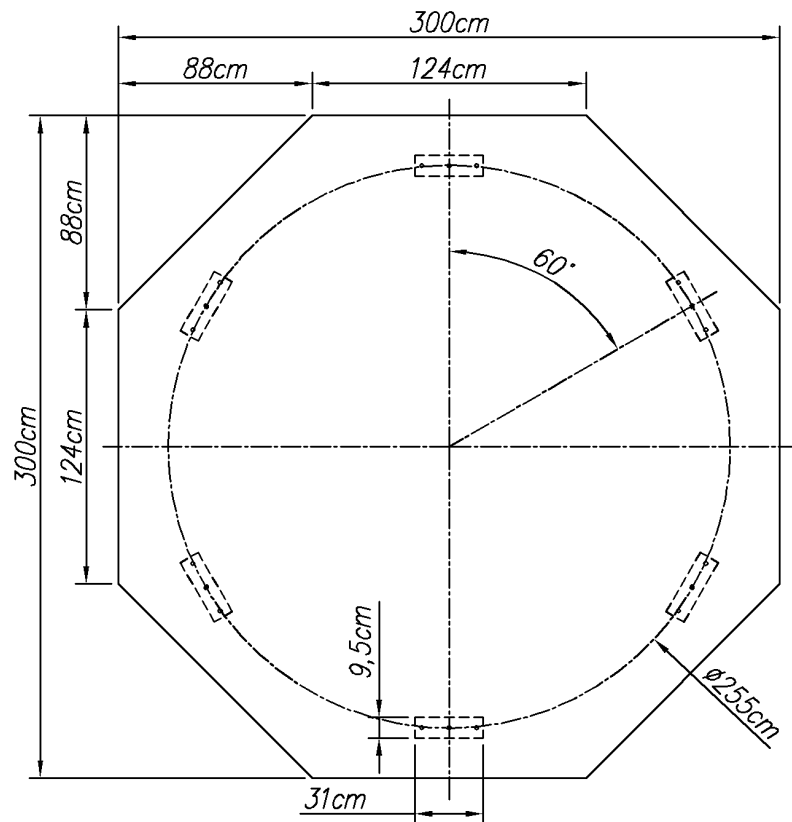


Fig.7 Foundation slab characteristics for PBIN9, PBIN9/M, PBIN12, PBIN12/M, PBIN15 and PBIN15/M silos.

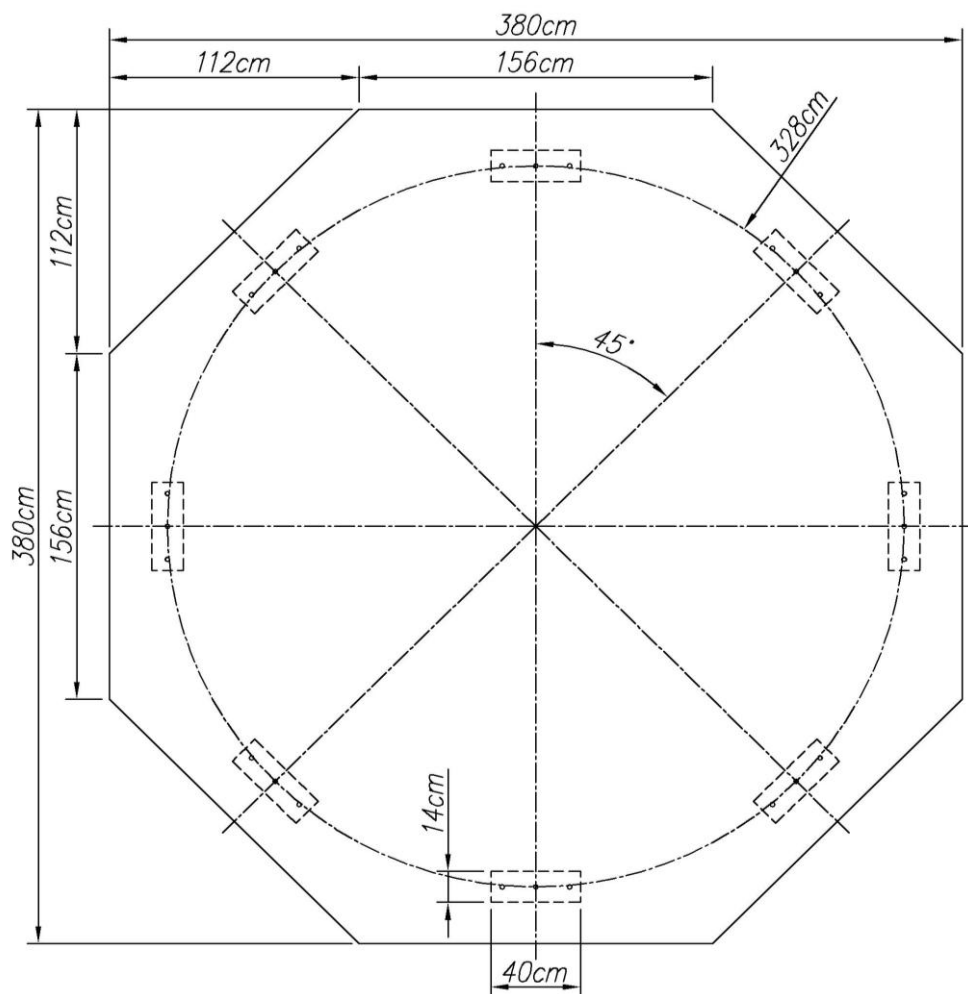


Fig.8 Foundation slab characteristics for PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M silos.

