

**CV/LF and CV/CF  
TICO Structural Bearings**



## TICO CV/LF and TICO CV/CF

Isolation of vibrations from one part of a building to another is as equally important as isolating the whole building itself. Indeed, in many cases, isolating key parts of the structure internally is often more practical, convenient and economical than isolating the whole building at foundation level.

TICO low stress, low frequency bearings - TICO CV/LF and TICO CV/CF - have been designed specifically for total or partial support of all types of internal structures such as anechoic chambers, recording studios, floating floors, theatre stages and any other structures where quiet is of paramount importance.

There are two types of bearing available, each type in two different grades - four options in total which cater for virtually any application of this type.

TICO CV/LF bearings have been used and proved extensively for many years in widely varying structural applications. They form one of the cornerstones of the TICO Structural Bearing product range; with natural frequencies of less than 7 Hz they give excellent performance.

TICO CV/CF bearings are a new generation of low frequency bearing taking the exceptional performance of our TICO CV/LF bearings a leap forward. Being able to achieve natural frequencies of 5 - 6 Hz these bearings provide the highest isolation for critical applications without resorting to springs. Available for the first time in sheet form, these bearings provide a wealth of design possibilities.

TICO CV/LF and TICO CV/CF bearings are dimensionally stable under widely varying atmospheric conditions. The high quality constituents used in manufacture will render them durable and age resistant over many decades with a total load bearing life expectancy well in excess of the normal working life of the building.



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CV/LF CV/CF  
CVF-050606

TICO CV/LF and TICO CV/CF can be used in plied up layers to give even better performance. However we strongly suggest contacting our Technical Department when considering such options as thicker bearings can lead to instability within a structure which may need to be addressed with some form of reinforcement or restraint.

The incorporation of resilient structural bearings into a structure has to be considered at an early design stage to enable a safe, effective and economical system to be engineered. Detailing such systems late in the construction process can cause major complications and in some instances may simply not be feasible. It is Tiflex' custom to work closely with consultants, engineers and other authorised bodies throughout the design and build process to ensure that we provide a bearing solution best suited to each individual application.

## Installation

TICO CV/LF and TICO CV/CF bearings have specially prepared bonding surfaces which allow them to be bonded to concrete, steel, wood and other substrates simply with Tiflex Marine Epoxy or Tiflex Contact S Adhesive. It is generally only necessary to bond the underside of the pad to the structure, making installation as simple as possible.

Good surface preparation is essential for a strong and durable bond. Surfaces onto which the bearing is to be placed, and surfaces mating with the upper surface of the pad, should be clean and as level as possible. Although bearings have been designed to take up some surface irregularity, out of plane mating surfaces can produce excessive stresses on the pads and impair their performance. Where possible the guidance of BS6177:1982 should be followed, in particular section 4.6 regarding bearing support surfaces.

Pre-cast structures such as concrete planks may be placed directly on top of bearings or concrete may also be cast directly on the bearings. In this case a suitable void filler should be employed between the pads, e.g. polythene covered mineral wool or TICO VF/PA Void Filler. In some cases a permanent shuttering can be employed such as a marine ply board or steel plate.

In all cases any joints should be sealed with a waterproof tape such as TICO A/ST Sealing Tape, to prevent the ingress of wet concrete which can cause noise and vibration leak paths.

## Storage and Handling

On arrival at site, TICO Structural Bearings should be stored away from direct sunlight, excessive heat, chemicals or any liquid media. They should be kept in a safe, secure location where they are unlikely to be damaged or tampered with, become immersed in water, or have other building materials stacked on top of them.

Bearings should be handled with care during installation to ensure that they are not dropped or in any other way damaged. Damaged bearings should never be incorporated in the works and should be brought to the attention of the resident engineer or consultant.

On no account should welding be carried out on, or next to a bearing either before or after manufacture.

