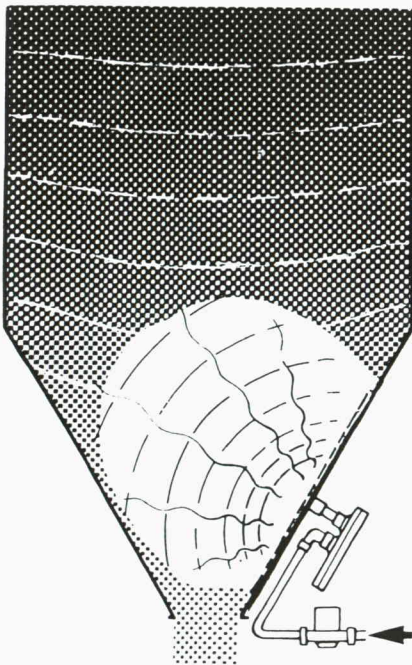


# It's the material, not the silo, that has to vibrate

## PULSATING SILO DISCHARGE SYSTEM

**PATENTED**


The panel activator spreads air vibrations deep into the material.

### Fluidising with low frequencies

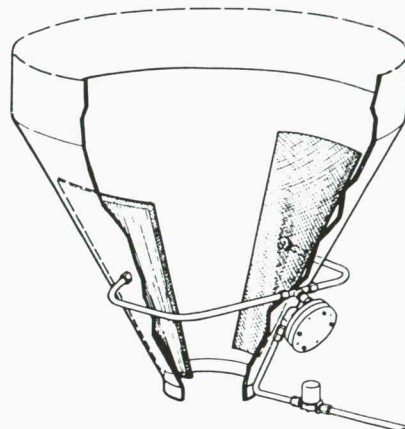
This DISCHARGE SYSTEM has been developed for efficient loosening of material in silos. In this case, the activator operates by means of rapid compressed air impulses from a wholly pneumatic pulsator. A panel activator is used both to inject the pulsating air into the powdered material and to distribute it with optimal effect.

The air that is blown in is thus finely distributed so that it forms a slip surface over the activator cloth, and the vibrations in the air ensure that the particles are easily displaced. This combination results in especially efficient emptying; the mass of material is set in uniform movement, and it shows a minimal tendency to segregate.

The system is also highly flexible, as the size, shape and location of the panels can be adapted to

both the design of the silo and to the type of material. As a result, an optimal solution can be planned for any given situation.

Another advantage of this system is that it is easy to install. And the system works equally well in concrete and in metal silos —with straight or curved sides.



Simple, flexible installation is one of the advantages of this equipment.

