RUBAIR

SPECIALISED RUBBER PRODUCTS

Donut Springs | Spring Covers | Rubber Bumpers | Tensions Bands



DONUT SPRINGS

WHY CHOOSE RUBBER DONUT SPRINGS?

There are many reasons why this type of spring has been chosen for certain applications. Rubber springs have been used for a long time because of the rubbers natural ability to reduce vibration. The Donut Spring uses both rubber and reinforced fabric to carry greater loads while isolating the vibration.

The alternative to these types of springs are standard steel coil springs which do not provide the same characteristics as rubber springs. The Donut Spring will provide a nearly constant natural frequency with changing loads.

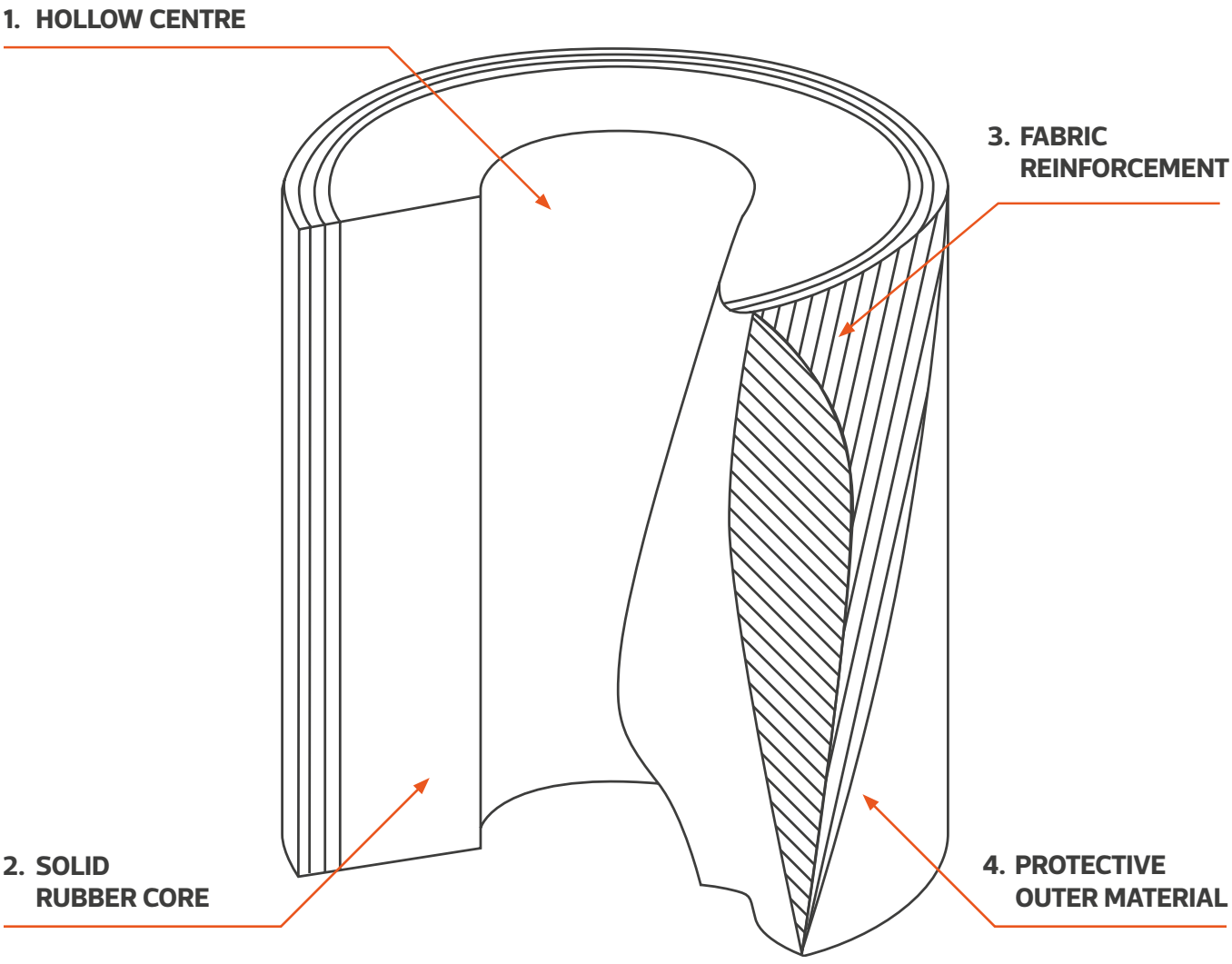
ADVANTAGES

Some of the Advantages which make the Donut Spring stand out are:

