OLI®

WAMGROUP

PERCUSSION FLOW AIDS

PS – PJ – PG

GUIDELINES

CATALOGUE No. **6010**			CREATION DATE
ISSUE **A1**	CIRCULATION **100**	DATE OF LATEST UPDATE **02.02**	

DEVICE FOR REMOVING AND AIDING FLOW OF MATERIALS AND/OR CLEANING PRODUCTION WALLS O.L.I. SRL

VERSIONS

1) Pneumatic hammers	**PS**
2) Continuous pneumatic hammers	**P25 – P40 – P60**
3) Combined percussion pins	**PJ**
4) Disintegrator cannons	**PG**
5) Fluidisation pads and nozzles	**I100 U025**

The dimensions and technical features are described in detail in the relative illustrated booklets and the USE AND MAINTENANCE guide.

- P25-40-60 are designed for cleaning pipes. The outside cowling, in fact, has two lugs by means of which it can be easily fixed to pipes of different sizes, using two clamps;

HAMMERING

(General features, advantages and comparison with other systems)

- While the vibrator, whether electric or pneumatic, releases the energy produced on the entire structure and thus indirectly on the material, the hammer transmits the energy produced in the installation area with a direct action on the product.
  Therefore:
  a) By positioning the hammer correctly, it is possible to act only at that point where a bridge is formed without causing compacting of the remaining material.
  b) It is possible to use all the energy produced and thus have greater effect.
  Thanks to this advantage, especially with products having high compacting features, the hammer is much more effective than the vibrator for loosening and emptying material from hoppers, silos, etc.
- Owing to its physical nature (high intensity peak) hammering is more effective for destroying bridges.
- The hammer, especially the continuous pneumatic hammer (see Model P25-40-60) is highly effective in separating material from walls (piping, filters, hoppers, etc.).
- The pneumatic hammer does not have harmful effects on the structure (resonance).
- The pneumatic hammer makes it possible to save energy (air consumption) compared with other systems.
- Although it produces a relatively high amount of noise (70 dB - 100 dB), depending on the work pressure and model, during operation, the pneumatic hammer produces minimum noise pollution if compared with vibrating or continuous hammering systems.
- During operation, for all types, it is possible to change the energy produced and the frequency by changing the supply pressure according to the type of use.
- In combined percussion pins, the hammering action is reinforced by introducing air into the product thus causing fluidisation.
- No maintenance required.

When the material is easy to remove all systems are effective. In these cases, the vibrators, especially electric motor-driven vibrators, are the most suitable solution as they are economical.
Hammers, however, are effective and suitable when the material to be treated/handled is difficult to remove - in which case the effectiveness of vibration is limited.
During the initial phase, therefore, it is advisable to define the degree of removability of the material and then choose the most practical, economic system.
The Table below shows the removability of materials by means of a number, whose value expresses the class to which it belongs (the higher the value, the greater the difficulty for removal).

DETERMINING THE REMOVABILITY OF THE MATERIAL

Once the chemical-physical features of the product which influences removal (grain size, fluidity, density, humidity, hygroscopicity and compactability) have been observed in Table 1, an index value relative to each feature can be identified. The sum of these indices, given in Table 2, makes it possible to identify the class to which the material belongs.

TABLE 1

Chemical-physical features	Value	Index
Grain size (WAM code)	≤ C13 - B3.3	0.550
	< B3.3 - A0.406	1.1
	< A0.406 - A0.07	1.65
	Dx - E	2.2
Fluidity (Slide angle ∝°)	0° - 15° high	0.1
	> 15° - 30° medium	0.2
	> 30° - 45° low	0.3
	> 45 critical	0.4
Density (kg/dm³)	≤ 0.2 - 0.6	0.025
	> 0.6 - 1.3	0.05
	> 1.3 - 1.9	0.075
	> 1.9 - 2.5	0.1
Humidity (% of weight)	≤ 0 - 2	0.25
	> 2 - 6	0.5
	> 6 - 12	0.75
	> 12	1
Hygroscopicity U (WAM test)	No	0.025
	Yes (U)	0.1
Compactibility X (WAM test)	No	0.05
	Yes (X)	0.2

