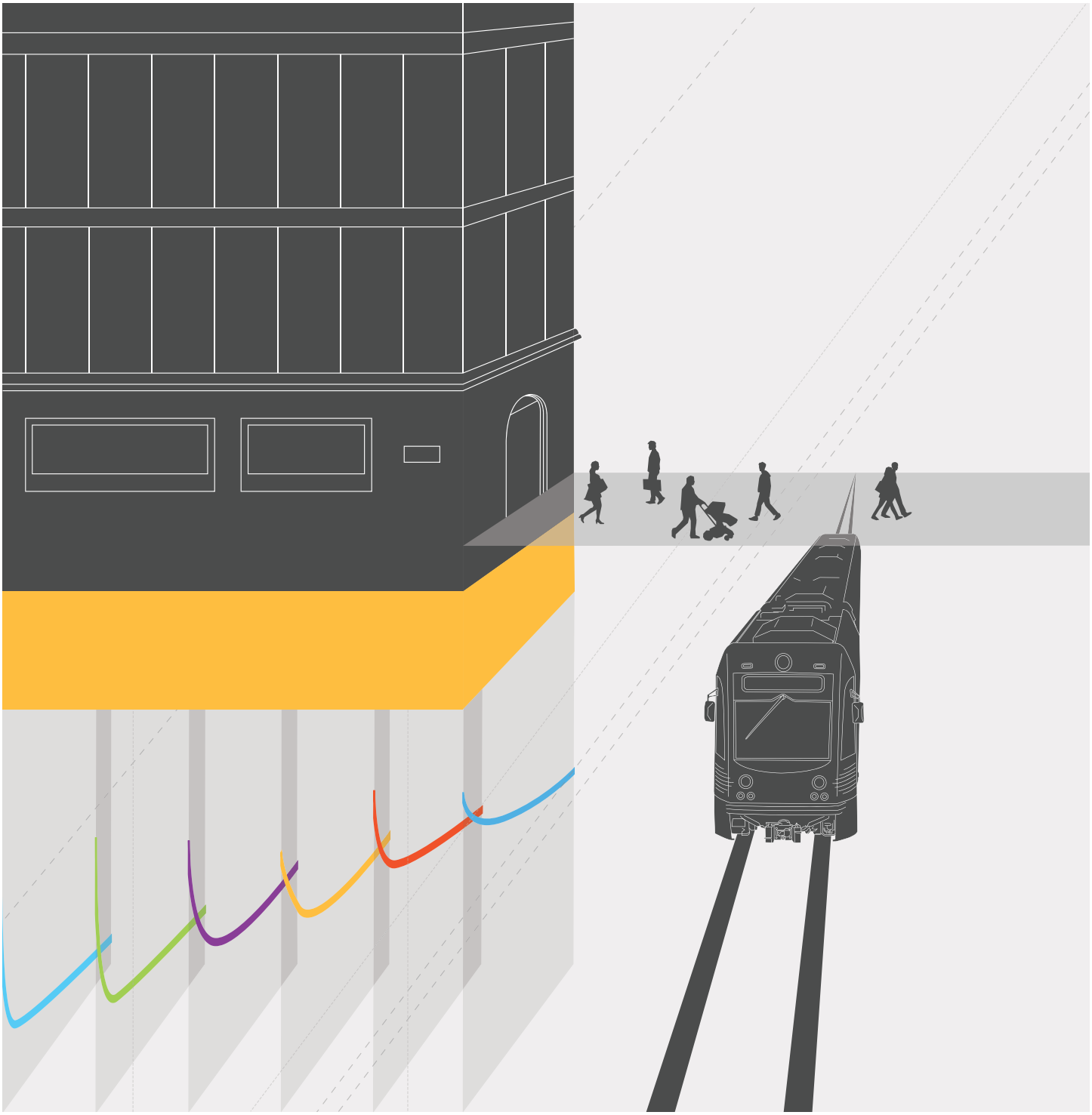


GenieMat® GBV

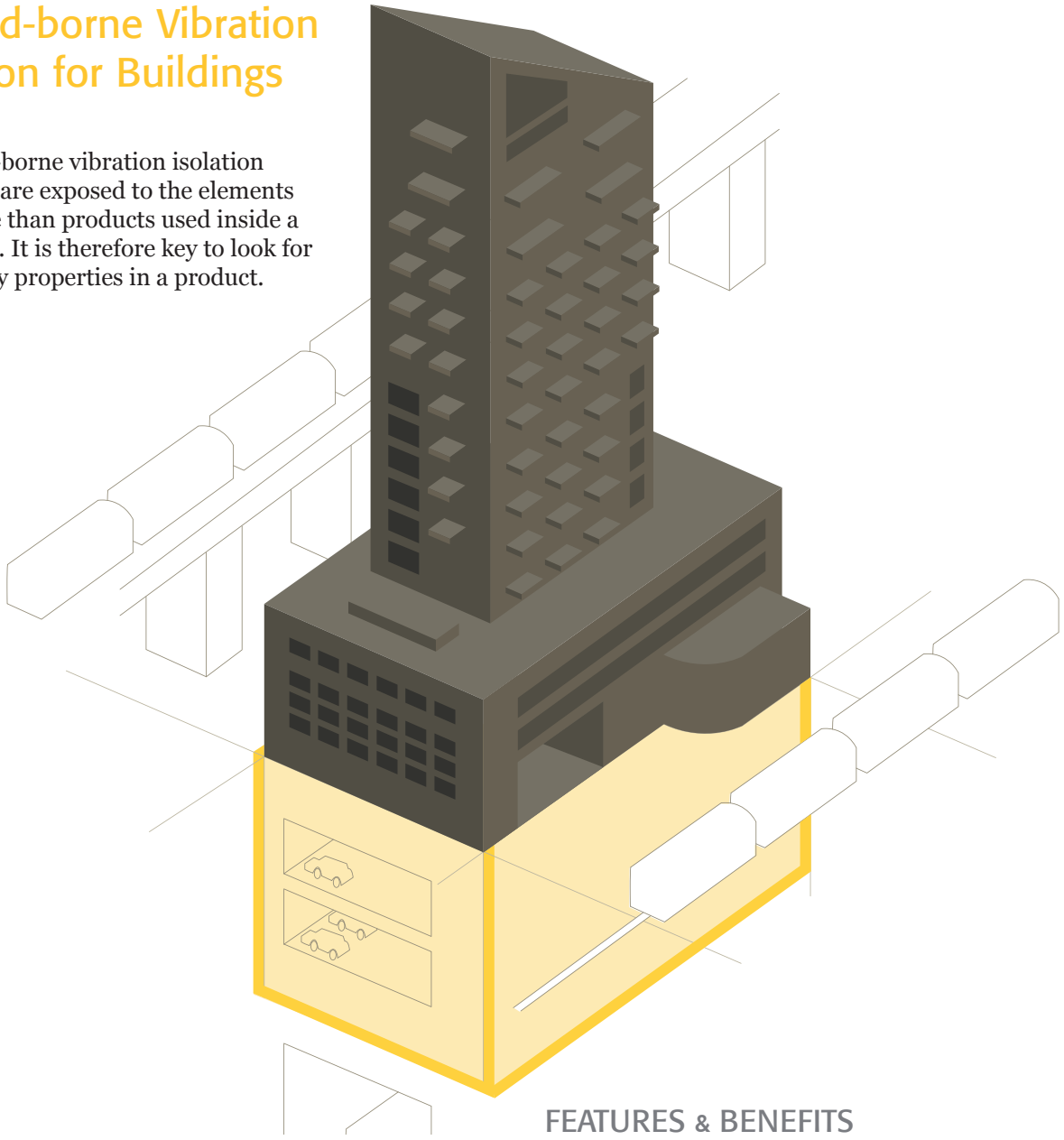
GROUND-BORNE VIBRATION
ISOLATION FOR BUILDINGS

PLITEQ®

GenieMat® GBV

Ground-borne Vibration Isolation for Buildings

Ground-borne vibration isolation systems are exposed to the elements far more than products used inside a building. It is therefore key to look for some key properties in a product.