- Noise levels are reduced dramatically which allows better working conditions for anyone in close proximity to the machine
- The Donut Spring will provide a nearly constant natural frequency even with changing loads, resulting in a consistent level of vibration isolation
- Down time is reduced on a machine as the Donut Spring can still perform even when slight failure has occurred meaning that production is not stopped
- As the spring is made from rubber and fabric it can be more effective and last longer in more corrosive environments
- There are no moving parts in the Donut Spring so they are maintenance-free
- Size can be an issue when designing a machine so the range of Donut Springs allows a more compact size of spring to carry greater loads

CONSTRUCTION

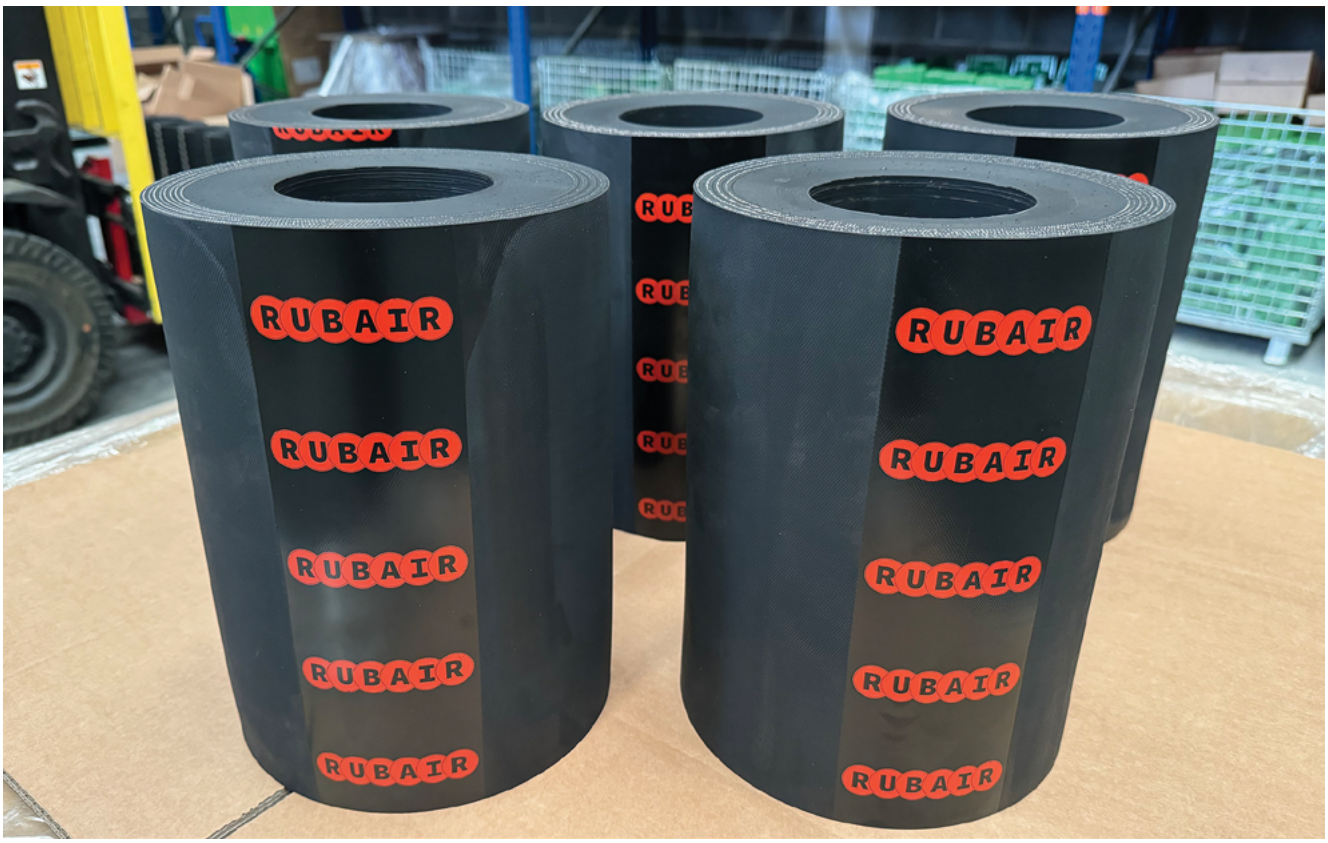
The hollow central part of the Donut Spring can be produced in a number of sizes that allows for a secure fit when attached to a mounting pin. This is essential in a vibration isolation application to ensure the spring remains in the correct location during use.