Postal Address

Address

Telephone

Telefax

**Kockum Sonics AB**

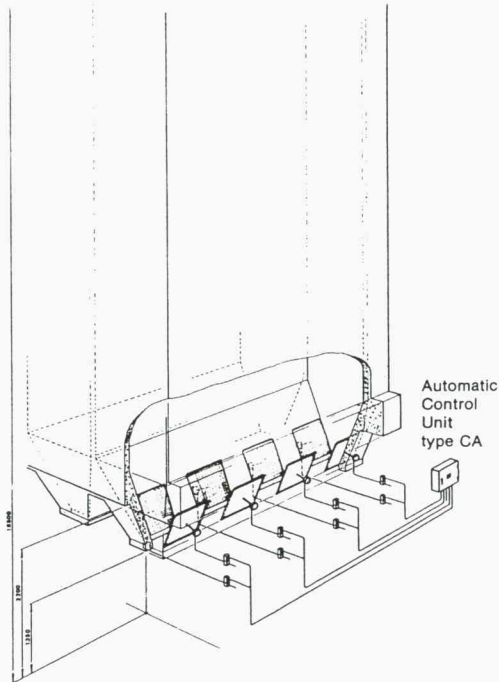
 Box 1035  
S-212 10 Malmö, Sweden

Industrigatan 39

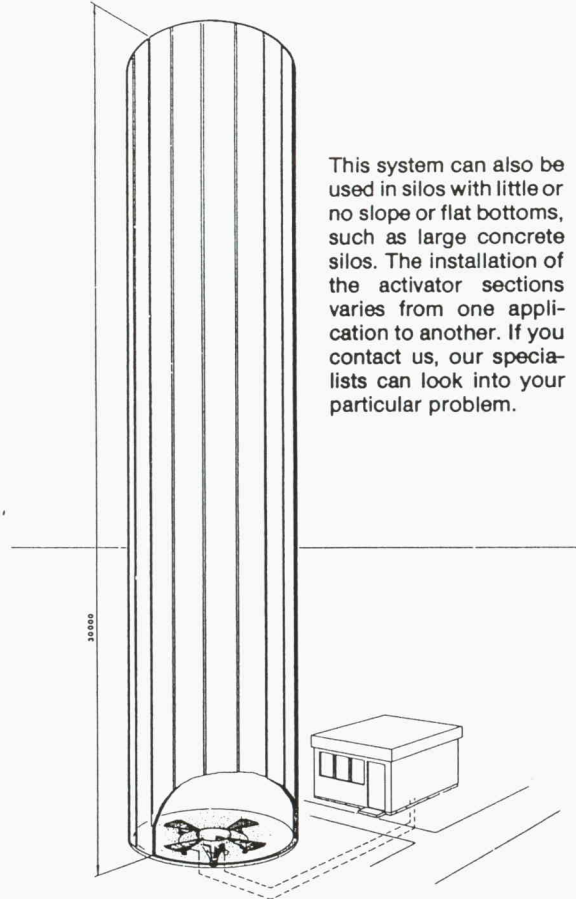
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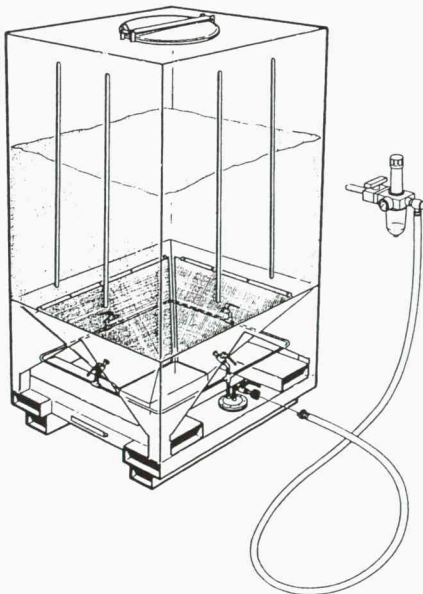

# INSTALLATION EXAMPLES



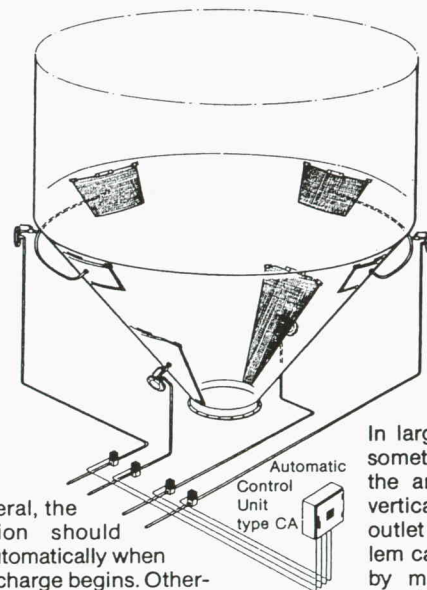
In this flour silo with a horizontally mounted discharging screw at the bottom, four pairs of Panel Activators above the outlet are activated in four stages, one after the other with 0.15-sec. activating and 6-sec. idling period per working cycle, bringing the total air consumption down to only 50 litres/minute.



This system can also be used in silos with little or no slope or flat bottoms, such as large concrete silos. The installation of the activator sections varies from one application to another. If you contact us, our specialists can look into your particular problem.



Sometimes, especially in smaller containers with difficult materials, it may be an advantage to have 3-4 very small Panel Activators operated by only one pulsator.

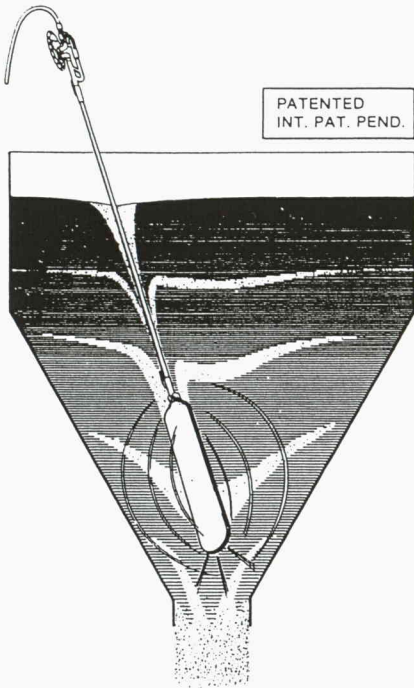


In general, the activation should start automatically when the discharge begins. Otherwise there is a risk of discharging material in such a way that the activating surfaces are uncovered, forming a bridge above them.