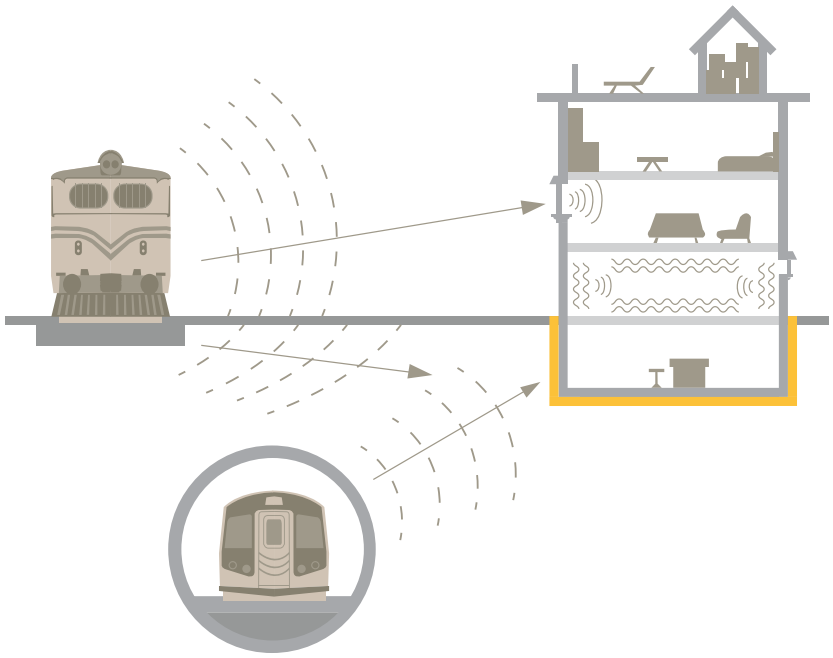


FEATURES & BENEFITS

- Dynamically soft for excellent vibration isolation
- Mold, bacteria, fungi, and water resistant
- No potential mold-producing fiberglass
- Will not break down or move under load
- Easy to install

GROUND-BORNE VIBRATION ISOLATION FOR BUILDINGS

As cities continue to grow exponentially, the ability to successfully develop adjacent to rail infrastructure has become project critical. Depending on the construction and use type of the building, these sensitive adjacencies open a potential avenue for increased tenant turnover. Since every building is unique, it is necessary to engage expert acoustic consultants to design ground-borne vibration isolation systems using **Pliteq's GenieMat GBV**.



DOES MY BUILDING NEED GROUND-BORNE VIBRATION IMPACT ASSESSMENT?

The Federal Transit Administration's Transit Noise and Vibration Impact Assessment Manual requires engaging an expert acoustic consultant if your building meets the following proximity criteria:

Building Use Type	Screening Distance from Property Line*	
	Commuter Rail Road	LRT & Streetcars
Special-Use Facilities : Buildings sensitive to vibration which require special consideration. Examples: concert halls, theaters, TV & recording studios.	Special care required on a case by case basis.	
High Sensitivity: Buildings with machinery that is highly sensitive to vibration. Examples: research facilities, manufacturing facilities, hospitals.	600 feet	450 feet
Residential: All residential construction where people normally sleep. Examples: Apartments, condominiums, town homes, developments.	200 feet	150 feet
Institutional: Includes all institutions and offices where vibration can interfere with activity. Examples: schools, churches, offices.	120 feet	100 feet

*These screening distances should identify the majority of potentially impacted buildings, however, areas with a history of problems with ground-borne vibration should increase the above distances by a factor of 1.5.

OTHER FACTORS AFFECTING GROUND-BORNE VIBRATION TRANSMISSION

SOIL & FOUNDATION TYPES

Geological conditions are important; the stiffer the soil, the higher the vibration levels. It is generally accepted that vibration levels are higher in stiff clay-type soils than in loose sandy soil. In this same manner, vibration levels do not attenuate as rapidly in rock as they do in soil.

TYPES OF CONSTRUCTION:

Each building responds differently to vibration, but it is typical for lighter buildings to be most sensitive to ground-borne vibration. Each component in the building will have a resonant frequency at which the maximum vibration amplitudes occur.

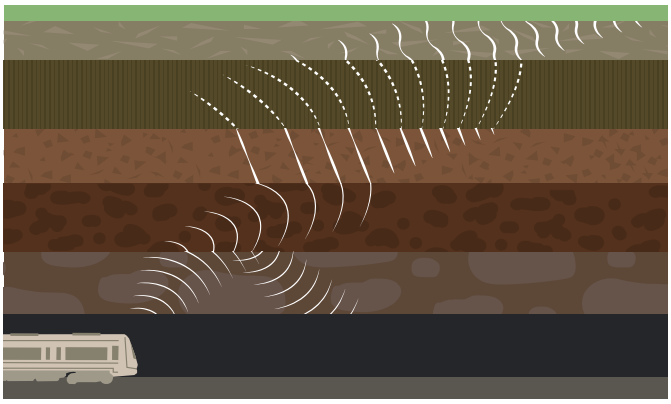


Figure 1: The dynamic properties of differing layers of soil can have an impact on how vibration propagates from an underground source to a building.

ADDING PERSPECTIVE TO TYPICAL LEVELS OF VIBRATION

*RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second

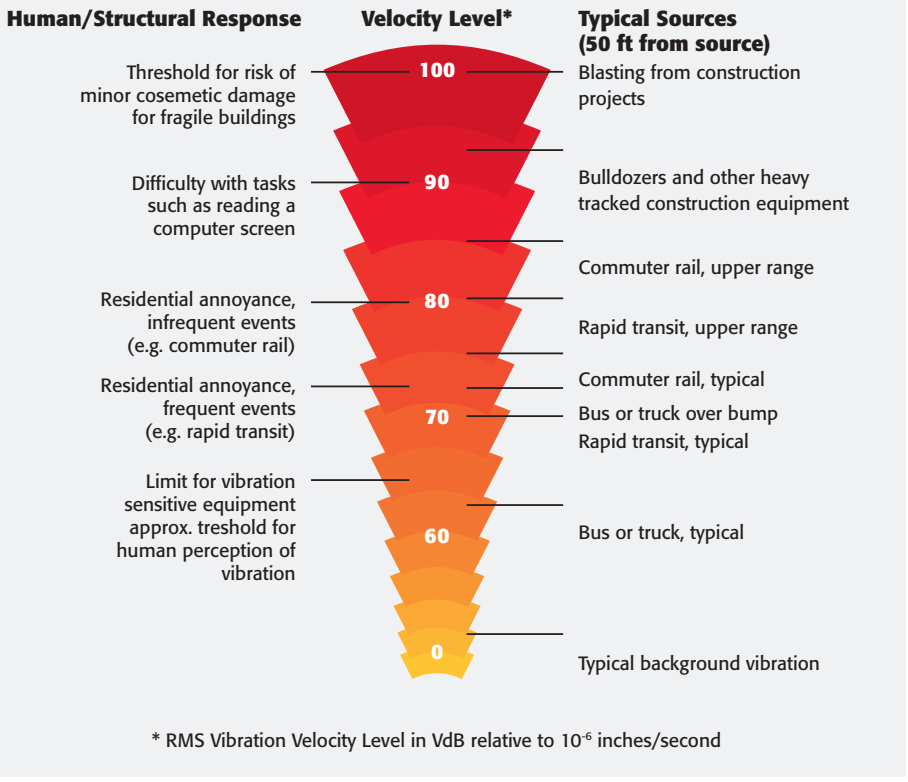


Figure 2: Subjective vibration levels with context provided by the FTA's transit Noise and Vibration Impact Assessment Manual.