The rubber core allows the Donut Spring to naturally reduce vibrations. The physical dimensions for this depends on the application and the required force it has to support.

The fabric reinforcement is made up of layers of bias material and gives the Donut it's unique properties and advantages over steel coil springs. This supports the rubber core and allows the spring to support a higher force. The physical properties of the Spring can be altered by the number of layers of fabric and angle that they are plied.

The outer material adds a layer of protection to the Donuts fabric layers. This gives the outer diameter when unloaded and can be altered depending on the application. This layer can also have a logo or brand image attached where requested.



SELECTION PROCEDURE FOR VIBRATION ISOLATION APPLICATIONS

The selection of a Donut Spring is unique to the application, and for known design parameters the 'DONUT SPRING Selection Guide' can be used. For applications where a particular spring is unknown, please request a 'Selection Procedure' questionnaire from us.

There are a number of essential design parameters that must be understood before the correct spring is selected. Firstly, an estimation of the maximum and minimum loads that will occur on each spring. The minimum loading can be calculated by knowing the unloaded weight of the machine or screen deck, and dividing by the number of springs required. (For further information contact the OEM or distributor) The maximum loading weight is the unloaded machine weight, plus the weight of material that the machine will carry.

This information can be used along with the selection guide to choose the most suitable Donut Spring. It is recommended to choose a spring that lies mid-range of the maximum and minimum loads. Ideally the spring should not exceed a deflection of 25% free height. The spring itself can support a load deflection of up to 27.5% of it's free height, but the life capacity and natural frequency will be reduced.

For a vibration isolation application, if more than one spring meets the loading criteria then choose the spring with the lower natural frequency. This will allow for a better isolation percentage.

The reference code to each Donut Spring refers to the dimensions of the spring, for example;

114.050.152 is a 114mm O.D. with an I.D. of 50mm, and a free height of 152mm.

It is important to take these dimensions, along with the stroke and compressed diameter into account when looking at the design parameters for the spring. This is critical in the installation of the spring where it must have a large enough design envelope to increase in diameter during compression, whilst ensuring the stroke does not exceed the maximum the spring can withstand.

INSTALLATION OF DONUT SPRINGS

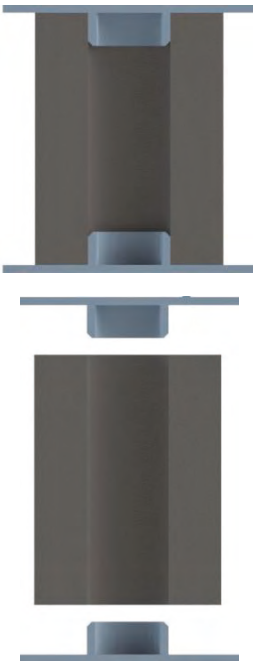
One key advantage of a Donut Spring is the quick and easy installation in a busy working environment. This can save a company vast amounts of money in comparison to failure of a steel coil spring by drastically reducing the downtime.