TABLE 2

Sum of indices	Material Class
1 - 1.75	1
1.76 - 2.5	2
2.51 - 3.25	3
3.25 - 4	4

CHOICE OF TYPE OF HAMMER

Table 3 lists the systems (manufactured by O.L.I.) most suitable for facilitating removal and aiding flow of material, for each class of material.
It must be stressed that, the higher the class number - and therefore the greater the difficulty of removal - the use of hammers and/or combined percussion pins is highly effective and economical compared with other systems (electric vibrators, pneumatic vibrators, etc.).

TABLE 3

MATERIAL CLASS	HYGROSCOPICITY	PS	PJ	PG	P25-40-60
1	YES	*			*
	NO	*			*
2	YES	**			**
	NO	**	***	**	**
3	YES	***			***
	NO	***	****	***	***
4	YES	***			
	NO	***			

Applications which have given positive results

TYPE OF PROCESS	MATERIAL	SECTOR	MODEL
Weigh hoppers	Dolomite, feldspar, limestone, soda, sand, carbonate	Glassworks	PS
Chutes-inclined planes	Dolomite, feldspar, limestone, soda, sand, carbonate	Glassworks	PS
Removal from silos and hoppers	Atomised dry ground clays	Ceramics	PS-PJ
Filters (hopper cleaning)		Ceramics	PS
Filters (hopper cleaning)	Lead oxide	Car battery industry	PS 032
Removal from silos and hoppers	Cement	Concrete batching	PS

Removal from silos and hoppers	Lime		PJ
Cleaning batching hoppers	Sand	Concrete batching-mining	PS
Batching hoppers	Castor sugar	Food-confectionery	PS 032
Flow aid in small silos	Plain flour 00	Grinding	PS 063
Removal from silos	Carbonate		PS 063
Removal from silos	Talc type coloured filler	Concrete batching	PS 063
Removal from silos	Cement, filler	Concrete batching	PS 063
Scales	Cement	Concrete plant	PS 063
Hoppers	Aggregates	Concrete plant	PS 040
Octagonal silos 8000 dia. tower system	Various aggregates	Concrete plant	PJ 063

SECTORS AND APPLICATIONS

Bearing in mind the above, hammers are effective and economical for the following types of processes:
1) Loosening and removing materials from silos, hoppers, etc.
2) Cleaning the sides of containers and pipes.
3) Cleaning filters.
They can therefore be used in the following sectors:

CHEMICAL

Hoppers and silos
Piping
Transport trolleys
Separators/precipitators
Filters

FOUNDRY

Sand silos
Transport trolleys
Filters

CONCRETE

Transport trolleys
Hoppers and silos
Chutes-inclined planes
Filters

FOOD

Transport trolleys
Hoppers and silos
Dryers
Piping
Batch feeders

WOOD & PAPER

Hoppers and silos
Filters
Transport trolleys
Separators

MINING

Hoppers and silos
Sifters
Transport trolleys
Chutes-inclined planes
Formworks

CERAMICS

Silos and hoppers
Filters
Diffusers

GLASS WORKS

Weigh hoppers
Chutes-inclined planes

CHOOSING THE HAMMER

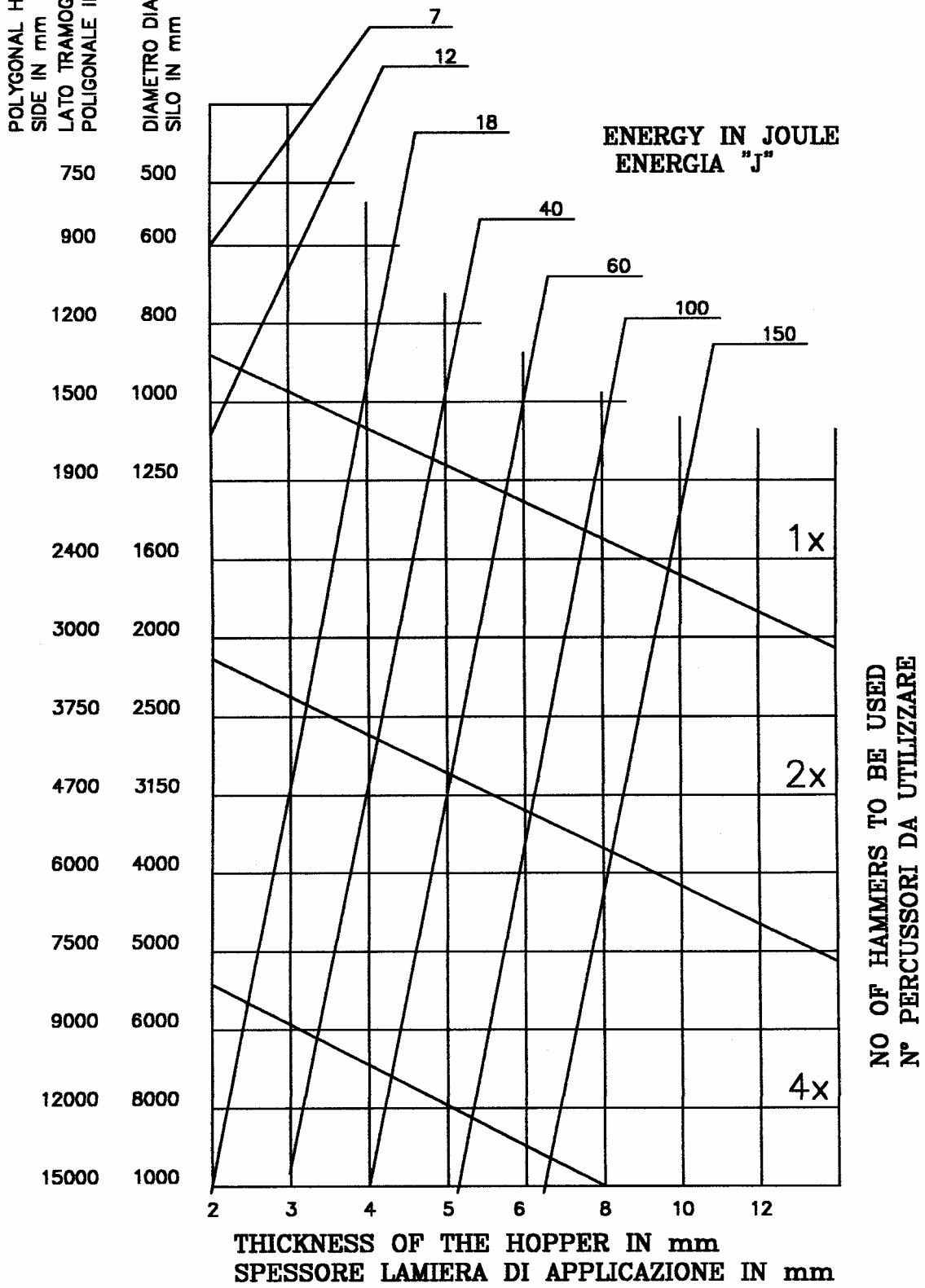
As regards the removal and flow aid process, after identifying the type of device or system to be used (Table 3 and known applications where positive results have been obtained), once the size and shape of the container are known, it is possible to define the energy required and the number of devices to be installed, using the nomograph given below.