GenieMat® GBV

Typical Construction Details for Ground-borne Vibration

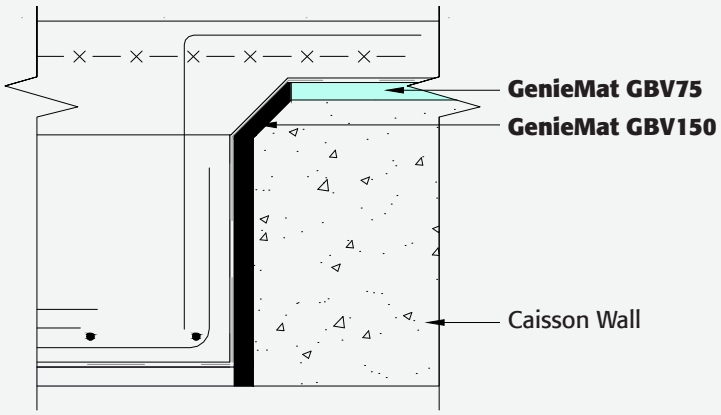


Figure 3: Caisson Wall Isolation

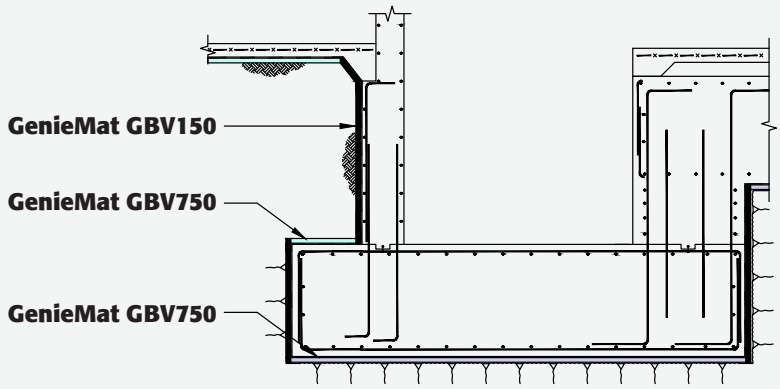


Figure 4: Raft slab isolation

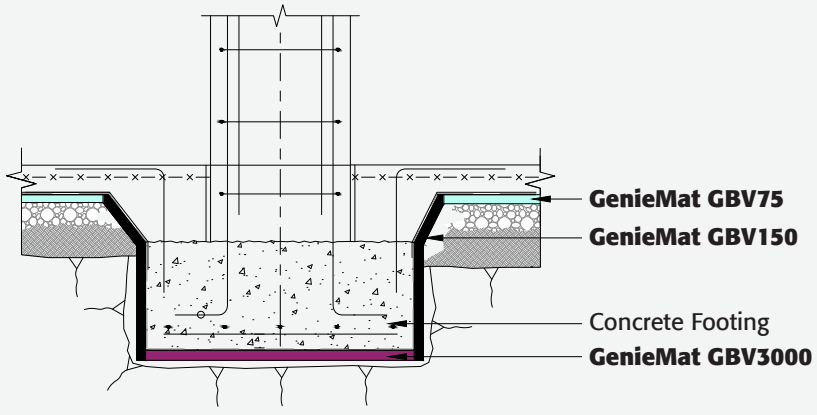


Figure 5: Concrete Footing Isolation

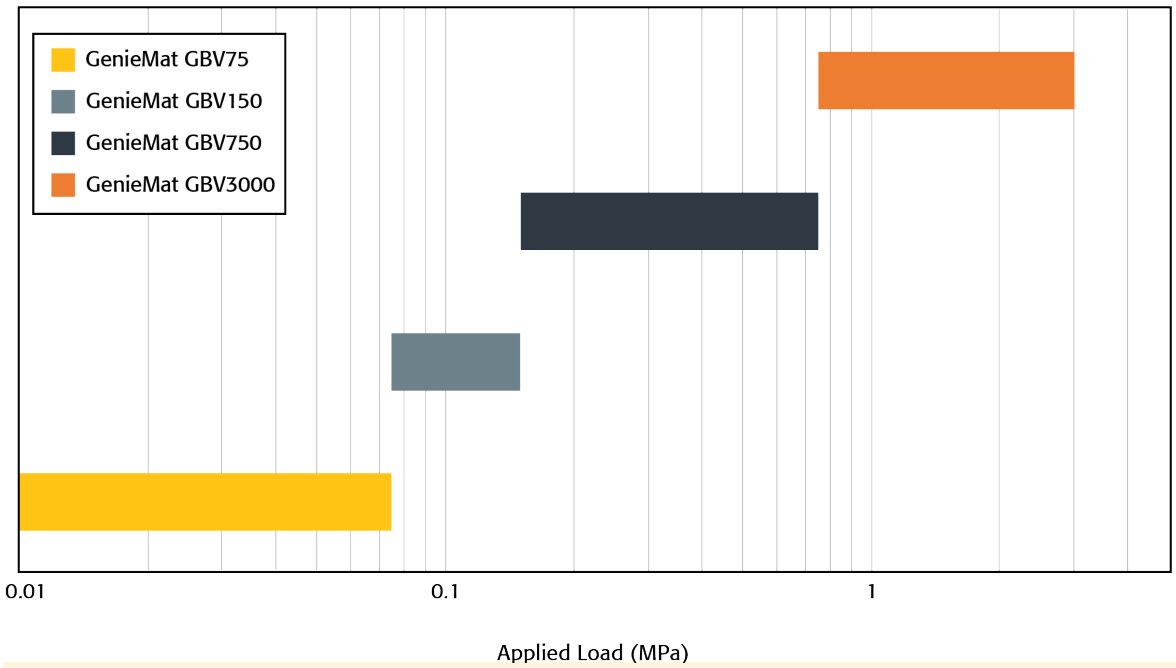
NOTE: Project conditions and loads will vary.

GENIEMAT® GBV75

Ground-Borne Vibration Isolation

It's not magic, it's engineering.®

PRODUCT RANGE



PRODUCT SPECIFICATIONS

PRODUCT NAME	GenieMat GBV75
DESCRIPTION	Dynamically soft rebonded-rubber material capable of withstanding high loads. Used in a variety of applications when superior vibration mitigation is required.
THICKNESS	50 mm (2 layers of 25 mm)
OPERATING LOAD LIMIT	Suitable for loads up to 75 kPa
FEATURES & BENEFITS	• Dynamically soft for excellent vibration isolation • Mold, bacteria, fungi, and water resistant • Resistant to long-term creep, deflects uniformly over time • Will not break down or move under load • Easy to install
DIMENSION	Rolls: 1220 mm x 4575 mm (4' x 15')
SHEET AREA	5.56 m^2 (60 ft^2)
LEAD TIME	4 weeks after receipt of order

GENIEMAT® GBV75

Ground-Borne Vibration Isolation

TECHNICAL DATA	
OPERATING LOAD LIMIT	Suitable for loads up to 75 kPa
PEAK LOAD LIMIT **(infrequent short term loads)**	500 kPa
MECHANICAL LOSS FACTOR	0.15*
TEMPERATURE STABILITY	-40°C to +80°C (-40°F to +176°F)
THERMAL CONDUCTIVITY	0.13 W/m °C
R-VALUE @ 2”	2.1 ft^2 h °F/Btu

