ON-LINE MANUAL
Vibrator Selection

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4. Selection of the optimal vibrator type

4.1. General Information

In this section you will find some suggestions on how to select vibrators, but selection of the optimal vibrator cannot be done soely by using a calculator, some graphs and tables. Every single application is to be treated in a different way. Very often the free vibration is hindered by structural reinforcements, stiffeners, or other impediments. The following tables may give you an approximate idea to come close to the optimum, but in the end the final adjustment has to be done by varying the air pressure and tuning in to the object's natural frequency or a frequency that provides good working conditions.

There are many applications where three or more types of vibrators will do the job. In these cases the decision on which vibrator to use needs to be made according to noise and cost, both initial and long-term.

Generally speaking there are 7 factors to be taken into consideration :

- air consumption
- noise
- space of the unit / mounting area
- frequency required
- amplitude / vibrating energy
- cost / maintenance cost
- air supply / lubrication necessary

You will find different types of vibrator listed in the following tables, listed according to their force and amplitude. Other factors which are important are cost, noise and air consumption. For example, it might sometimes be important to use a Golden Turbine Vibrator, which is less noisy and consumes less than half the air that a ball vibrator with similar characteristics. For other applications there are no noise restrictions and a ball vibrator will be sufficient and save money as well.

How to proceed :

1. Select all the possible vibrator types and models according to the force needed in the following tables.
2. If silent operation is required, then do not use noisy types.

3. If oil-free running is required, then do not use T-, DAR-, and FP-vibrators.
4. If low air consumption is required, do not use Ball- and Roller-Vibrators (K-, R- and DAR-vibrators). For air consumption data please refer to Section 10--Technical Data.
5. Check for the mounting space needed.
6. Compare the costs. Take into consideration that one single GT-vibrator may do the job of two ball vibrators and that it might be less expensive in the long run.

4.2. Bins And Hoppers

4.2.1. Formula

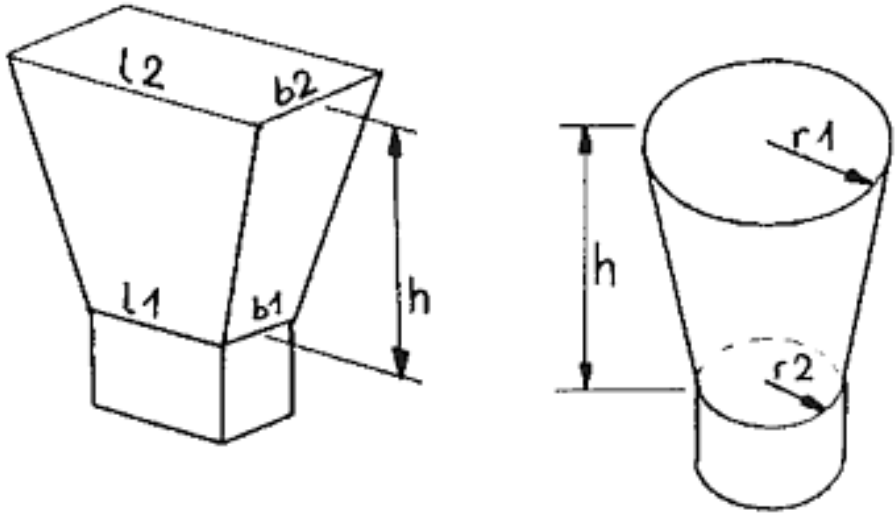
The most important factor in selecting the optimal vibrator model is the weight of the good that has to be vibrated. Where bins and hoppers are concerned, only the material in the sloped part of the bin or hopper is of interest.

Weight of the content :

W(cont) = Volume x Volume Weight of the Material

$$W(cont) = \frac{(b1 \times L1 + b2 \times L2)}{2} \times h \times VW \text{ for square bins}$$

$$W(cont) = \frac{(r12 \times p + r22 \times p)}{2} \times h \times VW \text{ for conical bins}$$



Calculation of the material weight of bins and hoppers

4.2.2. Vibrator table

Very often it is better to run two smaller vibrators instead of a large one. The units should be placed opposite each other on the bin or hopper so the structure is not stressed toomuch at one single point.

	Materials					
Weight of the content in kg	dry/loose grain, corn, coffee dry powders, flours			humid/wet/bulky cement, concrete, sugar salt, chemicals		
	Ball Vibrator K-Type	Roller Vibrator R-Type	Golden Turbine GT-Type	(Ball) Roller Vibrator R-Type	DAR Vibrator	Golden Turbine GT-Type
	noisy	noisy	silent	noisy	noisy	silent
50	K-8		GT-8	K-10		GT-8
100	K-8		GT-8	K-13		GT-8
200	K-10		GT-8	K-16		GT-8
300	K-13		GT-8	K-20		GT-8
500	K-16		GT-8	R-50		GT-8
800	K-20	R-50	GT-8	R-50	DAR-2	GT-10
1,000	K-25	R-50	GT-13	R-50	DAR-2	GT-16
1,500	K-30	R-50	GT-16	R-65	DAR-3	GT-20
2,000	K-36	R-65	GT-20	R-80	DAR-4	GT-25
3,000	K-36	R-65	GT-25	R-100	DAR-5	GT-36
5,000		R-80	GT-30	R-120	DAR-6	GT-40
8,000		R-100	GT-40		DAR-7	GT-78
10,000		R-100	GT-48		DAR-7	GT-48-S

Selection table for bins and hoppers

4.3. Chutes And Screens

To select the correct vibrator, first determine the weight of the material and the volume to be moved. For smaller chutes and screens, up to a total of about 120 kg, piston vibrators can be used but for larger chutes and screens, rotary vibrators, especially turbines, are a better choice.