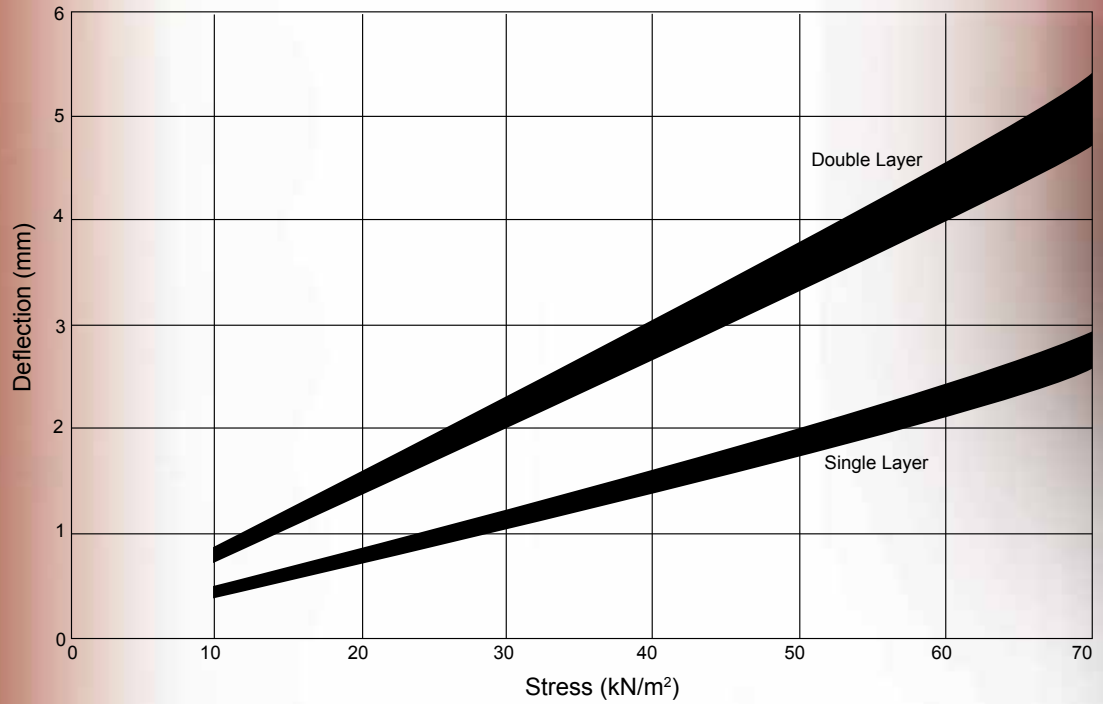
Safe Handling data sheets are available for TICO CV/LF and CV/CF bearings on request.



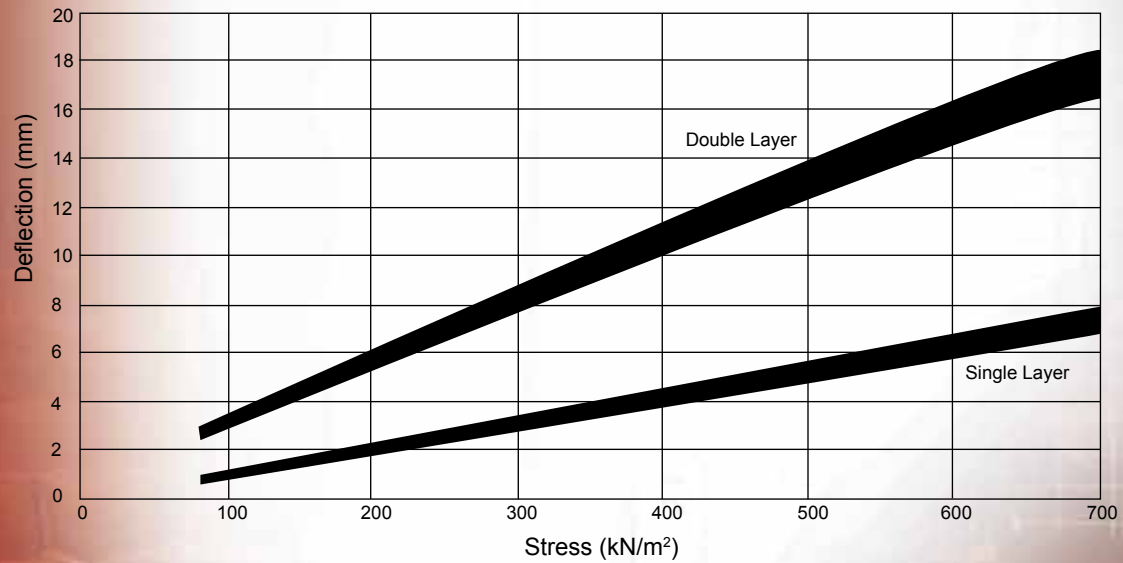
## Bearing Stress vs Static Deflection

These graphs have been prepared from the results of extensive testing over many years. Where appropriate, data has been presented in the form of a shadow graph to illustrate the effect of shape factor on performance of the pads. All data is presented for guidance only.