OPERATING LOAD DATA	0.05 MPa LOADING
NATURAL FREQUENCY	13 Hz
30 Hz DYNAMIC MODULUS	1.9 MPa

* Load and frequency dependent

GenieMat® GBV75

Ground-Borne Vibration Isolation

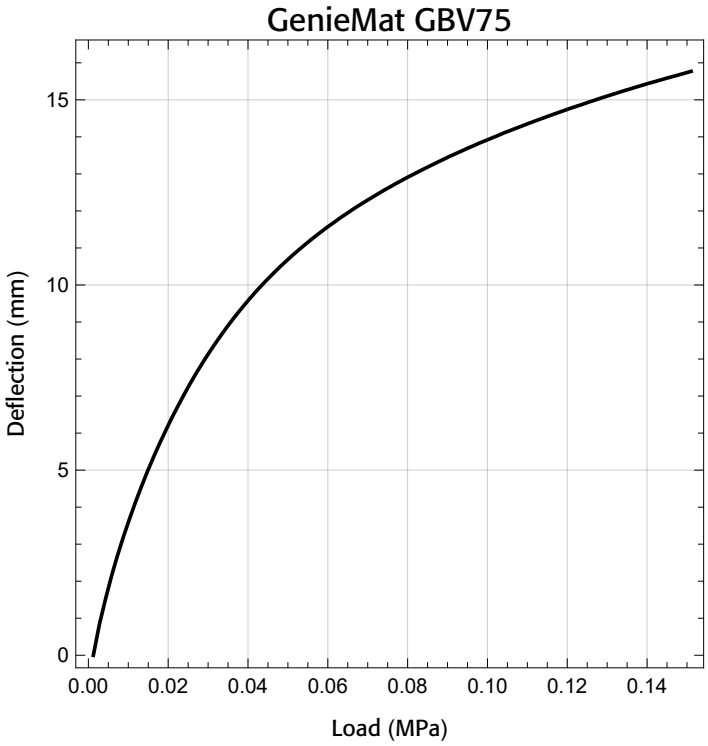


Fig. 1: Applied Load vs Deflection

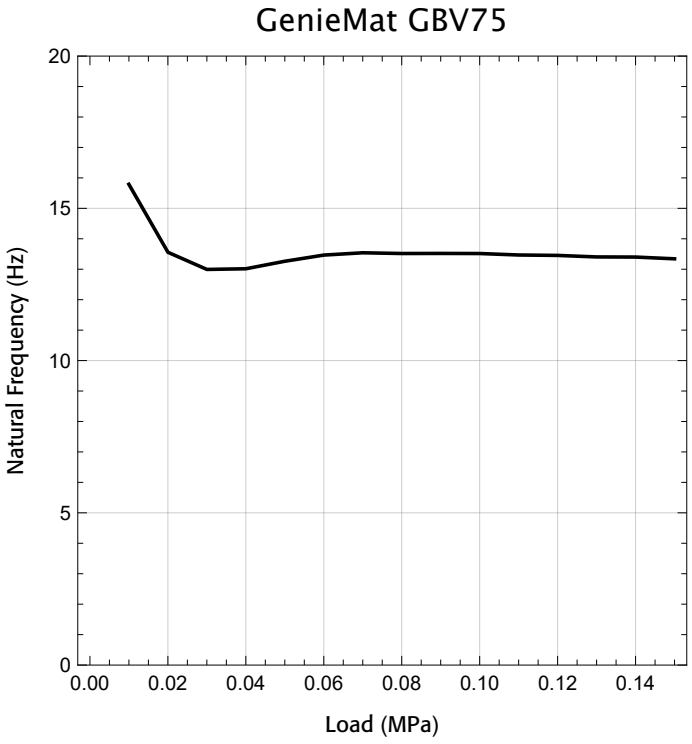


Fig. 2: Load vs Natural Frequency

GENIEMAT® GBV75

Ground-Borne Vibration Isolation

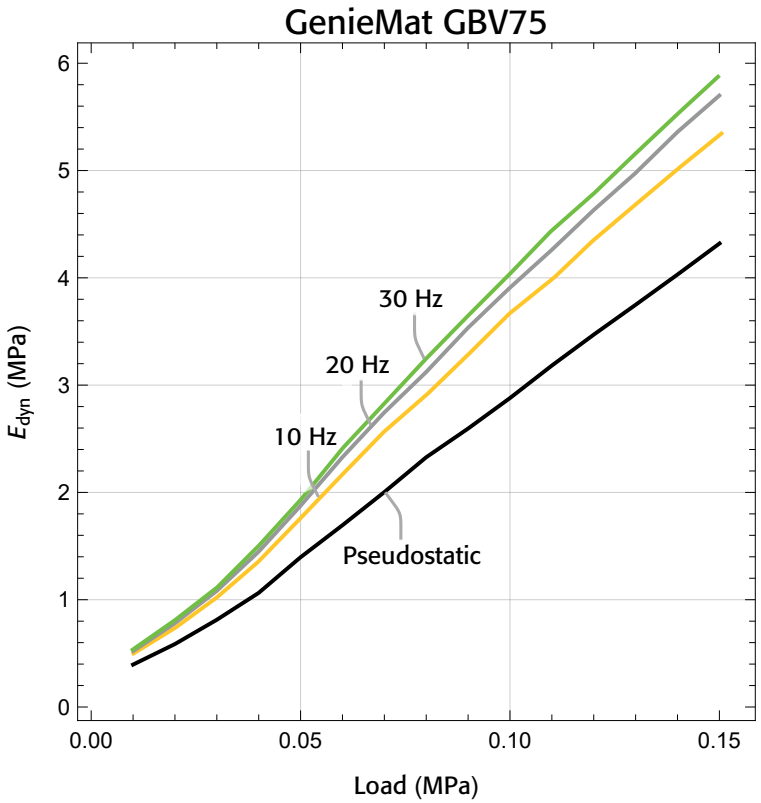


Fig. 3: Applied Load vs Dynamic Modulus

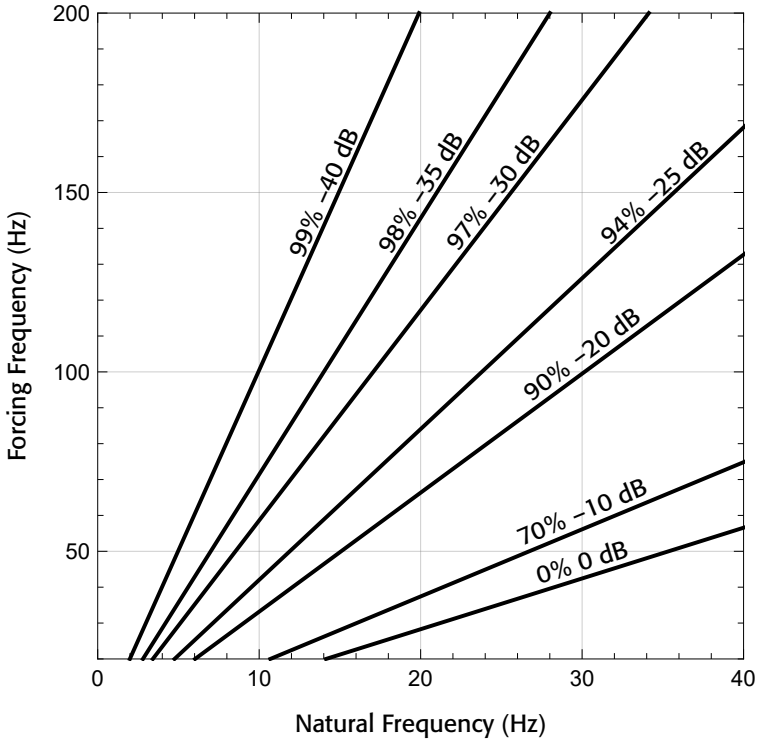


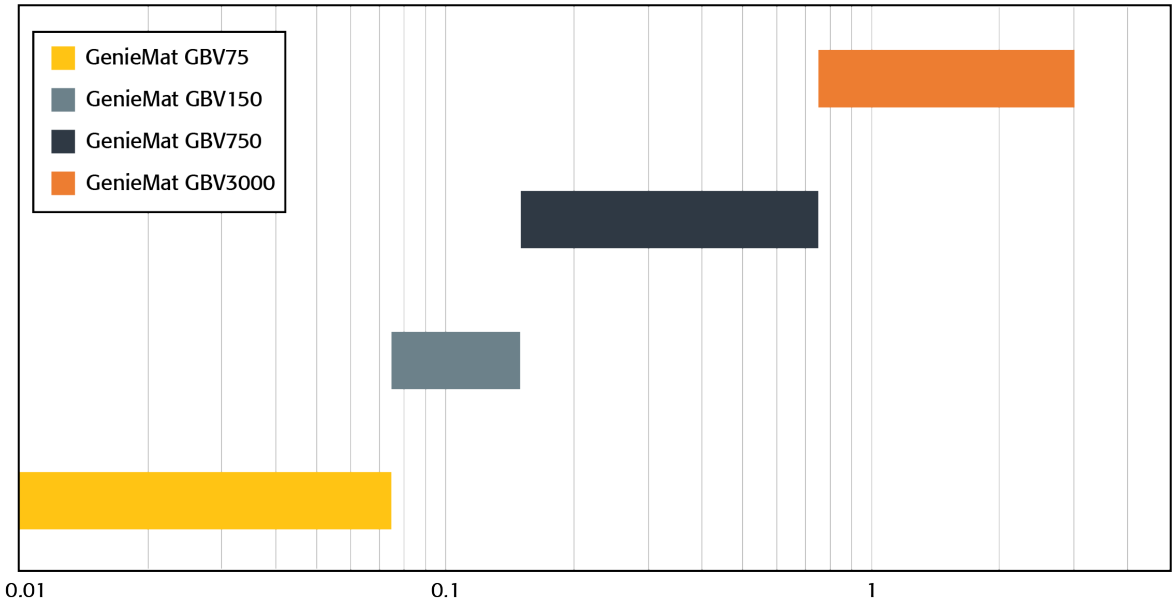
Fig. 4: Isolation Efficiency

GENIEMAT® GBV150

Ground-Borne Vibration Isolation

It's not magic, it's engineering.®

PRODUCT RANGE



PRODUCT SPECIFICATIONS

PRODUCT NAME	GenieMat GBV150
DESCRIPTION	Dynamically soft rebonded-rubber material capable of withstanding high loads. Used when superior lateral vibration decoupling is required for building isolation.
APPLICATION	Suitable for loads up to 150 kPa
FEATURES & BENEFITS	• Dynamically soft for excellent vibration isolation • Mold, bacteria, fungi, and water resistant • No potential mold -producing fiberglass • Will not break down or move under load • Easy to install
THICKNESS	50 mm (2")
DIMENSION	Sheets: 610 mm x 1220 mm (24" x 48")
SHEET AREA	0.74 m^2 (8 ft^2)
LEAD TIME	4 weeks after receipt of order

GENIEMAT® GBV150

Ground-Borne Vibration Isolation

TECHNICAL DATA	
OPERATING LOAD LIMIT	150 kPa
PEAK LOAD LIMIT	450 kPa
CREEP RATE	<1.0% per decade
MECHANICAL LOSS FACTOR	0.13*
TEMPERATURE STABILITY	-40°C to +80°C (-40°F to +176°F)
THERMAL CONDUCTIVITY	0.13 W/m °C
R-VALUE @ 2”	2.1 ft² h °F/Btu