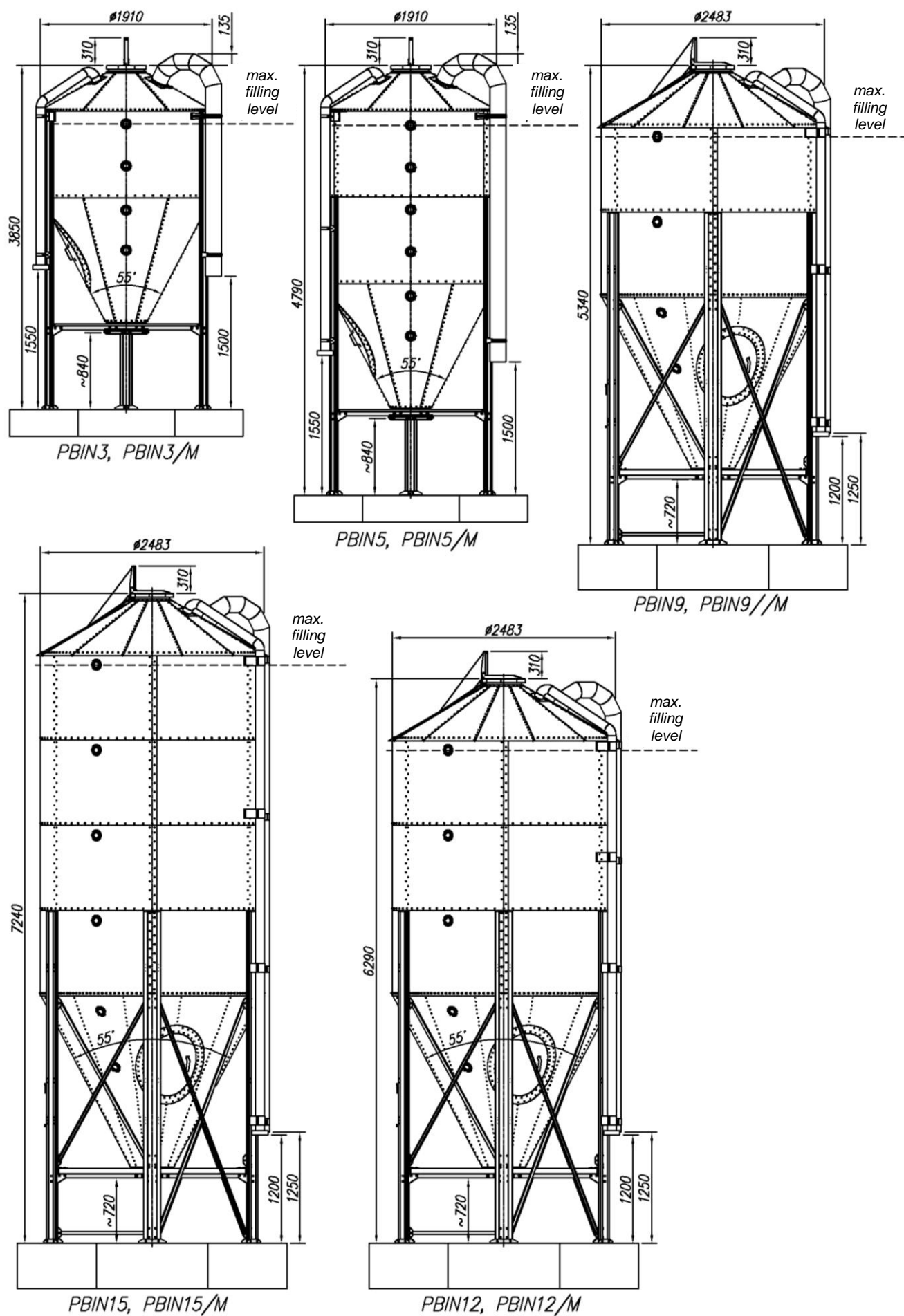


Fig. 9 PBIN silos – basic dimensions.

