

# Vibration Technology

## Technical Details



BSW Acoustic Solutions in:  
ADAC Building Munich, RTL Studios Cologne, Central Bus Station Munich

## Brief Overview of the Technical Data

**Regufoam® vibration** is a mixed cell polyurethane foam for vibration isolation. It is available in 12 different qualities.

### Standard forms of delivery, ex warehouse

#### Rolls for types 150, 190, 220, 270, 300

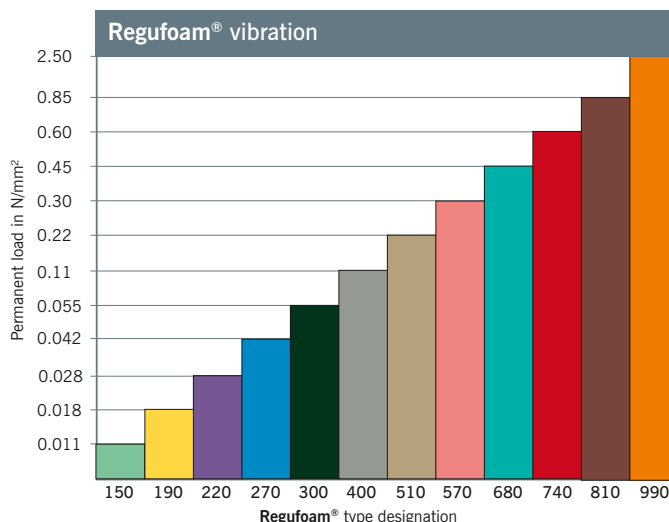
Thickness: 12 and 25 mm, special thicknesses on request  
 Length: 5,000 mm, special lengths available  
 Width: 1,500 mm

#### Plates for types 400, 510, 570, 680, 740, 810, 990

Thickness: 12 and 25 mm, special thicknesses on request  
 Length: 1,500 mm  
 Width: 1,000 mm

### Stripping/Plates

On request  
 Die-cutting, water-jet cutting, self-adhesive versions possible



Regufoam® vibration Colour	150 plus Green	190 plus Yellow	220 plus Purple	270 plus Blue	300 plus Black	400 plus Grey	510 plus Beige	570 plus Rose	680 plus Turquoise	740 plus Red	810 plus Brown	990 plus Orange
Permanent static load N/mm²	0.011	0.018	0.028	0.042	0.055	0.11	0.22	0.30	0.45	0.60	0.85	2.50
Optimum load range N/mm²	0.004 to 0.011	0.011 to 0.018	0.018 to 0.028	0.028 to 0.042	0.042 to 0.055	0.055 to 0.11	0.11 to 0.22	0.22 to 0.30	0.30 to 0.45	0.45 to 0.60	0.60 to 0.85	0.85 to 2.50
Tensile strength <sup>1</sup> N/mm²	0.31	0.4	0.5	0.9	1.2	1.5	2.4	2.9	3.6	4.0	4.6	6.9
Mechanical loss factor <sup>2</sup>	0.28	0.25	0.22	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10	0.09
Static modulus of elasticity <sup>3</sup> N/mm²	0.06 to 0.16	0.1 to 0.25	0.15 to 0.35	0.25 to 0.45	0.35 to 0.58	0.6 to 1.0	1.1 to 1.7	2.6 to 2.7	2.0 to 2.9	4.3 to 5.9	5.8 to 7.2	20.0 to 78.0
Dynamic modulus of elasticity <sup>4</sup> N/mm²	0.15 to 0.38	0.25 to 0.55	0.35 to 0.75	0.60 to 1.05	0.68 to 1.25	1.2 to 2.0	2.2 to 3.7	5.1 to 6.3	6.8 to 10.0	7.9 to 13.0	11.0 to 16.5	41.0 to 160.0
Compression hardness <sup>5</sup> kPa	14	22	22	63	82	170	330	620	840	1050	1241	3640
Fire behaviour	B2, E											

- 1 Measurement based on DIN EN ISO 1798
- 2 Measurement based on DIN 53513; load-, amplitude- and frequency-dependent.
- 3 Measurement based on EN 826.
- 4 Measurement based on DIN 53513; depending on frequency, load and thickness.
- 5 Measurement based on DIN EN ISO 3386-2; compressive stress at 25% deformation, depending on thickness.

Technical services and offers based on these are subject to our General Terms and Conditions of sale. In so far, please be advised as follows: Our expertise is the development and manufacturing of products. With our recommendation we can only assist you in selecting a product that is suitable for your demand. However, we cannot act as your architect or consulting expert. This would only be possible subject to a separately concluded service contract that we would have to bill you for. Such contracts are not part of our scope of supply and services. Hence, our recommendation does not lay claim for its correctness. The technical information given in the documents are guideline values. They are liable to manufacturing tolerances, which may vary depending on the type of underlying properties.