A Donut Spring uses mounting pins attached to the frame of the machine to locate and maintain the position of the spring during use. The diameter of the pin is equal to the internal diameter of the Donut.

The first step is to correctly choose a Donut Spring from the 'Selection Procedure'. The mounting plates / pins can then be designed specific to the selected Spring. The depth of the pin will vary with certain Donuts, for further information please contact us.

With the spring ready to be installed, the machine can be raised to a height greater than that of the pins and Donut Spring height combined, and the spring set into position. The frame can be lowered carefully into position, ensuring all springs align vertically. This can sometimes require lubrication (water or silicone spray) to avoid damaging the Donut Spring.

It is essential at this point to check the spring height to ensure that it falls within the specification found on the 'Individual Spec. Sheets.' If it does not fall within this range, the wrong spring has been selected. If the height is too large, too much resonance may be experienced during use, and if the height is too low then the springs have been overloaded and may fail prematurely. The machine should be tested during the start-up and shut-down processes 2/3 times to ensure the springs behave in an expected manner.



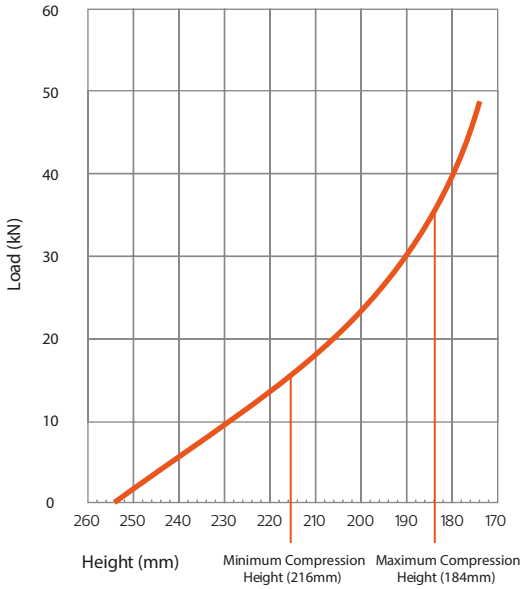
Mounting Pin with Chamfered edge.

WORKING TEMPERATURE

The Donut Springs have a recommended working temperature range of **-40°C to +75°C**. This value represents the actual rubber spring temperature. Higher forced loads or frequencies past the recommended working conditions can cause this to increase.

COMMON SPECIFICATIONS

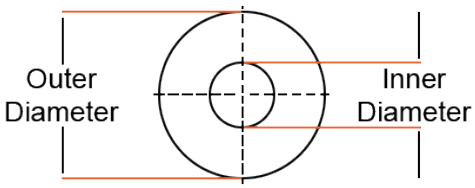
	Unloaded Size			Minimum Loading			Maximum Loading		
Donut Spring	Outside Diameter (mm)	Inside Diameter (mm)	Free Height (mm)	Minimum Loading (kN)	Compressed Height (mm)	Natural Frequency (Hz)	Maximum Loading (kN)	Compressed Height (mm)	Natural Frequency (Hz)
076.025.102	76	25	102	1.88	86	3.99	3.42	76	4.19
089.025.152	89	25	152	2.45	130	3.21	5.03	112	3.28
102.050.152	102	50	152	2.79	130	3.21	5.58	112	3.16
114.050.178	114	50	152	4.74	130	3.37	10.5	112	3.48
114.025.152	114	25	178	6.24	130	3.23	12.29	135	3.34
127.025.178	127	25	178	4.37	152	3.87	14.96	130	4.05
140.050.178	140	50	178	4.86	152	3.78	14.8	130	3.67
152.076.152	152	76	152	7.31	130	3.42	14.75	112	3.31
165.076.203	165	76	203	8.73	173	3.03	22.63	147	3.27
152.025.152	152	25	152	9.99	130	3.9	24.42	112	3.77
191.089.203	191	89	203	13.87	173	2.9	27.9	152	2.99
191.089.254	191	89	254	15.01	216	2.75	29.47	191	2.44
203.050.203	203	50	203	12.58	173	3.85	49	147	3.19