Stress/Deflection Characteristics TICO CV/LF/B

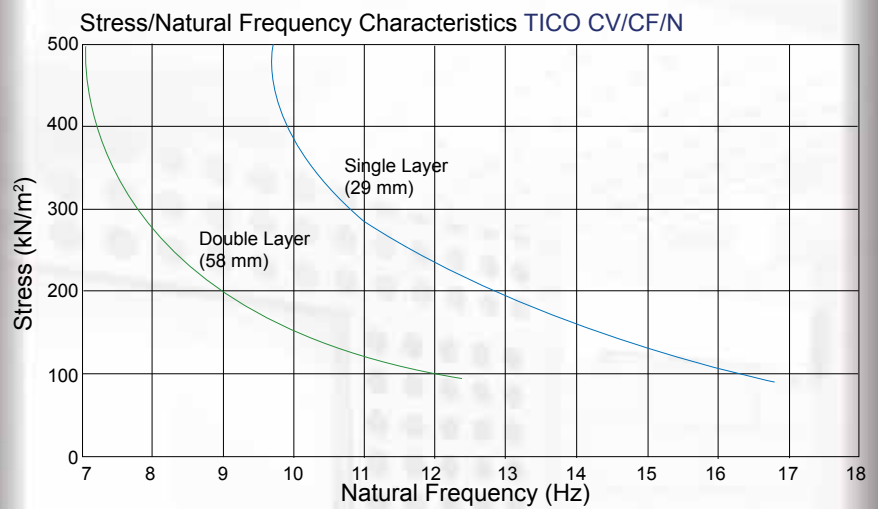
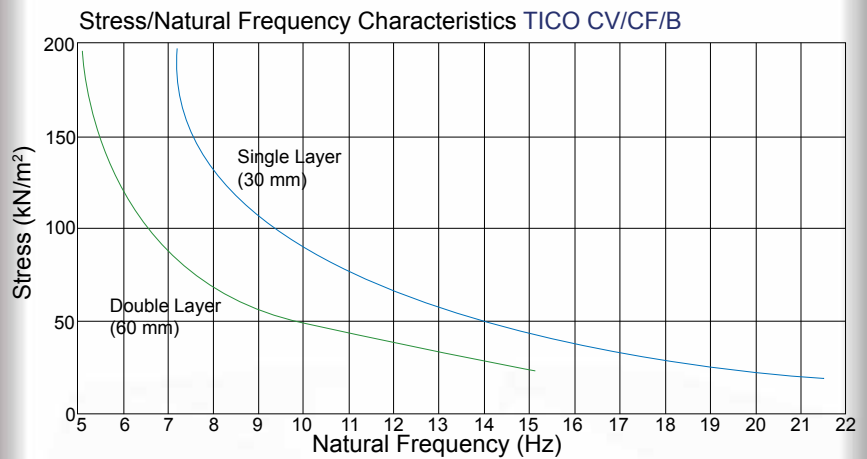


Stress/Deflection Characteristics TICO CV/LF/N

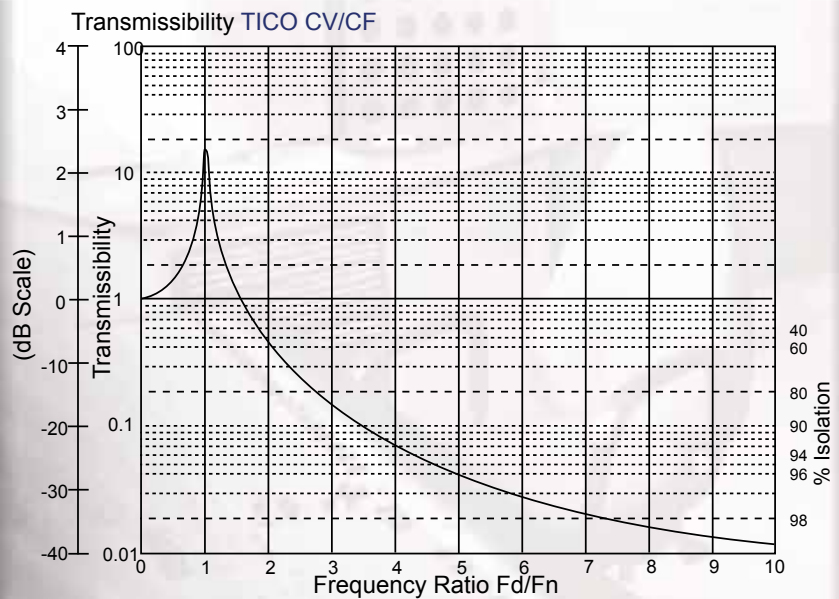


## Bearing Stress vs Natural Frequency

TICO CV/CF/B and TICO CV/CF/N bearing pads may be successfully employed at stresses in excess of the recommended maximum. However, please consult our Technical Department for advice prior to specification or use.



## Transmissibility



## Design Considerations

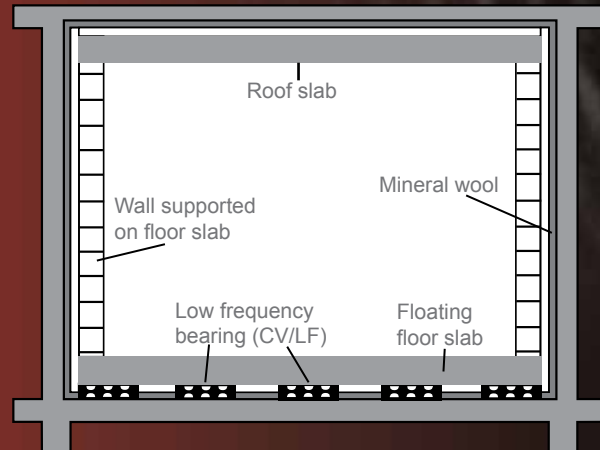
Key parameters in the specification of TICO CV/CF and CV/LF bearings are:

- Operating loads (dead load and live loads)
- Available space to incorporate bearings (for example area of a floating floor)
- Required natural frequency of isolation system (bearings)
- Disturbing frequency of vibration to be isolated (if known)

The load and available area will largely determine the plan dimensions and configuration of bearings, whereas the required natural frequency or disturbing frequency will strongly influence the bearing thickness. The interdependence of these parameters is indicated in the graphs in the previous section.