## Regufoam® – Mixed-Cell Polyurethane Elastomers

### Material Composition

**Regufoam®** elastomers consist of a mixed-cell polyurethane foam. Similar to the various **Regupol®** types, **Regufoam®** isolation materials have been precisely designed for different load ranges. Various standard thicknesses of 12 mm, 25 mm, 37 mm and 50 mm cover a wide spectrum of support frequencies up to 8 Hz.

The successful use of polyurethanes in vibration isolation over the course of many years offers expert consultants a conventional solution and a valuable alternative to **Regupol®** elastomers.

Moreover, the BSW test lab offers the option of developing project- and application-specific elastomers with special properties.

**Regufoam®** elastomers and their specific load ranges can be distinguished from one another using colour codes (green, yellow, purple, blue, black, grey, beige, rose, turquoise, red, brown, orange).

### Possible Uses

**Regufoam®** elastomers are suitable for a large range of applications in which insulation against vibration is required.

Due to their different dynamic rigidities and admissible load ranges, building and machine foundations can be placed elastically on strips or delicate point supports. Due to the low support frequencies, this type of support is technically efficient, but more difficult to plan and execute.

The majority of isolation jobs are performed on full-surface **Regufoam®** elastomers with lower rigidity, because this is more feasible and less error-prone.

The technical details, clearly arranged and determined as well as tested by the Technical University Dresden, among other institutions, provide a full overview of the load range of the **Regufoam®** elastomers and their non-linear material properties. They allow expert consultants to select and properly size the elastomer type that suits the situation at hand and meets its respective requirements.

**Regufoam®** elastomers are moisture- and rot-resistant. They are also ozone-resistant, but the colours may fade over time due to UV radiation. Because of their mixed-cell structure, especially types with lower dynamic rigidity can absorb water. These must be protected against water uptake.

### Effectiveness of the **Regufoam®** Elastomers

**Regufoam®** elastomers can be specifically set for support frequencies between 20 Hz and 8 Hz in a broad load range from 0.011 N/mm<sup>2</sup> to 2.50 N/mm<sup>2</sup>. Expert consultants in particular benefit from this large degree of flexibility.

The use of polyurethanes in vibration isolation over the course of many years offers expert consultants a conventional solution and valuable alternative. The admissible continuous load limits must be kept, as overload on the elastomers may lead to creep as well as rigidification of the material.

**Regufoam®** elastomers are produced and shipped in rolls. They can be cut to size with a standard utility knife right at the construction site. The professional company at the construction site is thus ensured that the installation is going to be simple, quick and, above all, cost-efficient.



## Brief Overview of the Technical Data

**Regupol® vibration** is a rubber-polyurethane-composite for vibration isolation. It is available in 8 different qualities.

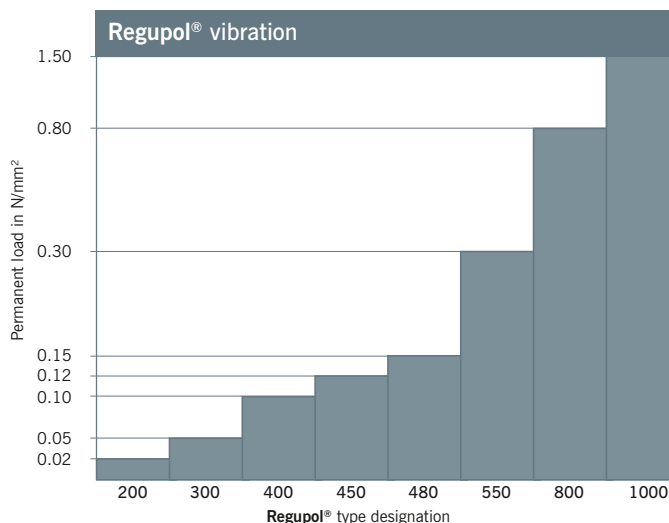
### Standard forms of delivery, ex warehouse

Depending on material. Exact dimensions are mentioned in the technical data sheets of each material type.

### Stripping/Plates

On request

Die-cutting, water-jet cutting, self-adhesive versions possible



Regupol® vibration	200	300	400	450	480	550	800	1000
Permanent static load N/mm <sup>2</sup>	0.02	0.05	0.10	0.12	0.15	0.30	0.80	1.50
Optimum load range N/mm <sup>2</sup>	0.004 to 0.014	0.010 to 0.050	0.050 to 0.10	-- <sup>6</sup>	0.10 to 0.15	0.15 to 0.30	0.20 to 0.80	0.80 to 1.50
Tensile strength <sup>1</sup> N/mm <sup>2</sup>	0.12	0.30	0.34	0.15	0.36	0.60	0.90	2.30
Mechanical loss factor <sup>2</sup>	0.22	0.18	0.17	0.2	0.17	0.16	0.18	0.16
Static modulus of elasticity <sup>3</sup> N/mm <sup>2</sup>	0.02 to 0.08	0.1 to 0.2	0.3 to 0.55	0.2 to 0.4	0.25 to 0.8	0.5 to 1.7	1.2 to 2.9	4.0 to 11.0
Dynamic modulus of elasticity <sup>4</sup> N/mm <sup>2</sup>	0.05 to 0.38	0.2 to 1.4	0.9 to 2.4	0.45 to 2.7	1.2 to 3.3	2.5 to 7.0	3.6 to 18.2	15.0 to 45.0
Compression hardness <sup>5</sup> kPa	14	50	180	83	220	415	545	1650
Fire behaviour	B2, E							