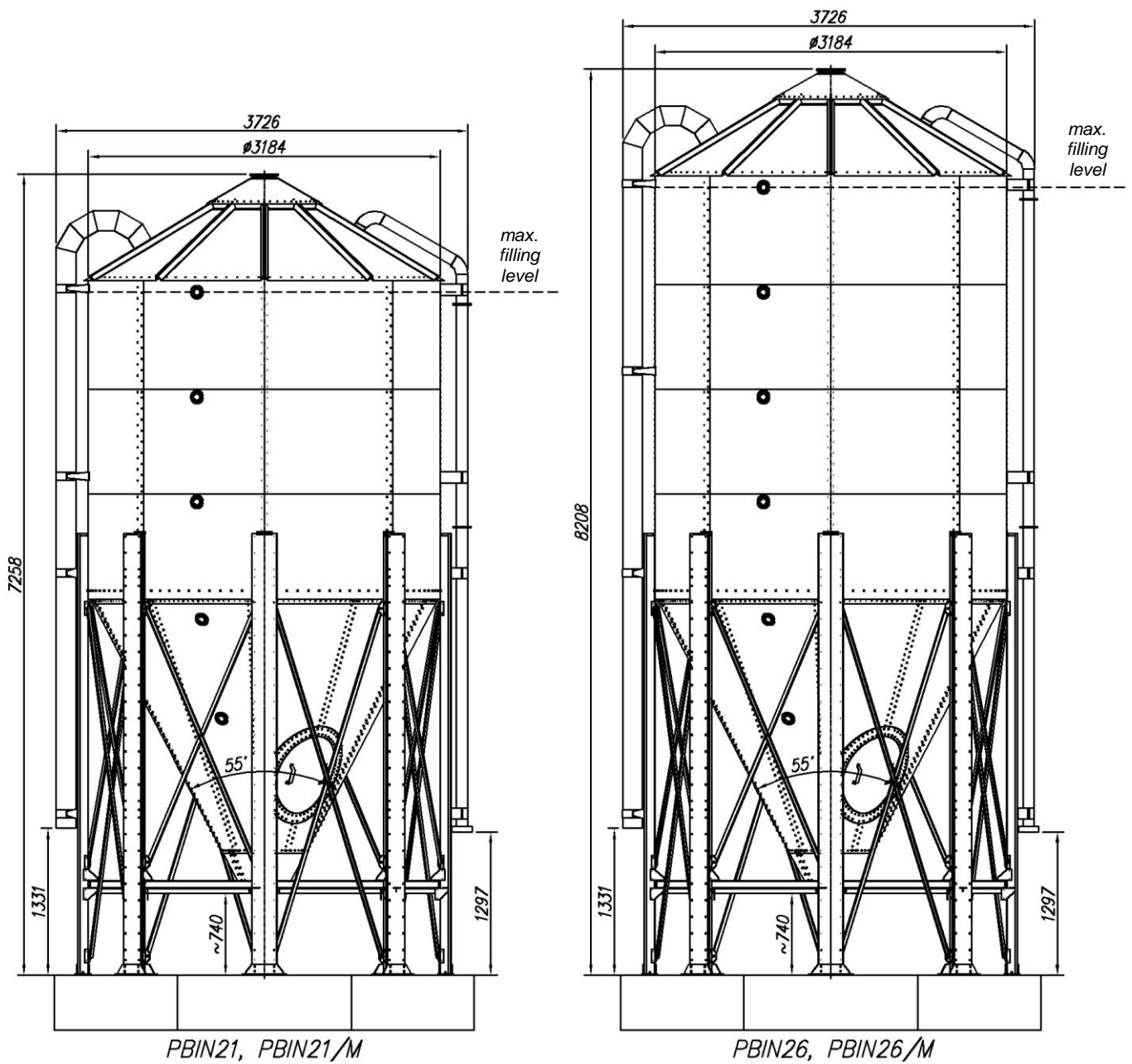


Fig. 10 PBIN silos – basic dimensions.