OPERATING LOAD DATA	0.1 MPa LOADING
NATURAL FREQUENCY	11.5 Hz
40 Hz DYNAMIC MODULUS	3.2 MPa

* Load and frequency dependent

GenieMat® GBV150

Ground-Borne Vibration Isolation

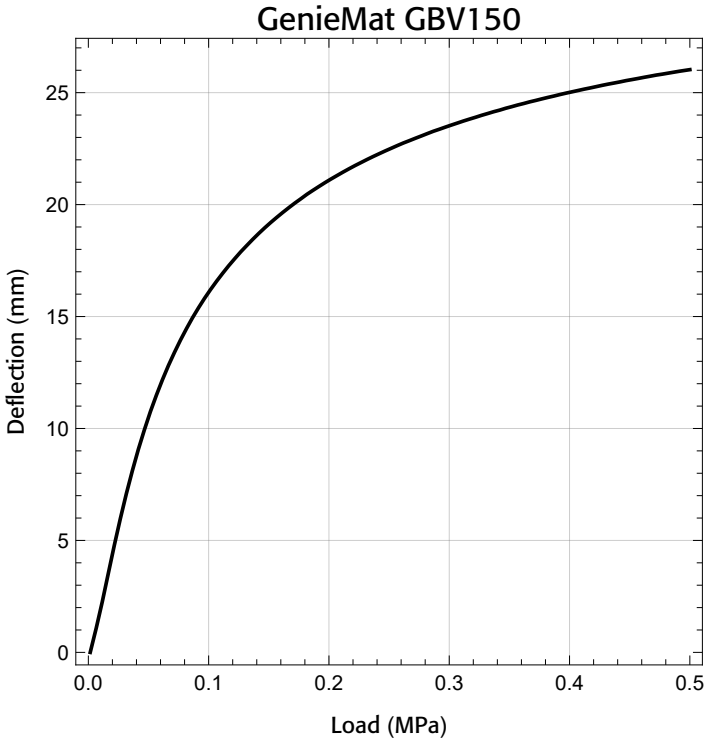


Fig. 1: Applied Load vs Deflection

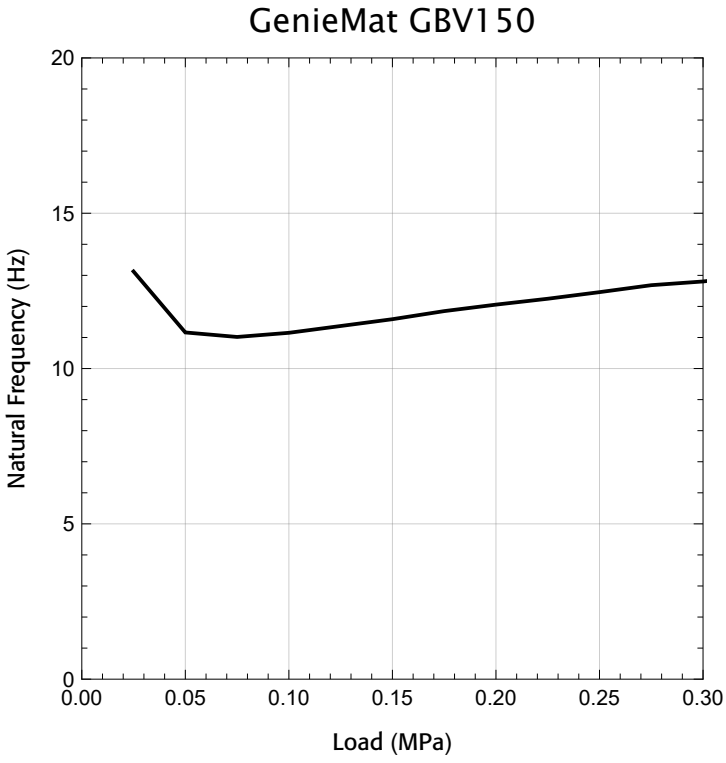


Fig. 2: Applied Load vs Natural Frequency

GenieMat® GBV150

Ground-Borne Vibration Isolation

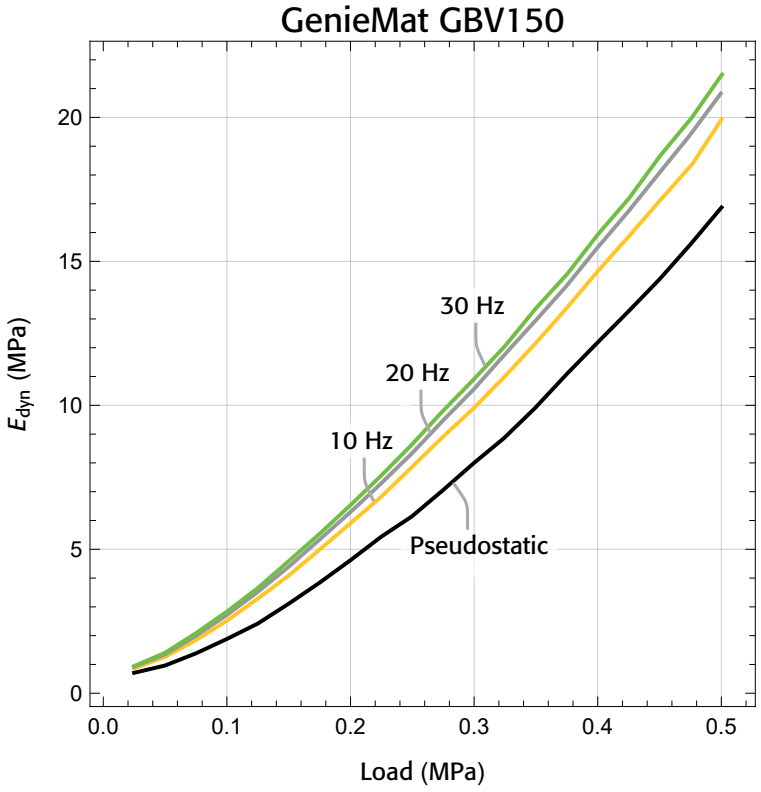


Fig. 3: Applied Load vs Dynamic Modulus

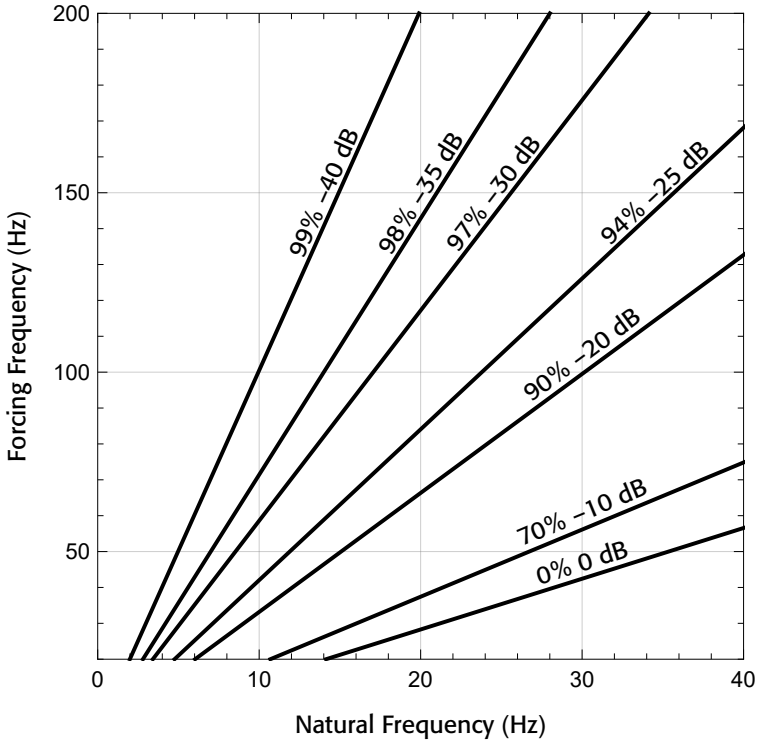


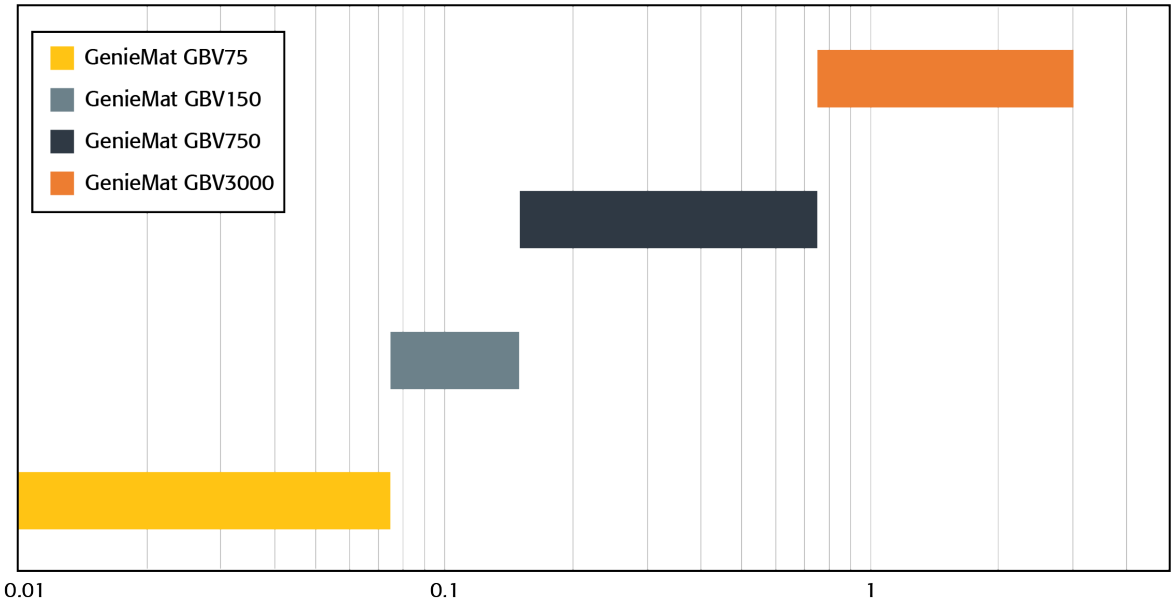
Fig. 4: Isolation Efficiency

GenieMat® GBV750

Ground-Borne Vibration Isolation

It's not magic, it's engineering.®

PRODUCT RANGE



PRODUCT SPECIFICATIONS

PRODUCT NAME	GenieMat GBV750
DESCRIPTION	Dynamically soft rebonded-rubber material capable of withstanding high loads. Used when superior lateral vibration decoupling is required for building isolation.