TICO CV/LF and TICO CV/CF bearings are most frequently employed in pad form, typically 100 to 150 mm square, in modular configurations to provide adequate support for larger areas of structure.

A typical application would be a floating floor which may be part of a room within a room construction for example, where the pads isolate the internal room from an outer shell incorporated in part of a larger structure, e.g. a recording studio.



In these instances pads are commonly laid out in a grid-like fashion with pads spaced evenly apart (for a uniformly distributed load).



The number of pads are calculated, taking into account the rigidity of the overlying floor, to ensure that under the applied load they are stressed sufficiently to achieve the design natural frequency.

TICO CV/LF and TICO CV/CF pads are also suited for use in strip form, for example to support heavy walls or pre-cast plank floors.

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CV/LF CV/CF  
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## TICO CV/LF- Low Frequency Bearings

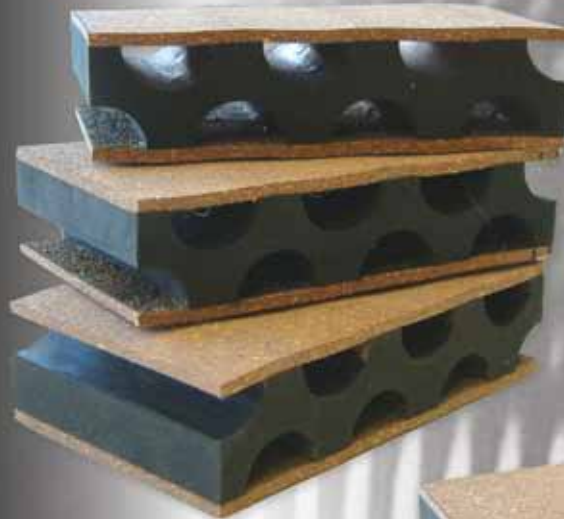
TICO CV/LF bearings comprise a specially moulded central layer of highest quality neoprene in a fluted configuration sandwiched between two flat face plies of a cork loaded neoprene composite material that facilitates bonding of the bearing on-site with adhesive.

There are two grades of TICO CV/LF available:

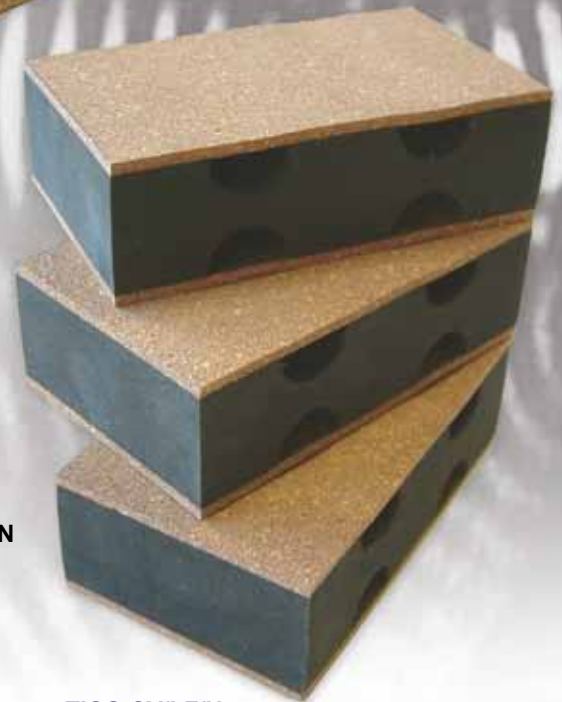
- TICO CV/LF/B**  
For stresses up to 70 kN/m<sup>2</sup>
- TICO CV/LF/N**  
For stresses up to 700 kN/m<sup>2</sup>

Both materials are supplied as standard in a single layer configuration which can be doubled up to provide enhanced performance.

With appropriate configurations isolation system natural frequencies of less than 10 Hz can be achieved using these materials.