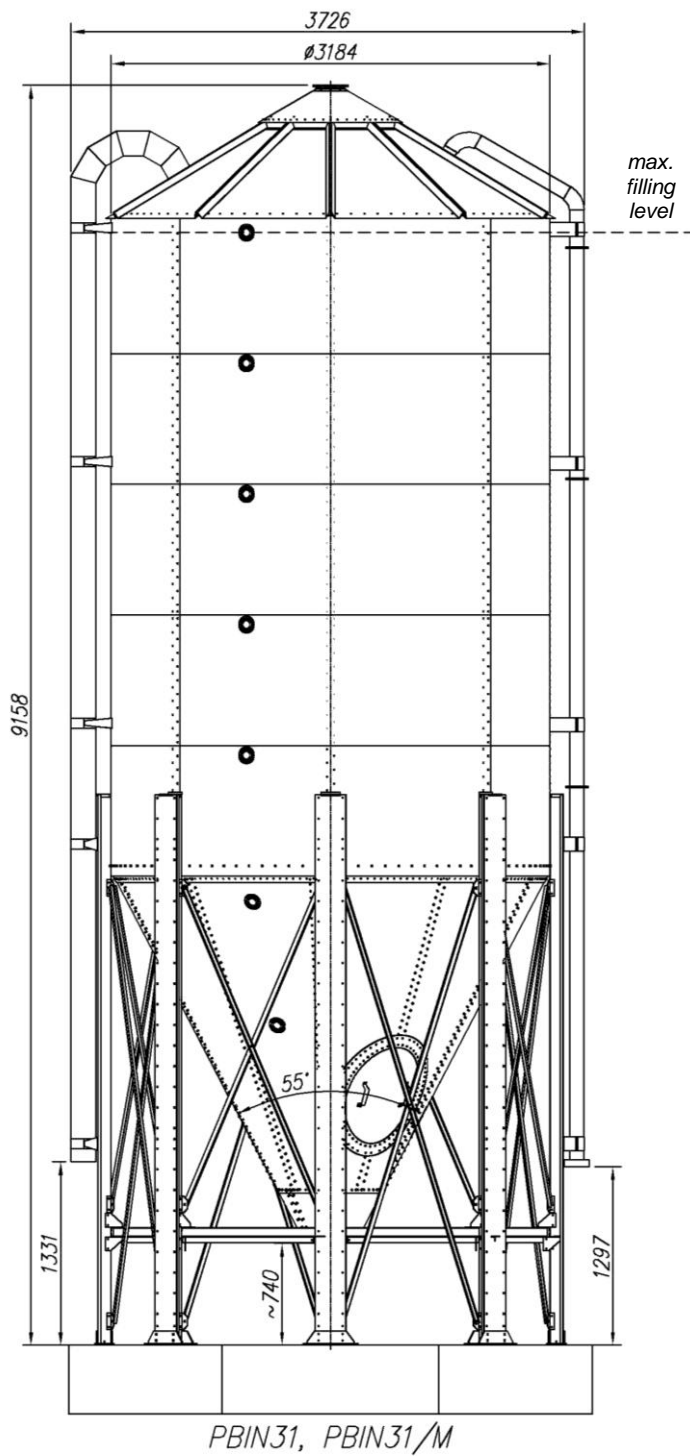


Fig. 11 PBIN silos – basic dimensions.

2.5. Standard and additional silo accessories.

S – standard (included in the silo price),
O – optional (available for additional fee)

TABLE 3. A list of equipment for PBIN silos.

SILO MODEL	PBIN 3 PBIN3/M	PBIN5 PBIN5/M	PBIN9 PBIN9/M	PBIN12 PBIN12/M	PBIN15 PBIN15/M	PBIN21 PBIN21/M	PBIN26 PBIN26/M	PBIN31 PBIN31/M
UNIVERSAL LOADING INLET	S	S	S	S	S	-	-	-
CENTRAL LOADING INLET	-	-	-	-	-	S	S	S
MAINTENANCE MANHOLE	S	S	S	S	S	S	S	S
UNLOADING SHUTTER FOR PBIN (Ø400)	O	O	O	O	O	O	O	O
UNLOADING SHUTTER FOR PBIN (Ø220)	O	O	O	O	O	O	O	O
SACK-FILLING DEVICE	O	O	O	O	O	O	O	O
INSPECTION OPENINGS	S	S	S	S	S	S	S	S
LOADING PIPE WITH A CONNECTOR	S	S	S	S	S	O	O	O
VENTING PIPE	S	S	S	S	S	O	O	O
TEXTILE FILTER	S	S	S	S	S	O	O	O

3. Initial operations and preparing the conveyor for operation

3.1. Investor initial activities

3.1.1. Formal and legal arrangements for the investment

Silos should be erected in accordance with the current Construction Law:

- The Construction Law Act of 07/07/1994 (Journal of Laws No. 89, item 414, as amended)
- Minister of Agriculture and Food Economy Regulation of 25.03.2013 concerning technical requirements that should be met by agricultural construction and their location - Journal of Laws 2013, No. 0, Item 472).

The investor responsible for meeting all formal and legal issues, together with a construction design. The designer is responsible for preparing a foundations design for the silo and equipment (when used), preparing a land development plan, and other works required under the current law or arrangements with the investor. Guidelines for design of foundations and silo dimensions are specified in this Operating Manual. A silo construction design is a multi use design - the investor can receive its copy at the manufacturer's facilities (on silo purchase). The whole silo design documentation was drawn up at BIN Sp. z o.o.

The investor is obliged to provide the user with necessary information concerning rules of operation (starting, stopping, controlling, signalisation, etc.) for all equipment used together with the silo, including emergency procedures in the event of a fire, trapping, blocking of material in the equipment, and similar situations.

The silos were designed in accordance with current standards and legislation, and are intended to be used in climate conditions of Poland for:

Wind load

PBIN silos (according to PN-EN1991-1-4:2005):

The basic wind velocity $v_{b,0} = 26$ m/s, corresponding to 2 zones and to 1 and 3 wind zones (for $A \leq 600$ m amsl).

Additionally, for calculations the II terrain category was selected, defined in the standard PN-EN 1991-1-4 as terrains with low vegetation and with low isolated obstacles with separations of at least 20 obstacle heights. The design does not provide for construction of silos at the sea and shore terrains, lakes and terrains without terrain obstacles, belonging to more stringent terrain categories.

Snow load

PBIN silos (according to PN-EN1991-1-3:2005)

Specific snow load for the ground of $s_k = 1.6$ kN/m², corresponding to 2 and 4 zones, and zone 1 to the height of 428m amsl, and zone 3 to the height of 366m amsl.

3.1.2. Silo location

Silos are installed outdoors. The silo can be installed in a building, provided a sufficient space is ensured for its installation and subsequent operation. The room should be provided with appropriate ventilation general lighting, and ensure correct anchoring of the silo. Conditions for outdoor or indoor installation of the silo and requirements for rooms and anchoring are provided in the Construction Design for Multiple Applications for BIN silos, which should then be adapted to the individual investment conditions by a person holding a relevant licence.

A design provides for silo installation on a slope of an incline not exceeding 5%.

It is required for all structures and machines to be located at least 1.0m away from the silo shell. It is forbidden to install a silo near or under power lines.

Silos can be erected at a minimum distance of 15m away from storage of organic fertilisers: manure, liquid manure, and similar.