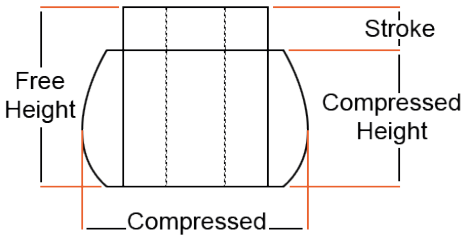


191.089.254 Donut Spring

Compression (%)	15	20	22.5	25	27.5
Load (kN)	15.01	21.74	25.31	29.47	35.61
Height (mm)	216	203	197	191	184
Spring Rate (kN/m)	440	572	672	703	920
Effective Deflection	34	38	38	42	39
Natural Frequency (Hz)	2.71	2.56	2.58	2.44	2.54
Maximum OD (mm)	205	208	211	214	220
Weight (Kg)	6.5				

LOAD REQUIREMENTS





SPRING COVERS

On occasions when Donut Springs are not suitable and using steel coil springs is necessary, we also produce spring covers.

We have developed a cover that will withstand most applications as it uses ozone resistant rubber along with a fabric reinforcement to give longer life.

PROTECTION AGAINST

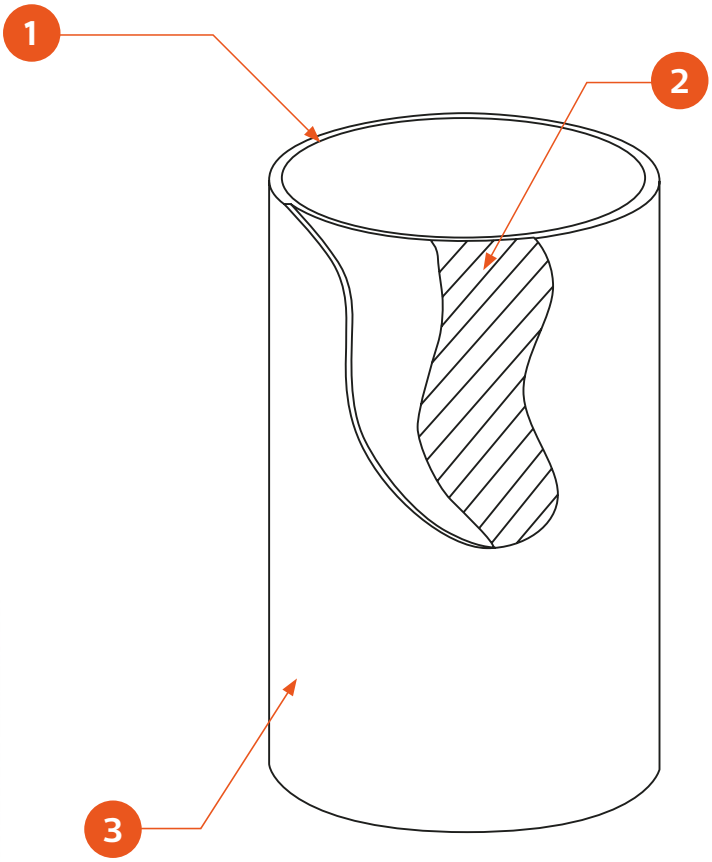
- Corrosive Environments
- Material Blockage
- As well as eliminating dangerous nip points

CUSTOMISATION

We can produce the covers in a wide range of sizes to match the exact springs being used.

On volume orders we can also offer branding and individual part numbers/date coding for identification and traceability.

1. Custom Sizes
2. Fabric Reinforcement
3. Protective Outer Material



RUBBER BUMPERS

Rubber Bumpers have become one of our more popular ranges as it can be used in many applications for antivibration or perhaps as bumper rubber. They are solid rubber springs which act as an anti-vibration mounts and easily work alongside other springs or mountings

Our range for this type of bumper can be quite specific to the customers requirements. We have the capability of creating and working to engineering drawings specific to individual projects, as well as testing and prototyping where required.

Because these products are not injection moulded or compression moulded the tooling costs are reduced significantly and samples can be made in a short period of time. The type of rubber used can be specified by the customer and by using our quality European-based suppliers, we can source most rubber compounds available.