**TICO CV/LF/B**



**TICO CV/LF/N**

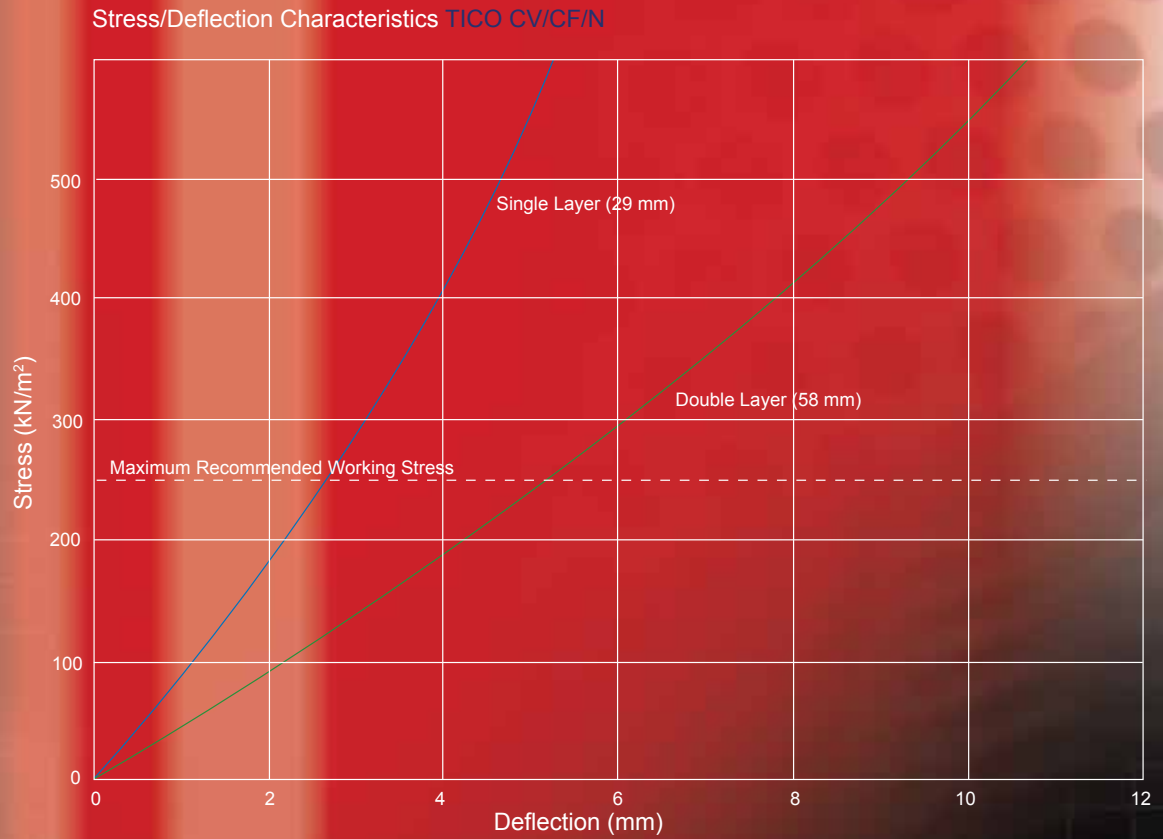
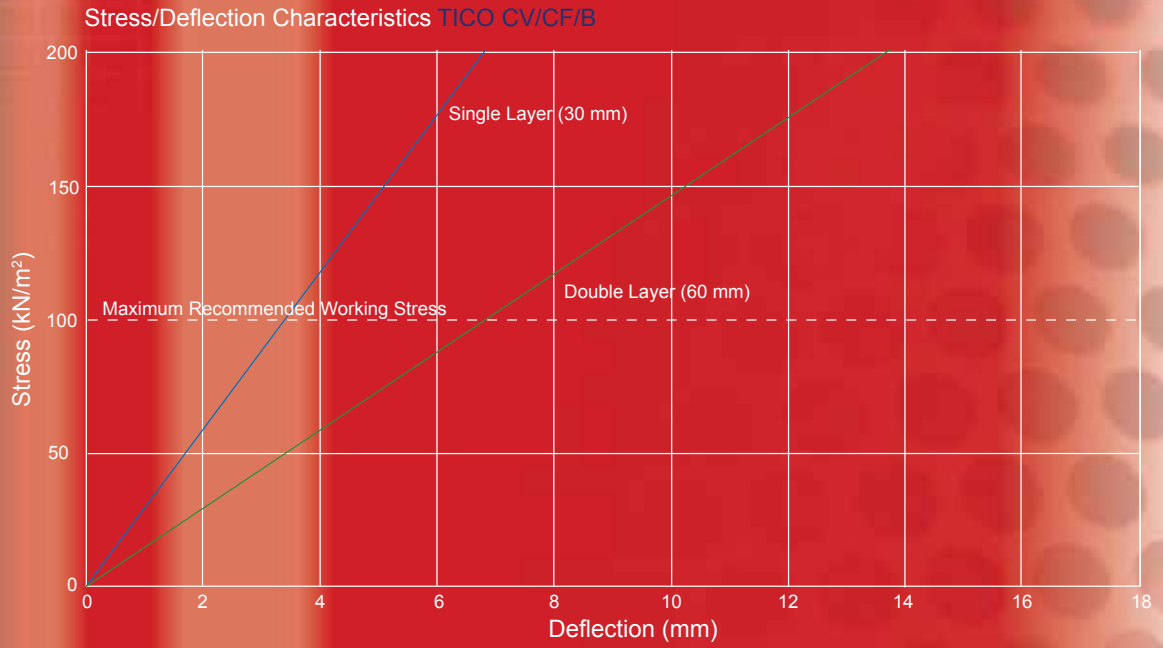
	<b>TICO CV/LF/B</b>	<b>TICO CV/LF/N</b>
Maximum Recommended Working Stress	70 kN/m <sup>2</sup>	700 kN/m <sup>2</sup>
Working Stress Range	40-70 kN/m <sup>2</sup>	350-700 kN/m <sup>2</sup>
Breakdown	In excess of 3 times the maximum recommended working stress (in accordance with BS6177)	
Hardness (IRHD)	40 ± 3	40 ± 3
Density (Typical)	1050 kg/m <sup>3</sup>	1050 kg/m <sup>3</sup>
Temperature Range	-30 to +70°C Performance of bearing may be impaired at extremes of durable temperature range.	-30 to +70°C Performance of bearing may be impaired at extremes of durable temperature range.
Typical Damping Ratio	0.06 to 0.085	0.06 to 0.085