3.1.3. Ordering a silo

Orders for silos and spare parts can be placed with BIN Sp. z o.o. or with authorised BIN sales representatives. Each time, before purchasing any components a customer should consult the manufacturer or a sales representative in detail about planned investment.

3.2.3. Transport of silo components

PBIN3, PBIN5, PBIN9, PBIN12 and PBIN15 are delivered assembled. PBIN3/M, PBIN5/M, PBIN9/M, PBIN12/M, PBIN15/M, PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M silos are delivered in parts to be assembled on the foundation slab. Transport, loading and unloading of the components is arranged by a seller or a customer, under an additional agreement. PBIN3/M, PBIN5/M, PBIN9/M, PBIN12/M, PBIN15/M, PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M are

adapted to storage and transport in special transport containers. Fig.12. The container weighs ca. 250 kg. A special transport vehicle is required for transport of PBIN3, PBIN5, PBIN9, PBIN12 and PBIN15, of dimensions and loading capacity specified in Table 1 and Fig. 9. For transport of PBIN3/M, PBIN5/M, PBIN9/M, PBIN12/M, PBIN15/M, PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M silos, a special transport vehicle is required of dimensions taking into account dimensions of the transport containers (Fig. 12), and of loading capacity resulting from data specified in Table 1 plus the container weight (ca. 250 kg). In transport, the silo must be secured against sudden movement. Loading and unloading should be performed with lifting equipment of lifting capacity resulting from data provided in Table 1 and Figures 9, 10, 11 and 12. During a delivery acceptance, a silo buyer is obliged to check the delivery completeness.

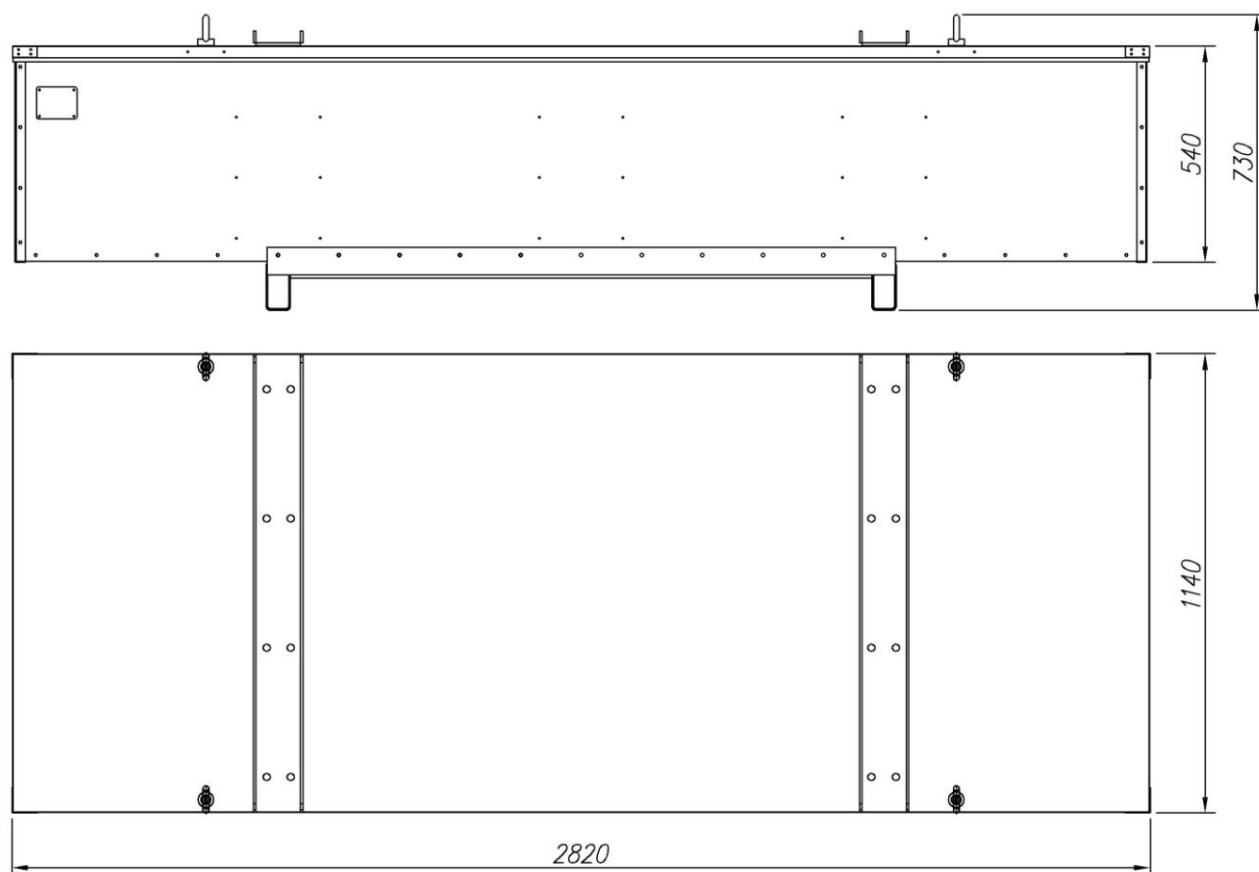


Fig. 12 Transport container for PBIN3/M, PBIN5/M, PBIN9/M, PBIN12/M, PBIN15/M, PBIN21/M, PBIN26/M and PBIN31/M silos



IT IS FORBIDDEN TO CARRY THE SILO ABOVE PEOPLE AND ANIMALS

3.3. Information on installation

PBIN3, PBIN5, PBIN9, PBIN12, and PBIN15 silos:

Following the silo delivery to an installation site it should be placed in the required location and anchored. All activities related to correct placing and anchoring of the silo are performed by the investor. Anchoring means fixing of the supporting structure piles with steel rawplugs (standard equipment accessory - 2 pcs for each pile) to the foundation slabs. Correct anchoring of the silo must take into account conditions specified in Table 4.