In larger silos, arcs are sometimes formed at the angle between the vertical wall and the outlet funnel. This problem can often be solved by means of separate panel activators mounted at the upper edge of the conical part, as illustrated.

WHEN THE APPLICATION CLAIMS FOR AN EASY  
REPLACEABLE ACTIVATOR OR A FULLY PORTABLE KIT...

# PULSATOR-LANCE



## EFFECTIVE DISCHARGE

The PULSATOR-LANCE has been developed for very efficient loosening of materials in bins and containers. Also very difficult powders will easily flow out when using this PULSATOR-LANCE.

The paddle activator at the end of the lance operates by means of rapid compressed air pulses from a wholly pneumatic pulsator in the handle. The pulsating air forces the sides of the paddle into hard vibration. The paddle sides will work as a double diaphragm with a certain air permeability, distributing the air pulses into the powder material with optimal effect.

The paddle activator diaphragm is manufactured of heavy-duty Nylon cloth, formed as a straight hose. That hose can easily be removed for cleaning or interchange and is fixed by a simple clamp.

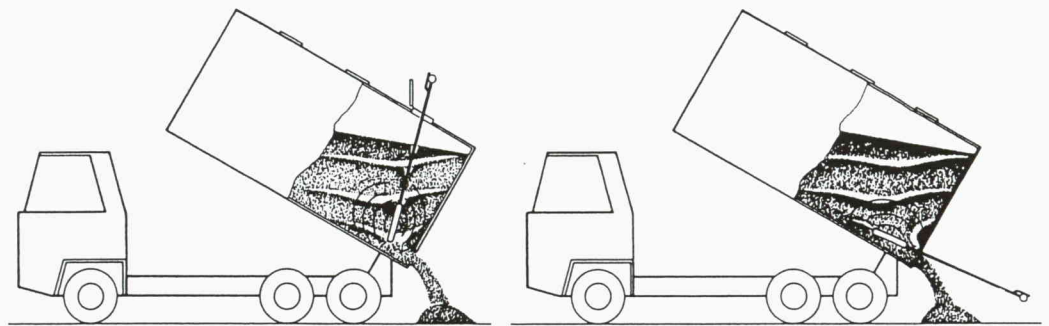
For cleaning of cavities, pipes etc with diameter of 30-40 mm and upwards, there is a Rod-Activator available — should be connected at the end of the lance in place of the paddle activator.

The PULSATOR-LANCE operates almost completely silent.