# TICO CV/CF- Critical Frequency Bearings

TICO CV/CF/B and TICO CV/CF/N bearing pads may be successfully employed at stresses in excess of the recommended maximum. However, please consult our Technical Department for advice prior to specification or use.

## Bearing Stress vs Static Deflection



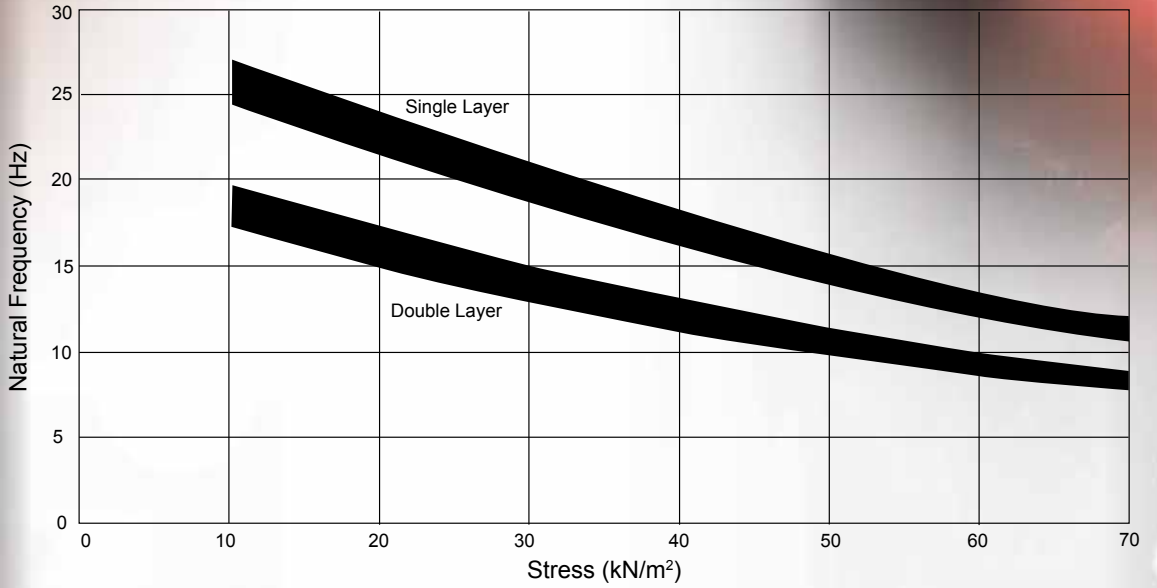
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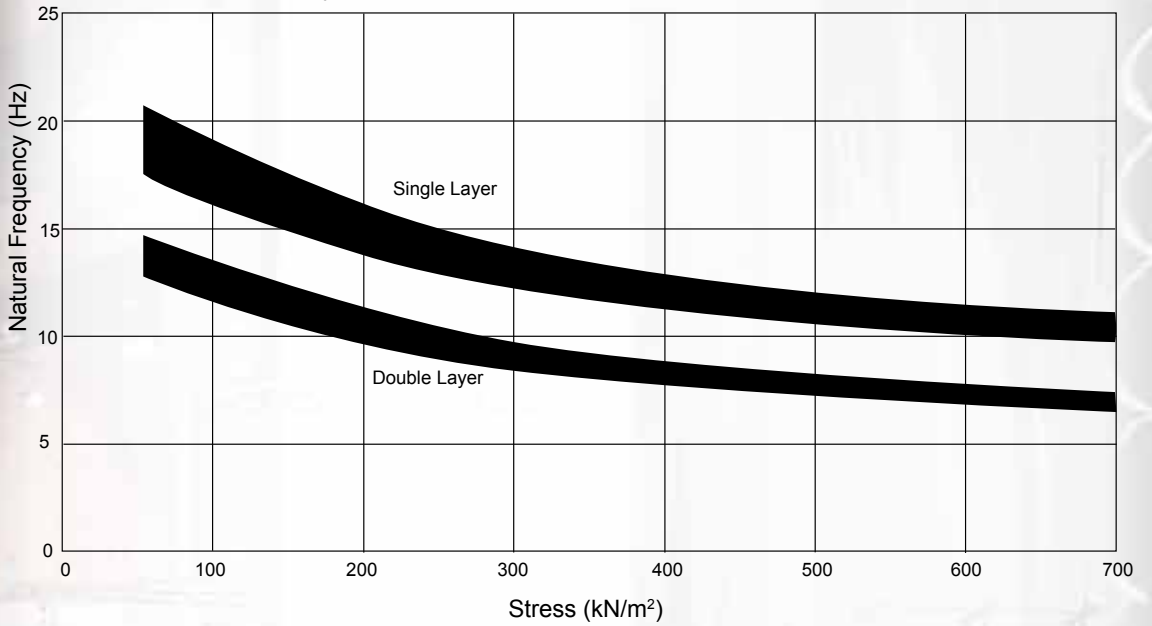
## Bearing Stress vs Natural Frequency