PBIN3/M, PBIN5/M, PBIN9/M, PBIN12/M, PBIN15/M, PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M silos:

Installation of the silo requires use of special equipment, and relevant know-how. Therefore, the silo can only be installed by an installation company authorised by BIN. The installation company should cooperate with an entity ordering installation, in terms of works organisation, financial settlements, and acceptance of installation works. Due to risks related to the installation works, it is forbidden for the investor or other companies not authorised by BIN to perform these works. Installation works can start when required foundation slab is constructed and all silo components are collected in a required place. All activities related to correct placing and anchoring of the silo are performed by an installation company under a direct order from the investor. Anchoring means fixing of the supporting structure piles with steel rawplugs (standard equipment accessory - 2 pcs for each pile) to the foundation slabs. Correct anchoring of the silo must take into account conditions specified in Table 4. The investor is obliged to check and ensure itself that all installation works are performed correctly.

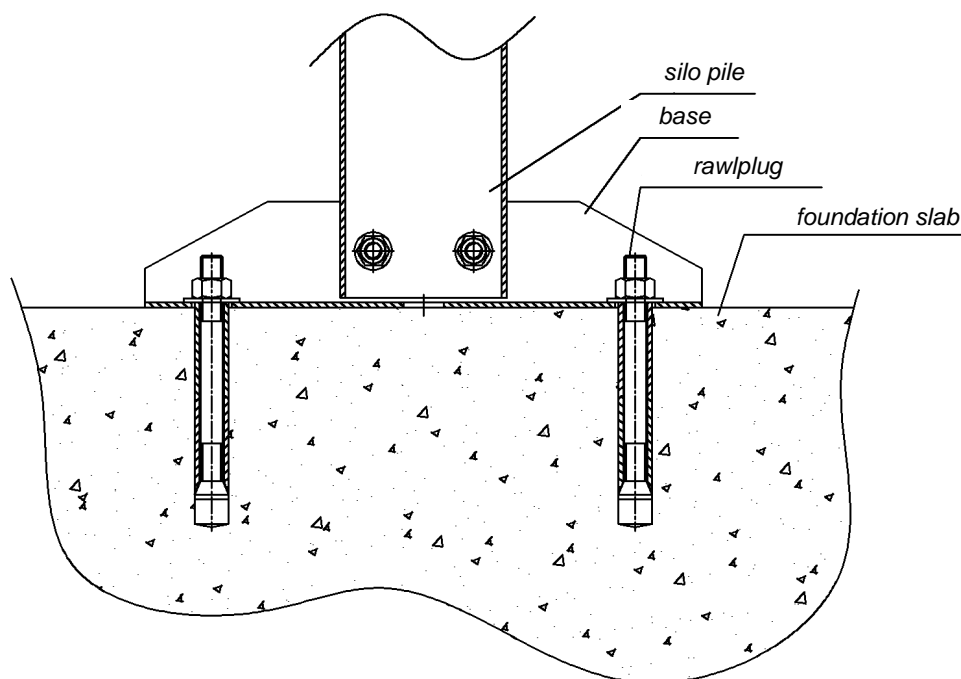


Fig. 13 Silo anchoring.



LACK OF THE REQUIRED ANCHORING FOR THE SILO MAY RESULT IN ITS DESTRUCTION AND IN A THREAT TO HUMAN HEALTH OR LIFE.

TABLE 4. Anchoring conditions for PBIN silos.

Number of piles in the supporting structure	3 pcs	6 pcs	8 pcs
Steel rawplugs	M10/Ø16x120	M12/Ø18x150	M12/Ø18x150
Number of steel rawplugs (per one silo)	6 pcs	12 pcs	16 pcs
Installation of rawplugs - torque	40Nm	70Nm	70Nm
Installation of rawplugs - a diameter of a hole in foundations	Ø16mm	Ø18mm	Ø18mm
Minimum rawplug distance from the foundations edge	100mm	120mm	120mm

3.4. Investor final activities

3.4.1. Lightning system

The investor is responsible for construction of a lightning system. Construction and effectiveness verification of the lightning system should be ordered from a specialist company. The silo roof, walls and the supporting structure must be treated as natural components of its protection. No additional components should be installed on the roof, the walls and the supporting structure. The investor's responsibilities include construction of a ground ring and connecting it with the silo structure with a grounding wire. The above structural recommendations should be considered when they are not contrary to the current standards or legislation.