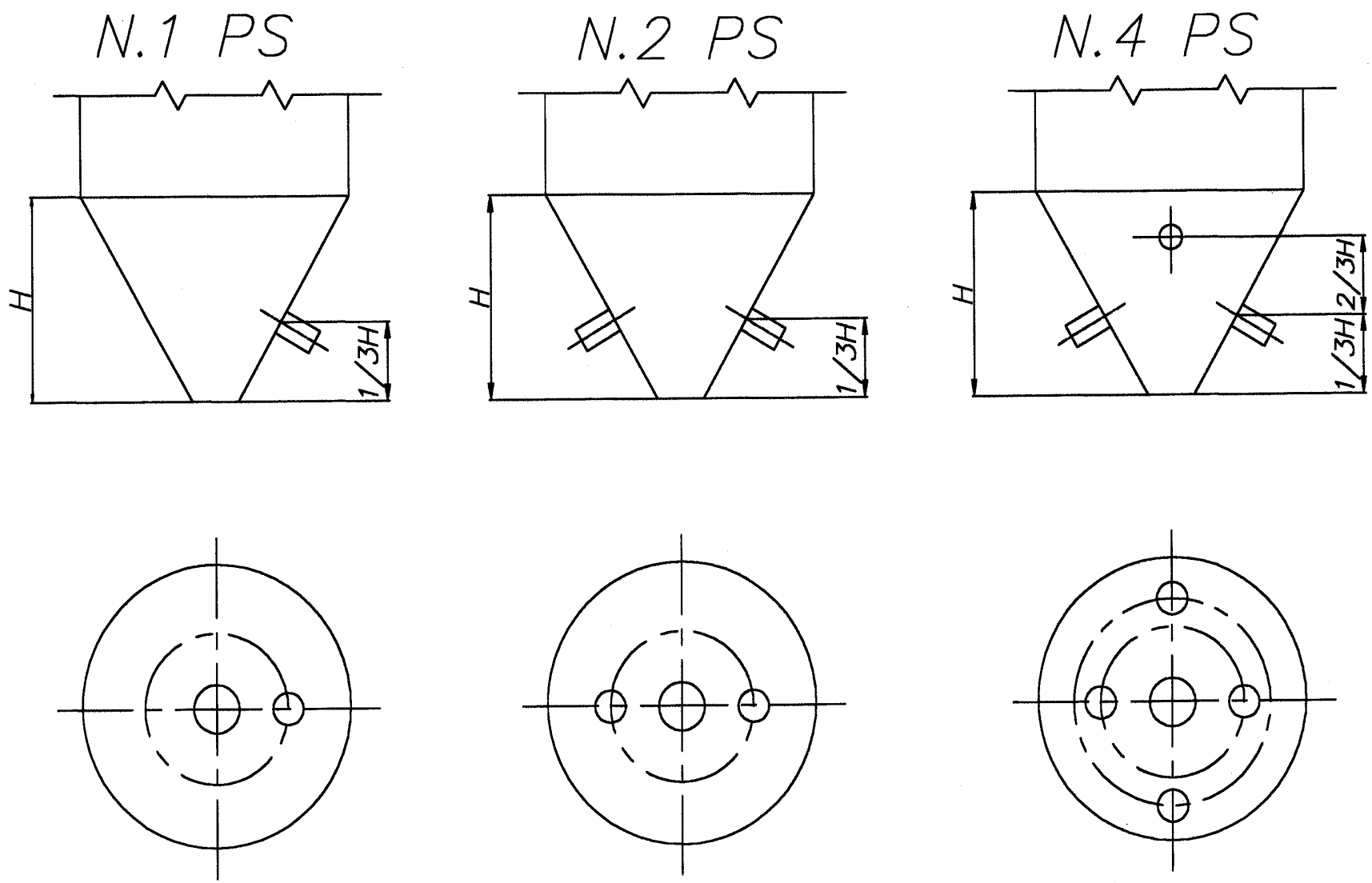
CHOICE OF HAMMERS PS - PJ

POLYGONAL HOPPER SIDE IN mm
SILO DIAMETER IN mm
ENERGY "J"
APPLICATION SHEET THICKNESS IN mm
No. OF HAMMERS TO BE USED

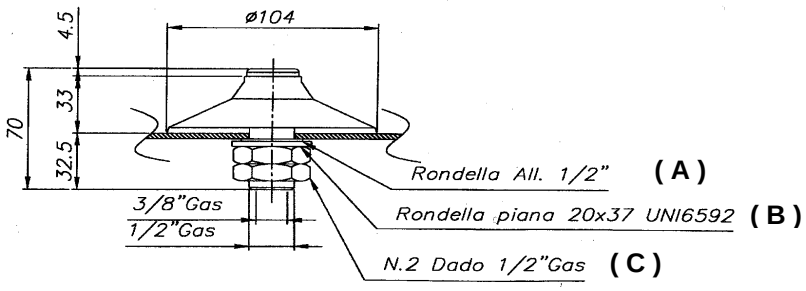
NB: In polygonal hoppers, it is advisable to install the devices on two sides at 90°.

SELEZIONE PERCUSSORI PS–PJ
SELECTION OF HAMMERS PS–PJ




N.1 PS
H
1/3H
N.2 PS
H
1/3H
N.4 PS
H
2/3H
1/3H

BIN AERATOR "VB" - Installation manual



DRAWING "1"

INSTALLATION

Make a hole of about 23 mm (1") as showed on the drawing "2". Insert the **"VB"** bin aerator from the inside of the silo putting the threatned part out of silo. Mount the washer (A), the washer (B) and tighten the first nut (C) and the second nut (C).

INSTALLATION

Bringen Sie gem. Skizze “2” die Befestigungsbohrungen von 23mm Duchmesser an der Silowand an. Führen Sie den Vibrationsbelüfter **„VB“** mit dem Gewindeanschluss von innen nach aussen. Führen Sie zuerst die Unterlegscheibe (A) , dann den Sicherungsring (B) über den Gewindeanschluss. Schrauben Sie die Mutter (C) und die Kontermutter (C) auf den Gewindeanschluss. Ziehen Sie beide Muttern fest.

INSTALLATION

Faire un trou dans le silo de 23 mm (1 pouce), comme indiqué sur le dessin 2. Insérer le "VB" par l' intérieur du silo en faisant sortir la partie filetée. Appliquer la rondelle (A), la rondelle plate (B), serrer le premier écrou jusqu' en buttée sur le silo (C), et serrer le contre écrou (C). Puis terminer par le raccordement pneumatique.

INSTALLAZIONE

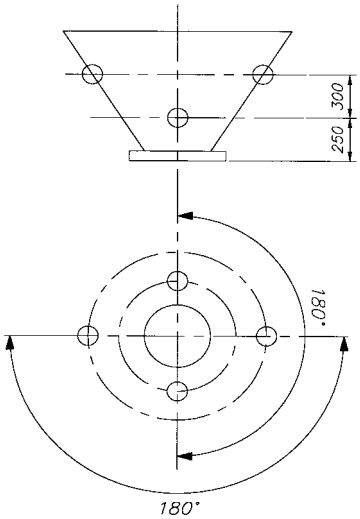
Applicare un foro sul silo (o tramoggia) di circa 23 mm (1") come indicato nel disegno "2". Inserire il vibrofluidificatore **"VB"** dalla parte interna del silo, facendo uscire la parte filettata. Applicare la rondella (A), la rondella piana (B) e serrare il primo dado (C) fino a battuta sul silo. Applicare il secondo dado e serrare a battuta sul primo. Applicare quindi la parte pneumatica.