These graphs have been prepared from the results of extensive testing over many years. Where appropriate, data has been presented in the form of a shadow graph to illustrate the effect of shape factor on performance of the pads. All data is presented for guidance only.

Stress/Natural Frequency Characteristics TICO CV/LF/B



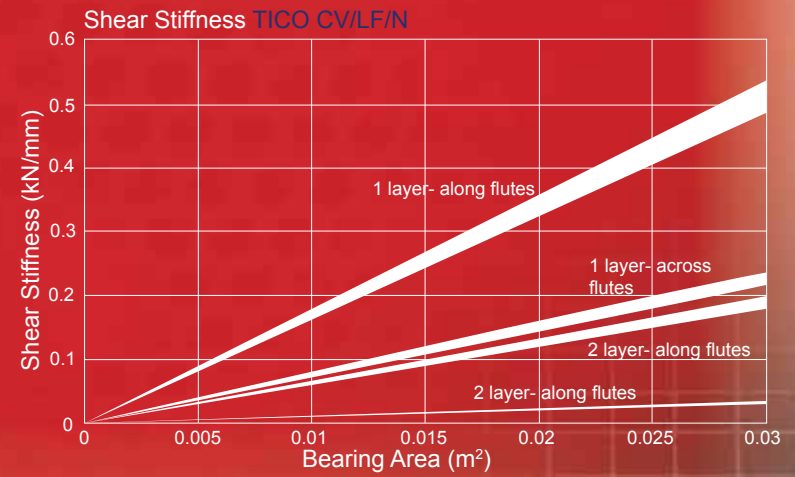
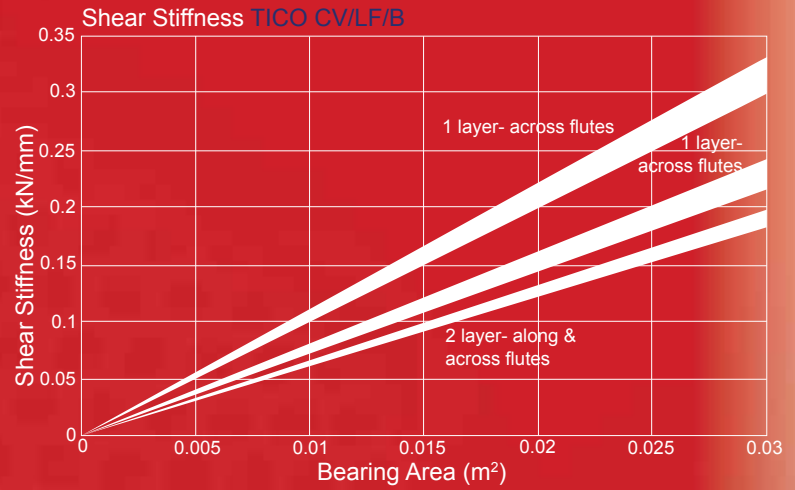
Stress/Natural Frequency Characteristics TICO CV/LF/N



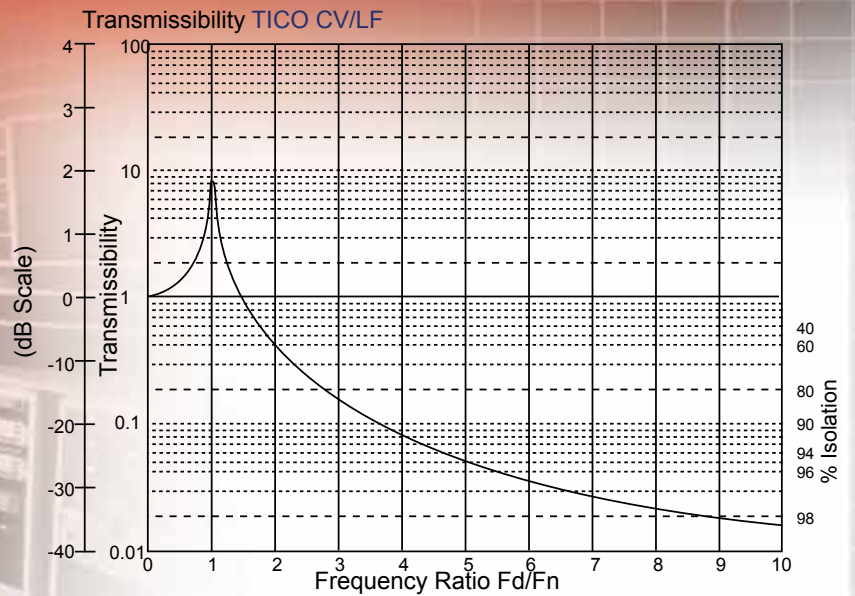
# TICO CV/LF- Low Frequency Bearings



## Shear Properties



## Transmissibility



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## TICO CV/CF- Critical Frequency Bearings