3.4.2. Fire prevention measures

The investor is responsible for meeting all requirements related to fire prevention. They include ensuring of: access and emergency escape routes, access to sources of water for extinguishing, distribution of extinguishing equipment and fire safety instructions. Fire prevention issues are governed by the Minister of Interior and Administration Regulation of 7 June 2010 concerning fire prevention in buildings, other structures, and terrains (Journal of Laws, 2010, No. 109, item 719) and the Minister of Interior and Administration Regulation of 24 July 2009 concerning supplies of water for extinguishing purposes and fire department access roads (Journal of Laws 2009, No. 124, Item 1030).

3.4.3. Installation of power delivery points

Power delivery points and power supply for accessories should be installed by an authorised electrician, in accordance with current legislation and an individual design of a structure.

4. Operation

4.1. Silo operation

4.1.1. Feed loading into a silo

Each silo should be equipped with devices for loading of feed. Loading can be performed with pneumatic transport, or with a screw, a spiral or a scrapper conveyor. Recommended loading methods are listed in Table 2.

1. Silo loading directly from a vehicle for feed transport is one of the most common methods for loading feed silos. Loading speed and its method depends on a vehicle type and options available to a feed supplier. A pipe for pneumatic loading, of external diameter of 100 mm ending with a connection is standard equipment of PBIN3, PBIN3/M, PBIN5, PBIN5/M, PBIN9, PBIN9/M, PBIN12, PBIN12/M, PBIN15 and PBIN15/M silos. PBIN21, PBIN21/M, PBIN26, PBIN26/M, PBIN31 and PBIN31/M silos can be optionally equipped with a pipe for pneumatic loading of external diameter of 100 mm ending with a connection. During loading excess air is removed from the silo interior. For this purpose, a venting pipe of 180 mm in diameter is used, enabling connection of venting and dust extraction or filtrating equipment.
2. Loading with a screw, a spiral, or a scrapper conveyor is a universal method for filling PBIN silos. To enable this type of loading the silo is equipped with a universal loading inlet of ca. 390 mm in diameter or with a central loading inlet. The universal loading inlet enables inserting of an outlet pipe of a loading conveyor into the silo. The central loading inlet is used for connecting an outlet pipe of a loading conveyor or elbows and downpipes. During the silo loading, the speed of 25 tonnes per hour should not be exceeded; higher speeds may result in the permanent deformation of the silo.

All loading equipment attached to the silo should be installed in a way not damaging the silo. This applies, in particular, to loading through an universal loading inlet, when no part of the loading conveyor should be supported on the silo structure. During loading the silo filling level should be monitored through the inspection openings, so the silo is not overfilled. The maximum level of silo filling - Figures 9, 10 and 11.

Before starting to load the silo:

- 1) check the operational condition of the silo and its accessories;
- 2) make sure there are no people in the silo;
- 3) close a shutter of the outlet opening (if installed);
- 4) check the operational condition of filtrating subassemblies or venting and dust extracting devices.

For loading equipment, strictly adhere to rules of their operation as described in a relevant Operating Manual.

4.1.2. Feed storage

The material stored in the silo can be stored for a short time without losing its quality, provided the following rules are observed:

1. feed cannot be contaminated;
2. all parameters specified by feed manufacturer, including moisture content, storage temperature, etc., must meet the requirements of feed manufacturer;
3. a user should monitor condition of the stored material on a regular basis;
4. always remember to secure the silo against penetration of precipitation water;
5. when feed becomes wet, remove it from the silo immediately.

Note: Failure to follow rules for feed storage may result in significant deterioration in its quality or destruction of the whole silo load, as well as in numerous situations that can affect safety of the silo and its operators.

The worst hazard is so-called feed bridging. This situation can:

- completely prevent silo unloading;
- result in formation of empty cavities in the mass of stored material during its unloading.

Note: Materials that tend to arch during loading and unloading should not be stored in the silo.

4.1.3. Feed unloading

Each silo should be equipped with devices for loading of feed.

The following unloading methods are acceptable:

- unloading through the outlet opening with screw, spiral, scraper or other conveyors.
- unloading through the outlet opening to feed wheelbarrows or carts.

Recommended unloading methods, depending on a silo type, are provided in Table 2.

Before starting the unloading equipment:

- Check its operational condition.
- Ensure there are no people or animals at a location to which the feed will be transported.
- Ensure efficient collection of the unloaded material so the unloading devices are not blocked.

The following rules must be followed during unloading:

- Unloading requires continuous supervision.
- For unloading equipment, strictly adhere to rules of their operation as described in the relevant Operating Manual.
- During the silo unloading the speed of 25 tonnes per hour should not be exceeded; higher speeds may result in the permanent deformation and, eventually damage, of the silo.
- It is forbidden to cut any holes in the silo shell or its conical bottom, for an emergency silo unloading.

PBIN silos can also be unloaded on emergency by disconnecting unloading equipment - conveyors, and unloading feed to feed wheelbarrows or carts.

4.2. Silo maintenance

Correct and punctual maintenance inspections, maintenance and possible repairs guarantee availability of the full storage capacity of the silo and prevent its premature and excessive wear.

4.2.1. Periodic maintenance and regular repairs

Periodic maintenance covers:

- inspection of a flap of the universal loading inlet (fixing strength and ability to close automatically);
- verification of silo anchoring (tightening of steel rawlplugs);
- inspection of a technical condition of a silo shell, a conical bottom, a maintenance manhole, and bolted joints;
- steel thickness measurements in the conical bottom;
The measurement is based on determining the weigh of zinc coating (g/m^2) on the inner side of the conical silo bottom. No zinc coating means the conical silo bottom should be replaced with a new one.
- checking operation a shutter of the outlet opening (if installed);
- inspection of anti-corrosion coatings.