Working pressure:
min 2 bar (29 psi)
max 6 bar (87 psi)

Arbeitsdruck:
min 2 bar (29 psi)
max 6 bar (87 psi)

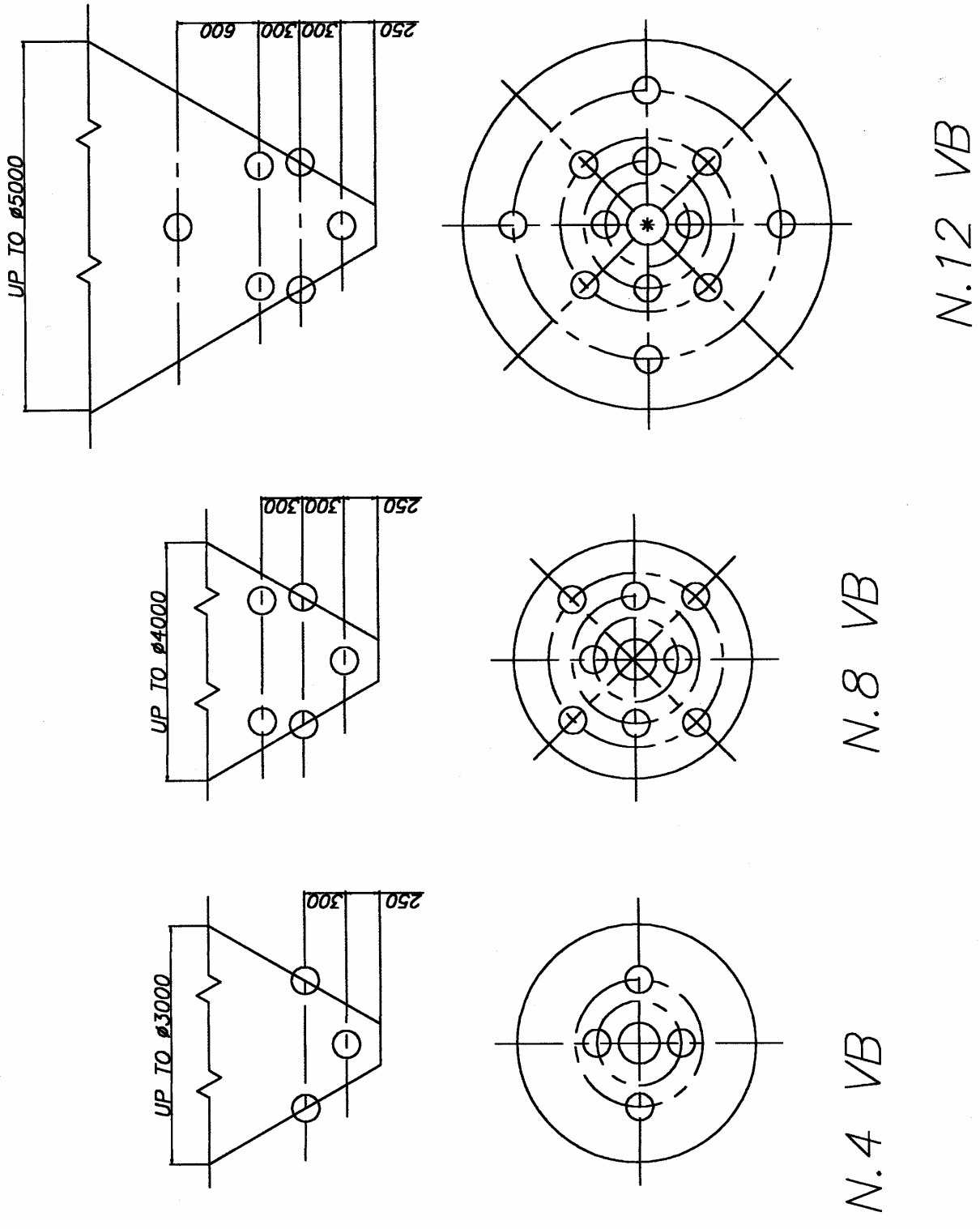
Pression de service:
min. 2 bar (29 psi)
max 6 bar (87 psi)

Pressione di esercizio:
min. 2 bar (29 psi)
max 6 bar (87 psi)



DRAWING "2"

VB - Vibrating Bin Selection Chart



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