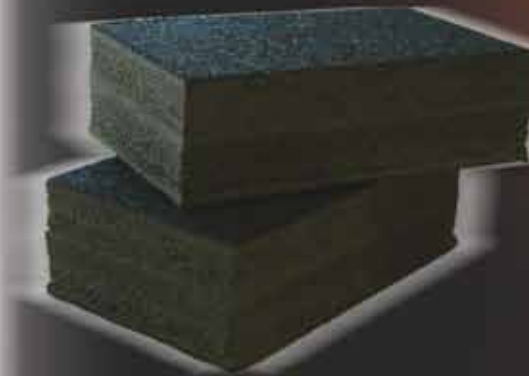
TICO CV/CF bearings are natural rubber based micro-cellular materials with high tensile geotextile upper and lower surfaces which protect the bearing surface, facilitate bonding and accommodate small surface irregularities.

TICO CV/CF bearings, unlike TICO CV/LF, are manufactured in sheet form and can be cut to virtually any size within the maximum sheet dimensions of 1000 x 1000 mm. They offer greater flexibility of design and, in addition, the excellent properties of natural rubber allow TICO CV/CF pads to achieve natural frequencies of less than 8 Hz in appropriate configurations. Consequently these materials can be employed to provide the ultimate noise free environment.

Two grades of TICO CV/CF are available:

- TICO CV/CF/B**  
For stresses up to 100 kN/m<sup>2</sup>
- TICO CV/CF/N**  
For stresses up to 250 kN/m<sup>2</sup>

	<b>TICO CV/CF/B</b>	<b>TICO CV/CF/N</b>
Maximum Recommended Working Stress	100 kN/m <sup>2</sup>	250 kN/m <sup>2</sup>
Working Stress Range	25-100 kN/m <sup>2</sup>	100-250 kN/m <sup>2</sup>
Breakdown	In excess of 3 times the maximum recommended working stress (in accordance with BS6177)	
Weight	~14 kg/m <sup>2</sup> (30 mm thick)	~20 kg/m <sup>2</sup> (29 mm thick)
Density (Typical)	470 kg/m <sup>3</sup>	740 kg/m <sup>3</sup>
Temperature Range	-40 to +70°C	-40 to +70°C
Typical Damping Ratio	0.022	0.038



Both materials are supplied as standard in a single layer configuration which can be doubled up to provide enhanced performance.



## Supply Details

TICO CV/LF and TICO CV/CF bearings are available in a range of standard sizes as follows:

	Length (mm)	Width (mm)	Thicknesses
<b>TICO CV/LF/B</b>	150	150	25 mm (single layer)
<b>TICO CV/LF/N</b>	150	150	32 mm (single layer)

TICO CV/LF bearings can be supplied in single units up to a maximum of 600 x 150 mm. Each grade of CV/LF is also available in multiples of standard thicknesses, e.g. a double layer CV/LF/B pad is 50 mm thick and similarly a double layer CV/LF/N pad is 64 mm thick.

	Length (mm)	Width (mm)	Thicknesses (mm)
<b>TICO CV/CF/B</b>	100	100	30
	150	150	30
	250	250	30
	500	500	30
	1000	50	30
	1000	100	30
	1000	250	30
	1000	500	30
	1000	1000	30
<b>TICO CV/CF/N</b>	100	100	29
	150	150	29
	250	250	29
	500	500	29
	1000	50	29
	1000	100	29
	1000	250	29
	1000	500	29
	1000	1000	29

TICO CV/CF bearings can be supplied in single units up to a maximum of 1000 x 1000 mm. Each grade of CV/CF is also available in multiples of standard thicknesses e.g. a double layer CV/CF/B pad is 60 mm thick and similarly a double layer CV/CF/N pad is 58 mm thick.

Tiflex recognises that in civil applications bearings often have to be custom sizes to meet the project requirements and thus we are happy to supply custom sizes up to the maximum sheet size available.

Please contact our customer services department with full details of your requirements for a free written quotation. Our Technical Department will also be pleased to assist you in determining your exact bearing requirements.

All TICO materials are manufactured in accordance with BS EN ISO 9001: 2000



Uniclass L31:N14	EPIC C215
C/SIB	
(29)	X

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a member of the  
**James Walker**  
Group