- 1 Measurement based on DIN EN ISO 1798
- 2 Measurement based on DIN 53513; load-, amplitude- and frequency-dependent.
- 3 Measurement based on EN 826.
- 4 Measurement based on DIN 53513; depending on frequency, load and thickness.
- 5 Measurement based on DIN EN ISO 2286-2; compressive stress at 25% deformation, depending on thickness.
- 6 **Regupol® vibration 450** is used for vertical isolation.

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## Regupol® Elastomer Mats

### Material Composition

**Regupol®** elastomers are composed of SBR and NBR rubber elements. For their production, rubber granulates, rubber fibres and rubber crumbs are combined with one another, processed and elasticised with various polyurethanes using a special manufacturing method.

Eight different **Regupol®** elastomers are available for the daily requirements. They can be used in a very wide load range if required.

The **Regupol®** elastomers offer a solution that is technically sufficient as well as the most economical one available for most vibration-technology-related jobs. Moreover, the BSW test lab offers the option of developing special, project- and application-specific types which can be given desired elastomer properties.

**Regupol®** elastomers can be distinguished from one another based on their individual load ranges and, accordingly, their dynamic rigidities.

### Possible Uses

**Regupol®** elastomers are suitable for all different kinds of vibration isolation.

Due to higher dynamic rigidities and the admissible load ranges of some elastomer types, buildings and machine foundations can either be bedded elastically on strips or on delicate point supports. Due to the low support frequencies, this type of support is technically efficient, but more difficult to plan and execute. The majority of isolation jobs are performed on full-surface **Regupol®** elastomers with lower rigidity, because this is more feasible and less error-prone.

The technical details, clearly arranged and determined as well as tested by the Technical University Dresden, provide a full overview of the load range of the **Regupol®** elastomers and their non-linear material properties. They allow expert consultants to select and properly size the elastomer type that suits the situation at hand and meets its respective requirements.

Additional benefits of **Regupol®** elastomers are their excellent moisture resistance, their rot-proof properties, their ozone resistance and their permanent elasticity even after frost-thaw cycles.

The use of **Regupol®** is therefore admissible not only inside but also outside of buildings. The only exception in this regard is **Regupol® vibration 200**. This material is to be protected against water penetration, as it has a low rigidity and a porous structure.

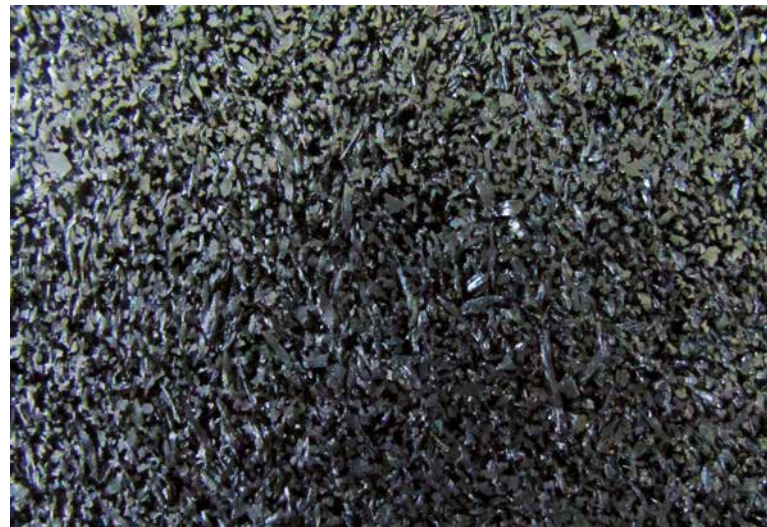
### Effectiveness of the Regupol® Elastomers

**Regupol®** elastomers can be specifically set for support frequencies between 20 Hz and 10 Hz in a broad load range from 0.050 N/mm<sup>2</sup> to 1.5 N/mm<sup>2</sup>. Expert consultants in particular benefit from this large degree of flexibility.

The natural frequency progressions of the **Regupol®** elastomers are benign, offering expert consultants nearly constant natural frequencies across a wide load range. This makes for a large degree of security in planning and execution.

The creep (or creep behaviour) is low for all different **Regupol®** elastomers at approx. 5–7% of the total thickness. The admissible permanent load limits are kept, the only effect of overloading on the elastomers is increased rigidity (rise in dynamic rigidity and natural frequency), which shows in progressive deflection.

**Regupol®** elastomers are produced and shipped in rolls. They can be cut to size with a standard utility knife right at the construction site. The professional company at the construction site is thus ensured that the installation is going to be simple, quick and cost-efficient.



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