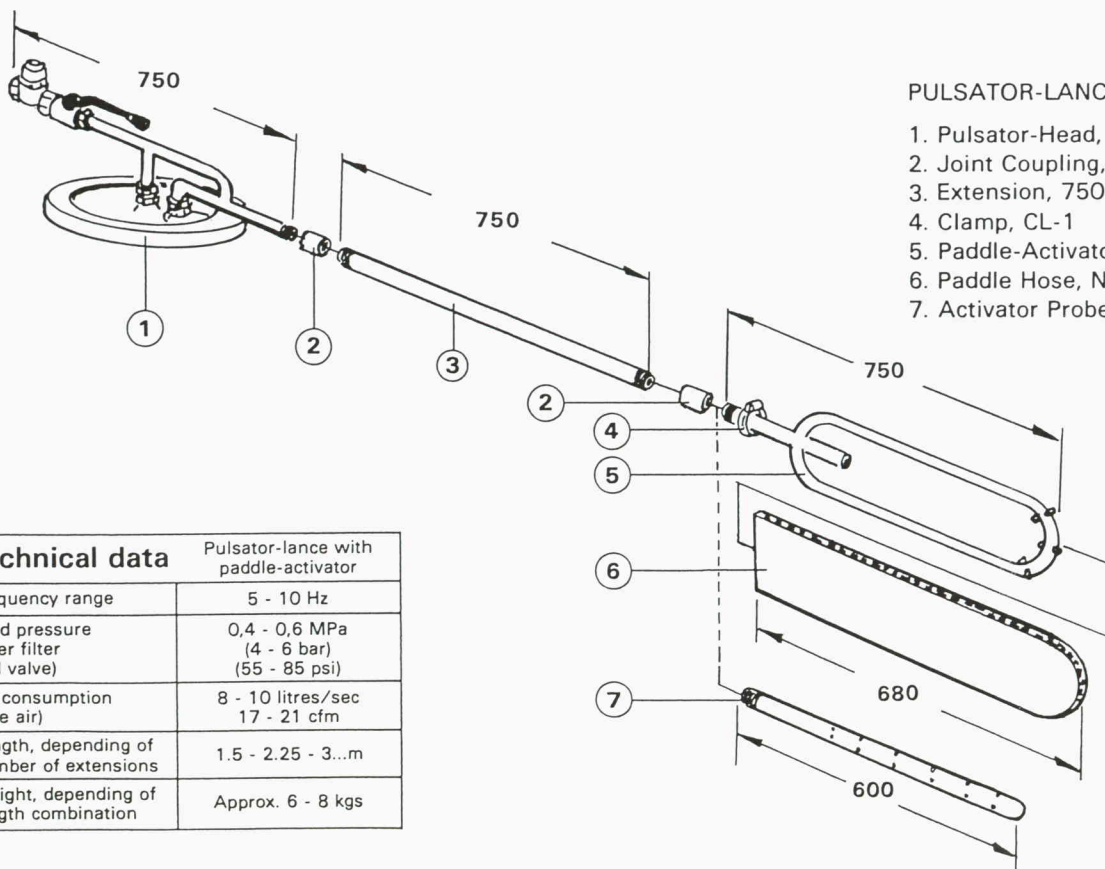
It is very light and handy, the weight is only 6-8 kgs (13-17 lbs), still a really rugged construction. There are very few moving parts and it is absolute safe and reliable in operation, asking for very little maintenance.

The paddle activator spreads the air vibrations deep into the material.

Thanks to the pulsating air surrounding the paddle activator, and because of the fact that the powder in the area around it is fluidised, it is easy to move the pulsator-lance through the powder into the very point where it is needed.



The PULSATOR-LANCE can be inserted into the container either from the top or the bottom. Also side insert pipes can be adapted for the paddle activator, all to suit every actual application. The PULSATOR-LANCE is exceedingly adaptable to the most different and difficult applications.



## PULSATOR-LANCE

1. Pulsator-Head, PPA-2
2. Joint Coupling, JC-2
3. Extension, 750
4. Clamp, CL-1
5. Paddle-Activator, PLA-2
6. Paddle Hose, NVA-2
7. Activator Probe, NVS-2

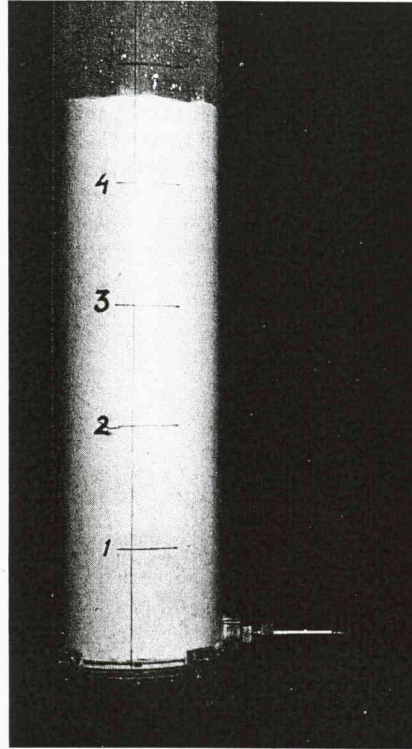
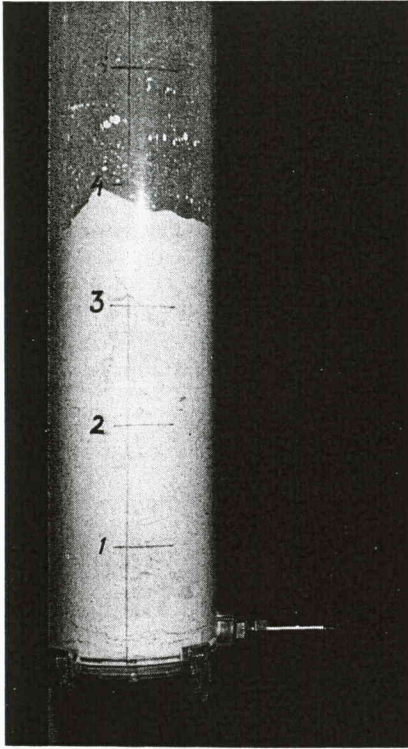
We reserve the right to change technical spec. without prior notice.