APPLICATION	Suitable for loads up to 750 kPa
FEATURES & BENEFITS	• Dynamically soft for excellent vibration isolation • Mold, bacteria, fungi, and water resistant • No potential mold -producing fiberglass • Will not break down or move under load • Easy to install
THICKNESS	50 mm (2")
DIMENSION	Sheets: 305 mm x 1220 mm (12" x 48")
SHEET AREA	0.37 m^2 (4 ft^2)
LEAD TIME	4 weeks after receipt of order

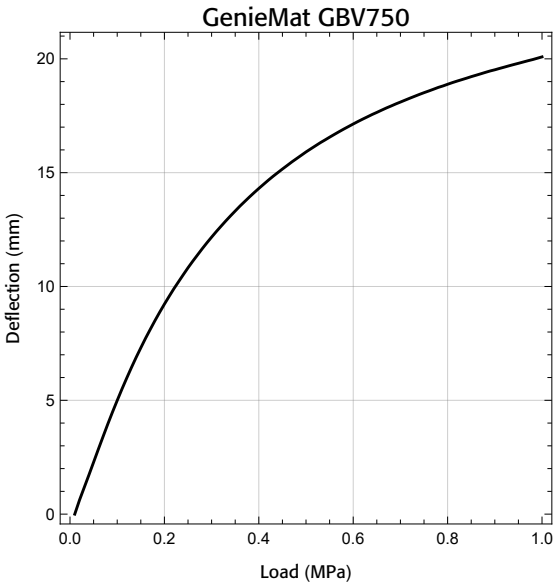
GENIEMAT® GBV750

Ground-Borne Vibration Isolation

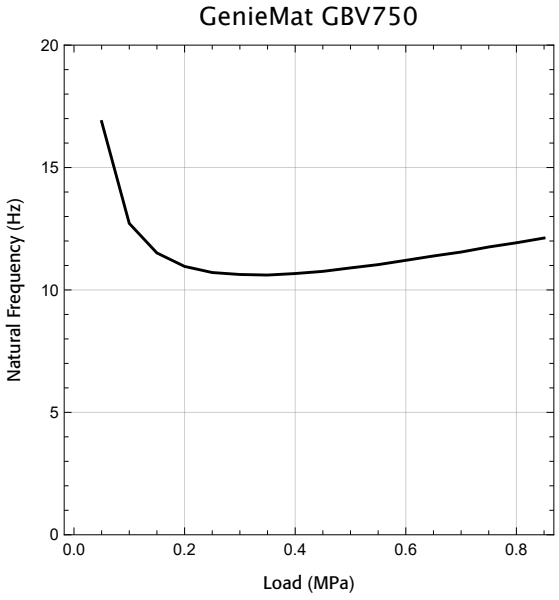
TECHNICAL DATA	
OPERATING LOAD LIMIT	750 kPa
PEAK LOAD LIMIT	3 MPa
CREEP RATE	1.0% per decade
MECHANICAL LOSS FACTOR	0.14*
TEMPERATURE STABILITY	-40°C to +80°C (-40°F to +176°F)
THERMAL CONDUCTIVITY	0.13 W/m °C
R-VALUE @ 2”	2.1 ft² h °F/Btu