Where two vibrators have to be used make sure both are fixed to the same stiffening iron so they will immediately run in resonance and amplify their forces.

4.3.1. Formula

Total weight to be vibrated :

W(vib) = Weight of chute or screen (moving part) + weight of the material inside

4.3.2. Vibrator table

Total weight in kg	Ball vibrator K-type noisy SA/HF	Roller vibrator R-type noisy MA/HF	Roller vibrator DAR-type noisy HA/LF	Turbine vibrator GT-type silent LA/MF	Piston vibrator FP-type silent 1/LF
5					FP-12
10					FP-18
15					FP-18
20	K-8				FP-25
30	K-8				FP-25
40	K-10				FP-25
50	K-13				FP-35
75	K-16				FP-35
100	K-20				2xFP-35
150	K-25	R-50	DAR-2	GT-16	
200	K-30	R-50	DAR-3	GT-16	
300	K-36	R-65	DAR-4	GT-25	
400	2x K-36	R-80	DAR-5	GT-36	
500		R-100	DAR-6	GT-36-S	
750		R-120	DAR-7	GT-48	
1,000		R-120	DAR-7	GT-48-S	
2,000		2xR-120	2xDAR-7	2xGT-48-S	

Selection table for chutes and screens

The FP-vibrators are available as S(mall), M(edium) and L(arge) amplitude types

SA = small amplitude	LF = low frequency
MA = medium amplitude	MF = medium frequency
HA = high amplitude	HF = high frequency

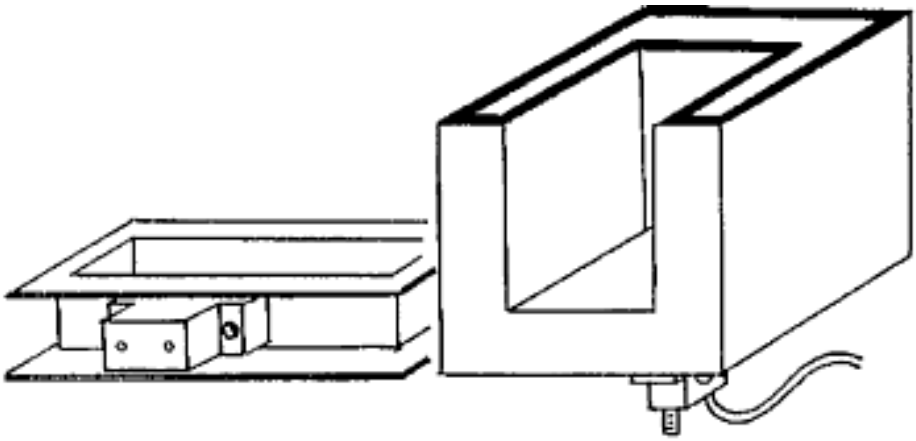
4.4. Molding Forms For Concrete and Iron Cast Applications

The important factors in selecting a vibrator for concrete molds are the mold weight and the condition of hte concrete, either dry, medium, or wet.

NOTE : Whatever vibrator you choose from the table, you will always have to perform practical tests to determine its best working conditions. Especially for concrete, the time of vibration is of significant importance to insure that the concrete is vibrated throughout. The table only provides a rough estimate.

	Condition		
Weight of filled mold in kg	WET	MEDIUM	DRY
20	R-50 DAR-2 GT-10-S	R-50 DAR-3 GT-10-S	R-65 DAR-4 GT-10-S
50	R-50 DAR-2 GT-10-S	R-65 DAR-3 GT-16-S	R-65 DAR-4 GT-16-S
100	R-65 DAR-5 GT-16-S	R-65 DAR-5 GT-16-S	R-80 DAR-6 GT-25-S
200	R-65 DAR-5 GT-25-S	R-80 DAR-6 GT-25-S	R-100 DAR-6 GT-36-S
500	R-80 DAR-6 GT-36-S	R-100 DAR-6 GT-48-S	R-120 DAR-7 2x GT-36-S
750	R-120 DAR-6 GT-48-S	R-120 DAR-7 2x GT-36-S	2x R-120 2x DAR-6 2x GT-48-S
1'000	2x R-120 DAR-7	2x R-120 2x DAR-6	2x DAR-7

Selection table for concrete molds



Fixation of the Vibrators depending on molding form

When more than 10 cm (4 inches) of concrete are to be compacted, DAR-vibrators (above, on the right) are recommended. The DAR-vibrators produce very large amplitudes which penetrate deeply into the concrete material.

For flat molding forms (above, on the left), DAR-vibrators should be used if the total width is more than 20 cm (8 inches) or 40 cm (16 inches) if two vibrators are used. If the width is less than 20cm, roller R-series or turbine GT-vibrators will produce good results.

To get a very compact and bubblefree surface, a GT-vibrator should be run for about ten seconds. Due to its higher frequency, it compacts sand material closely around gravel stones.

4.5. Foundry Molding Forms

To determine the correct vibrator to separate the silica sand of molding forms use the DRY column on the table. The use of GT-turbines is recommended since they can be operated without lubrication and their ball bearings are shielded so the silica sand dust can not harm the bearings. The vibrator should always be supplied with about 0.5 bar in standby operation so that no silica sand enters the exhaust port during the filling of the mold. Higher pressure is necessary to start the vibrator.

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