Technical data	Pulsator-lance with paddle-activator
Frequency range	5 - 10 Hz
Feed pressure (after filter and valve)	0,4 - 0,6 MPa (4 - 6 bar) (55 - 85 psi)
Air consumption (free air)	8 - 10 litres/sec 17 - 21 cfm
Length, depending of number of extensions	1.5 - 2.25 - 3...m
Weight, depending of length combination	Approx. 6 - 8 kgs

A number of different vibration systems for emptying silos are available on today's market. The trouble with most of them is that they generate vibration mainly in the walls of the containing structure - or in some cases in a special oscillating unit within the silo.

This means that both the foundation

and the structure are exposed to stress which can ultimately result in fatigue. What's more, there is a relatively large risk of packing and bridging. This applies especially to certain difficult materials such as fine-grain powders, damp or doughy substances and lighter material in the form of flakes or with a fibrous structure.



## Fluidisation

The ideal technique involves loosening the material effectively so that it runs - this is called fluidisation. Fluidised material runs easily out of the container, while it also facilitates subsequent transport through piping systems.

A commonly used method of fluidising the contents of silos is to introduce fine streams of air into the material in order to separate the individual particles. But this method is not always completely successful; the air often has the effect of simply forming a central hole, so that emptying is interrupted.

## Pulsating fluidisation

is a further development of this process. We enrich the air introduced into the silo with vibrations in the form of fluctuations in pressure. This enables us to achieve effective loosening of the material, and at the same time to make sure that it is mainly the material - and not the silo - that vibrates. The result:

**fast effective emptying.**

Laboratory tests clearly demonstrate the difference between fluidisation with air alone (left) and with vibration-enriched air according to this unique technique (right). Equal quantities of air were supplied into the two containers, which held equal quantities of powdered china clay.

## Economy and reliability

The list of difficult materials that have been successfully handled by this system is both long and comprehensive. The simple mechanical design of this equipment - based on years and years of experience and development in the field of advanced materials handling - allows for minimal wear and long operating lifetime.

A number of different standard sizes of panel activators have been designed for the system, giving possibilities for installation in almost every possible size and shape of silos, bins and hoppers for powders or granulates.

## Some Material References

- Chalk (natural)
- Chalk (synthetic)
- Lime (slaked)
- Lime (unslaked)
- Talcum powder
- Carbon Black
- Gypsum powder
- Plastic pellets
- Plastic granulate
- Plastic powder (miscellaneous)
- PVC-granulate
- PVC-powder
- Fly ash
- Soot
- Filter dust
- Wood powder
- Wood flour
- Sand
- Glass sand
- Silica powder
- Clay powder
- Kaolin (China clay)
- Titaniumdioxide
- Zinc white
- Zink oxide
- Colour pigments
- Aluminium, powder
- Aluminium oxide
- Magnesium oxide
- Wolfram oxide
- Mangan oxide
- Iron sulphate
- Mangansulphate
- Magnesiumsulphate
- Cupric sulphate
- Sodium sulphate
- Carboxymethylcellulose (CMC)
- Dicalciumphosphate
- Tripolyphosphate
- Potassium carbonate
- Sodiumcalcinate
- Chlorine chloride
- Bicarbonate
- Soda
- Resin powders
- Rubber granulate
- Silanogran
- Rhenogran
- Neoprene
- Paraffin
- Stearine
- Polyethylene powder
- Salt
- Granulated sugar
- Icing sugar
- Starch
- Milkpowder
- Skim-milk powder
- Vitamines (different powders)
- Soya flour
- Oil plant flour
- Wheat feed flour
- Beet feed powder
- Bran
- Wheat flour
- Rye flour
- Coffee
- Chopped almond