OPERATING LOAD DATA	0.5 MPa LOADING
NATURAL FREQUENCY	11 Hz
40 Hz DYNAMIC MODULUS	13.6 MPa

* Load and frequency dependent



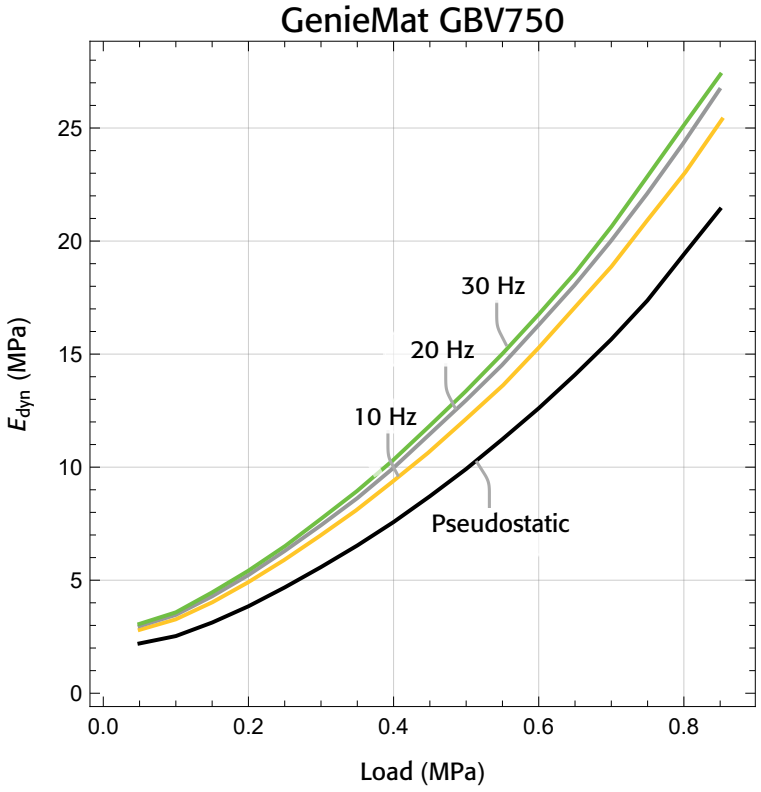
Applied Load vs Deflection



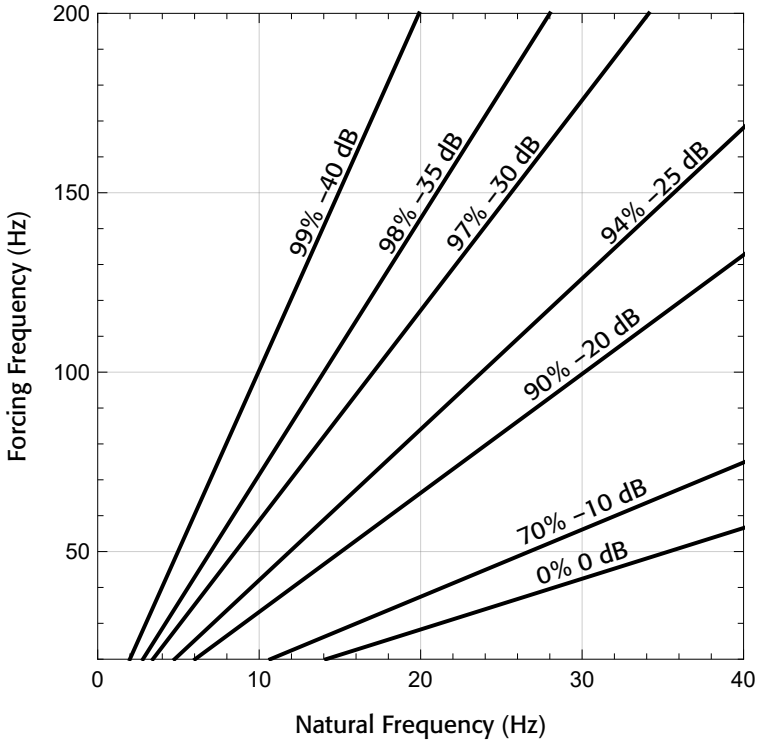
Applied Load vs Natural Frequency

GenieMat® GBV750

Ground-Borne Vibration Isolation



Applied Load vs Dynamic Modulus



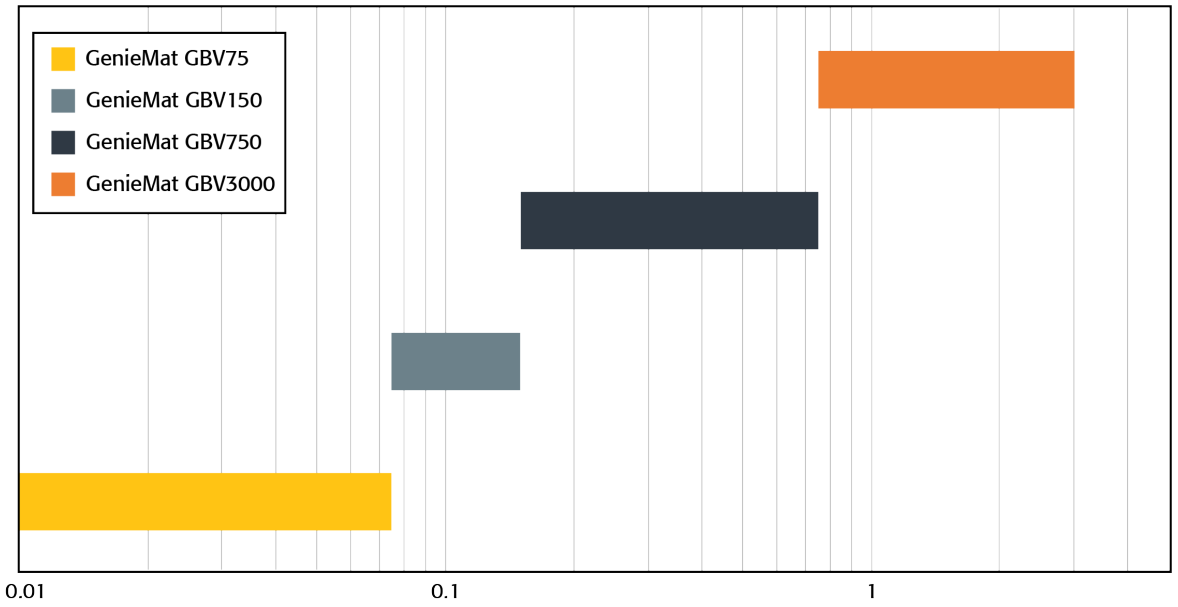
Isolation Efficiency

GENIEMAT® GBV3000

Ground-Borne Vibration Isolation

It's not magic, it's engineering.®

PRODUCT RANGE



PRODUCT SPECIFICATIONS

PRODUCT NAME	GenieMat GBV3000
DESCRIPTION	Dynamically soft rebonded-rubber material capable of withstanding high loads. Used when superior lateral vibration decoupling is required for building isolation.
APPLICATION	Suitable for loads up to 3000 kPa
FEATURES & BENEFITS	• Dynamically soft for excellent vibration isolation • Mold, bacteria, fungi, and water resistant • No potential mold -producing fiberglass • Will not break down or move under load • Easy to install
THICKNESS	50 mm (2")
DIMENSION	Sheets: 610 mm x 610 mm (24" x 24")
SHEET AREA	0.37 m^2 (4 ft^2)
LEAD TIME	4 weeks after receipt of order