Our range of internal diameters has grown significantly over the last few years and below shows a list of the internal diameters we can work with:

Rubber Bumper Internal Diameters									
12mm	16mm	18mm	20mm	25mm	50mm	76mm	89mm	100mm	110mm
120mm	130mm	150mm	152mm	165mm	185mm	200mm	230mm	235mm	Custom sizes on request

We then can make up the outside diameter to a maximum of 280mm. The maximum length we can produce is approx 850mm which can be cut down to whatever size is required.

The type of rubber used can be specified by the customer and using our quality rubber suppliers, our delivery times are usually very quick. We also don't mind small batch orders.

These types of product are used in a varying range of industries so if you have a specific requirement or need some further information please contact us.

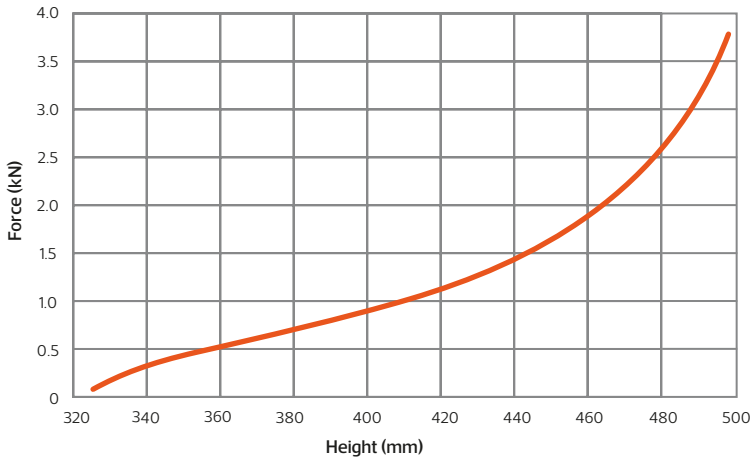
TENSION BANDS

Tension bands are additional products used commonly alongside the Donut Springs.

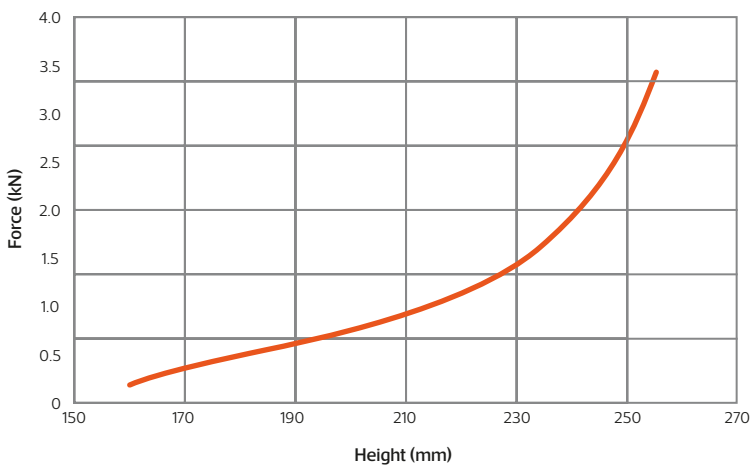
Our tension bands are additional products used commonly alongside the Donut Springs to give extra stability in applications such as inclined screens or where the screen has an off-mounted pivot motor. They can also be used in other applications to allow lateral movement but provide tension.

We currently offer two sizes, the TB-230-250 and the TB-110-130.

TB-230-250			
Extension (%)	110	120	130
Load (kN)	0.78	1.22	1.67
Height (mm)	391	427	462
Spring Rate (kN/m)	12	13	16
Effective Deflection (mm)	65	94	104
Natural Frequency (Hz)	1.98	1.63	1.55



TB-110-130			
Extension (%)	110	120	130
Load (kN)	0.61	0.89	1.27
Height (mm)	182	198	215
Spring Rate (kN/m)	18	17	24
Effective Deflection (mm)	34	52	53
Natural Frequency (Hz)	2.72	2.19	2.17



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