Before each loading of the silo, check the technical condition of the loading and unloading equipment, i.e., the conveyors installed in the silo.

Tightening of all steel rawlplugs anchoring the silo must be checked at least every 6 months.

Other silo components must be inspected at least once every 12 months.

The regular repairs include small repairs, applying solid lubricant onto hinges and possible repairs of anti-corrosion coats.

Anti-corrosion coating of screws can be damaged during installation (tightening). In such case, regular repairs include applying anti-corrosion coatings to damaged surfaces.

The maintenance and operational activities requiring removal of the maintenance manhole should be ordered at specialist companies or persons holding required qualifications.

A person authorised to conduct maintenance inspections of construction should participate in the annual maintenance of the silo. The person conducting the maintenance should draw up a report on verification of the silo operational condition. A silo user should keep silo maintenance records.

4.2.2. Overhaul

An overhaul is conducted at least once every 8 years. Its scope covers the regular repairs plus:

- painting of steel components;
- maintenance of the lightning system by an authorised electrician with drawing up of a relevant report;
- replacement of parts and assemblies of incorrect plate thickness (conical bottom of the silo);
- other relevant repairs.



All damages should be removed immediately, and damaged or worn parts should be repaired or replaced with new ones.

4.2.3. Spare parts

When any silo components are worn, damaged or lost, they can be purchased at BIN Sp. z o.o. The manufacturer does not provide for use of spare parts from manufacturers other than BIN Sp. z o.o. To purchase spare parts, contact the manufacturer in writing, specifying the following details: **device name, purchase document number, device model, year of production, serial number.**

Before placing an order, define precisely (on phone) types of spare parts ordered. A visit from a BIN representative may be necessary to correctly identify the part. The manufacturer does not provide the silo with spare parts.

4.2.4. Disassembling and liquidation

Silos are devices made of materials not harmful to the environment and can be scrapped, and all their components can be recycled. During disassembling, particular attention should be paid to safety, due to components large dimensions. Disassembling should be ordered at a specialist company.

As of June 7, 2017 I approve for use the Operating Manual:

title - FEED SILOS

review - VII

Issued on - June 7, 2017

Chief Constructor
Piotr Chojnacki, Eng.

.....
(signature)

5. Warranty and warranty card

BIN Spółka z o. o. guarantees correct operation of the purchased product from our company. The warranty covers 12 months from the date of sales and is valid only together with a proof of sales issued to a user by us or by our representative. The warranty covers free of charge removal of defects significantly affecting product performance. Therefore, application of warranty provisions of Article 558.1 of the Civil Code is explicitly excluded.

General warranty terms and conditions.

1. Warranty territory
The warranty covers the whole territory of Poland. The warrantor shall cover costs of transport related to an accepted warranty complaint for a distance of up to 250 kilometres covered, according to standard rates.
2. The warranty does not apply to defects resulting from incorrect or excessive operation, natural wear of parts, or other reasons outside the manufacturer's control.
3. The warranty shall not cover any other costs unspecified above, especially costs being a consequence of the equipment stoppage.
4. The warranty becomes invalid when:
 - the product is used in a way contrary to its intended use;
 - installation was incorrect or any unapproved changes are made;
 - works requiring specialist licences are performed by unauthorised persons.

Special warranty terms and conditions.

1. BIN Sp. z o.o. guarantees correct anti-corrosion protection for manufactured hot-dip galvanised products. A minimum weight of zinc coating of 200 g/m² for all products made of hot-dip galvanised steel is required.
Furthermore, products can have parameters of no importance from an anti-corrosion protection point of view, and thus not covered by a warranty, such as:
 - different colouring, zinc coat shade, etc., on individual product components (depending on a material supplier);
 - visible cracks and scratches created in the metal sheet production process with a minimum zinc coating weight maintained.
2. When arrangements made during placement of an order or included in the Operating Manual include obligations for a buyer, then the warranty does not cover consequences of failure to perform or incorrect performance of these obligations.
3. Outdated financial liabilities of a buyer towards the warrantor or the seller result in a loss of the warranty rights until the outstanding liabilities are covered.

Exercising of warranty rights

A customer notifies any defects found to the seller in writing, in the attached Warranty Card. The seller shall notify the customer about a way of handling its complaint, a place and a time of warranty repair no later than within 14 days.

Manufacturer:

BIN Sp. z o.o.
87-700 Aleksandrów Kujawski
ul. Narutowicza 12

.....
Seller

(seller's signature is not required when an invoice includes a note of granting the warranty)

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BIN Sp. z o.o.
87-700 Aleksandrów Kujawski
ul. Narutowicza 12
tel. 0-54 282 22 55

WARRANTY CERTIFICATE

Model	Year of production	Serial number	Purchase document no.

Possibly the most precise description of the revealed fault

First name and surname (company name)	Town	Street and house number	Postal code and post office

Date	Signature	Phone number	Date, signature and stamp of an electrician who starts up the device

WARRANTY CERTIFICATE



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