GenieMat® GBV3000

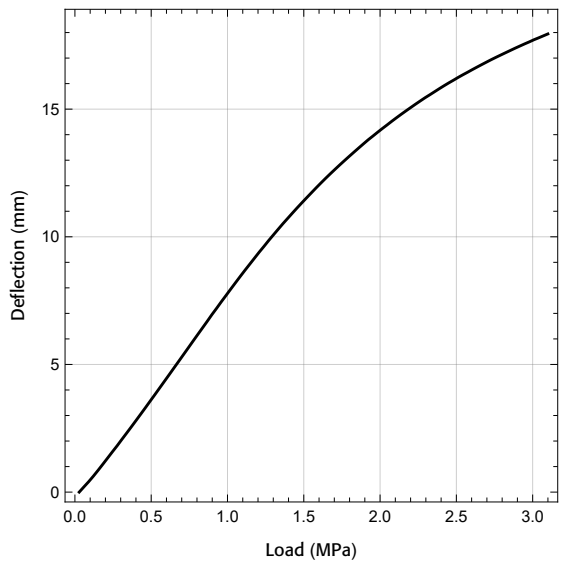
Ground-Borne Vibration Isolation

It's not magic, it's engineering.®

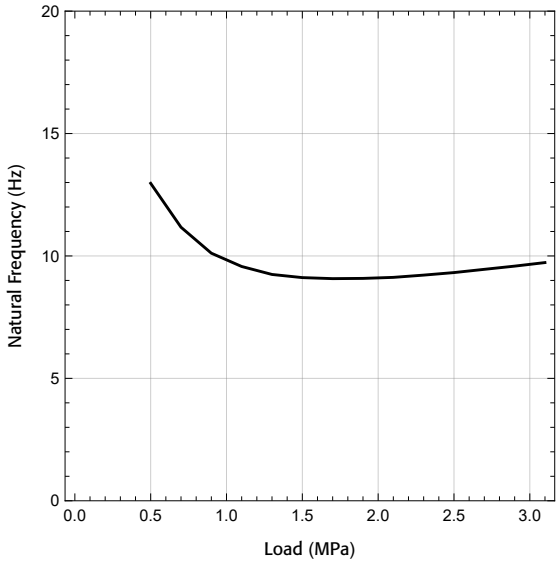
TECHNICAL DATA	
OPERATING LOAD LIMIT	3 MPa
PEAK LOAD LIMIT	4.5 MPa
CREEP RATE	1.0% per decade
MECHANICAL LOSS FACTOR	0.14*
TEMPERATURE STABILITY	-40°C to +80°C (-40°F to +176°F)
THERMAL CONDUCTIVITY	0.13 W/m °C
R-VALUE @ 2"	2.1 ft² h °F/Btu

OPERATING LOAD DATA	1.5 MPa LOADING
NATURAL FREQUENCY	9 Hz
30 Hz DYNAMIC MODULUS	28 MPa

* Load and frequency dependent



Applied Load vs Deflection



Applied Load vs Natural Frequency

GenieMat® GBV3000

Ground-Borne Vibration Isolation

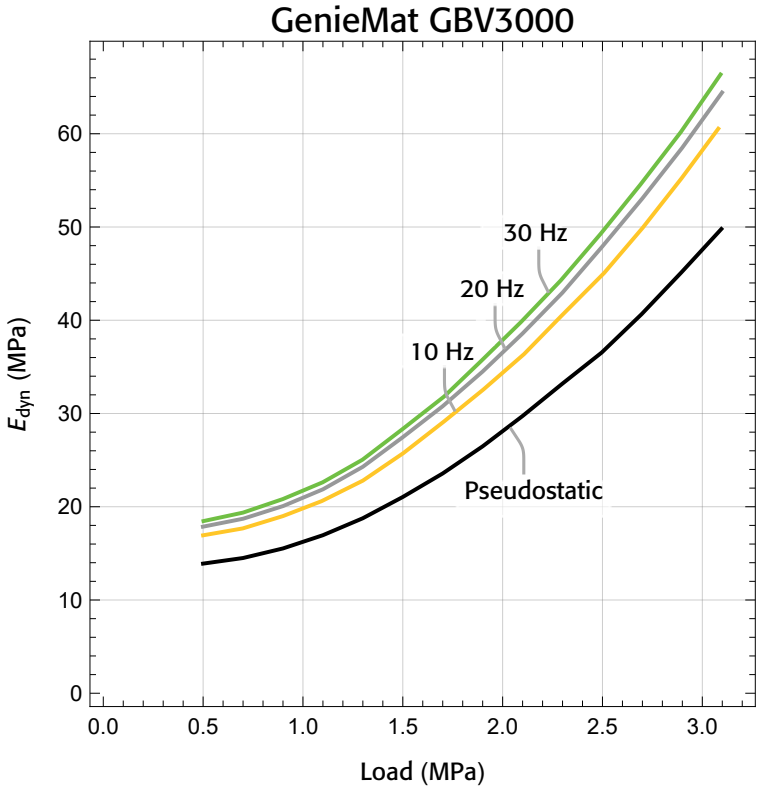


Fig. 3: Applied Load vs Dynamic Modulus

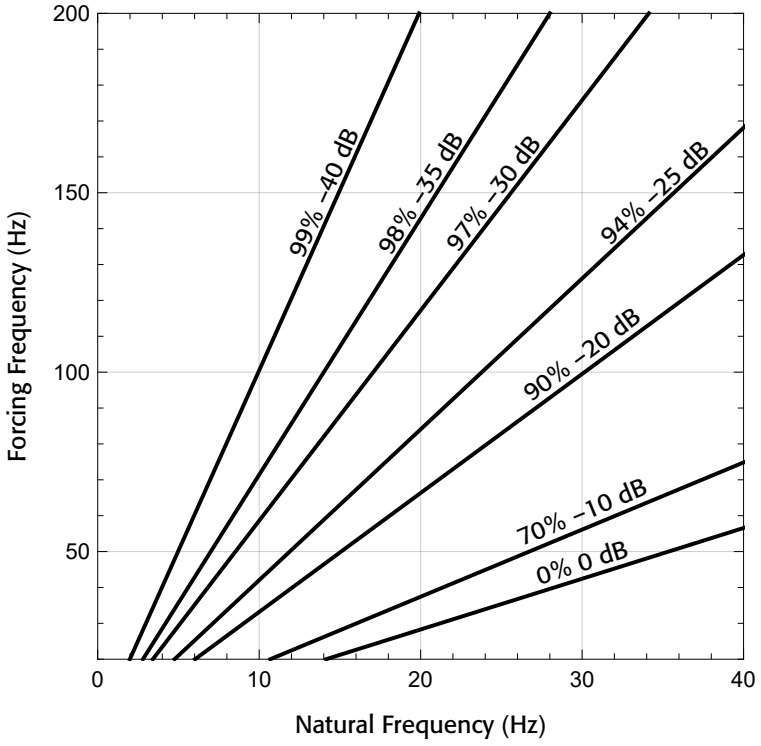


Fig. 4: Isolation Efficiency

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09.21

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