



Vibration mounts and elastomer springs

## MATERIAL

Polyurethane.

## STANDARD EXECUTIONS

Pass-through hole.

- **PES-80:** hardness 80 Shore A, blue colour.
- **PES-90:** hardness 90 Shore A, orange colour.
- **PES-92:** hardness 92 Shore A, red colour.

## WORKING TEMPERATURE

- Maximum continuous working temperature: 60°C.
- Minimum continuous operating temperature: PES-80 and PES-90: -20°C, PES-92: +15°C.

Use at temperatures between 60 and 100°C is tolerated but involves a significant reduction in the technical features.

Prolonged exposure to the maximum operating temperature may also lead to a significant deterioration in the mechanical characteristics compared to the nominal values indicated in the technical data.

## FEATURES AND APPLICATIONS

Hollow springs are an excellent alternative to traditional metal springs. They guarantee high resistance to axial load, avoiding sudden breakage in the event of overload.

They can be used as load dampers or as forming elements, in particular they are widely used in processes such as deep drawing (fig.1), sheet metal deformation, and ejectors.

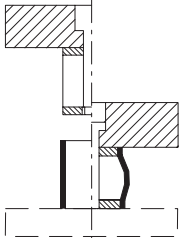
They are also resistant to chemicals such as acids, greases, and oils. (for details on chemical compatibility, please refer to the table Resistance to chemical agents).

During the application of the load (F1) the spring has a non-deformation zone (h1) and a maximum deformation (d3) proportional to the applied force F1.

Specific load curve for each diameter.



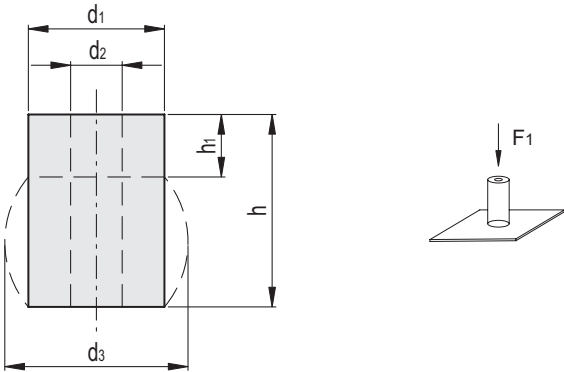
Fig. 1



| Mechanical characteristics                      |            |            |            |
|-------------------------------------------------|------------|------------|------------|
| Hardness<br>(according to ASTM2240)             | Shore A80  | Shore A90  | Shore A92  |
| Colour                                          | blue       | orange     | red        |
| Load at breakage<br>(according to DIN 53504)    | 25 MPa     | 30 MPa     | 50 MPa     |
| Elongation at break<br>(according to DIN 53504) | 750%       | 360%       | 475%       |
| Modulus 300%<br>(according to DIN 53504)        | 5.5 MPa    | 17 Mpa     | 17.6 MPa   |
| Tear resistance<br>(according to DIN 53515)     | 14 kN/m    | 54 kN/m    | 89 kN/m    |
| Compression set<br>(according to DIN 53517)     | 250%       | 230%       | 180%       |
| Abrasion<br>(according to DIN 53516)            | 50 mm3     | 56 mm3     | 82 mm3     |
| Rebound                                         | 55%        | 52%        | 39%        |
| Density                                         | 1.16 mg/m3 | 1.17 mg/m3 | 1.22 mg/m3 |

Compression set: measures the deformation percentage after the material has been subjected to a compressive load.

Rebound (or elastic recovery): ability of an elastomer to return to its original shape after being deformed.



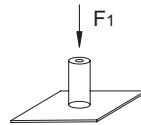
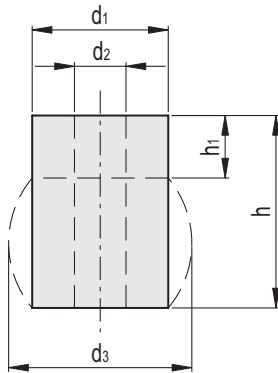
PES-80

| Code   | Description       | d1 | d2   | d3 | h   | h1   | F1 [N] | ⚖   |
|--------|-------------------|----|------|----|-----|------|--------|-----|
| 490106 | PES-16x16-6.5-80  | 16 | 6.5  | 22 | 16  | 5.6  | 1000   | 3   |
| 490111 | PES-16x20-6.5-80  | 16 | 6.5  | 22 | 20  | 7    | 1000   | 4   |
| 490116 | PES-16x25-6.5-80  | 16 | 6.5  | 22 | 25  | 9    | 1000   | 5   |
| 490121 | PES-16x32-6.5-80  | 16 | 6.5  | 22 | 32  | 11   | 1000   | 6   |
| 490126 | PES-20x16-8.5-80  | 20 | 8.5  | 27 | 16  | 6    | 1500   | 5   |
| 490131 | PES-20x20-8.5-80  | 20 | 8.5  | 27 | 20  | 7    | 1500   | 6   |
| 490136 | PES-20x25-8.5-80  | 20 | 8.5  | 27 | 25  | 9    | 1500   | 8   |
| 490141 | PES-20x32-8.5-80  | 20 | 8.5  | 27 | 32  | 11   | 1500   | 10  |
| 490146 | PES-20x40-8.5-80  | 20 | 8.5  | 27 | 40  | 14   | 1500   | 12  |
| 490151 | PES-25x16-10.5-80 | 25 | 10.5 | 34 | 16  | 6    | 2500   | 7   |
| 490156 | PES-25x20-10.5-80 | 25 | 10.5 | 34 | 20  | 7    | 2500   | 9   |
| 490161 | PES-25x25-10.5-80 | 25 | 10.5 | 34 | 25  | 9    | 2500   | 11  |
| 490166 | PES-25x32-10.5-80 | 25 | 10.5 | 34 | 32  | 11   | 2500   | 15  |
| 490171 | PES-25x40-10.5-80 | 25 | 10.5 | 34 | 40  | 14   | 2500   | 18  |
| 490176 | PES-25x50-10.5-80 | 25 | 10.5 | 34 | 50  | 18   | 2500   | 23  |
| 490181 | PES-32x16-13.5-80 | 32 | 13.5 | 43 | 16  | 6    | 4000   | 12  |
| 490186 | PES-32x20-13.5-80 | 32 | 13.5 | 43 | 20  | 7    | 4000   | 15  |
| 490191 | PES-32x25-13.5-80 | 32 | 13.5 | 43 | 25  | 9    | 4000   | 18  |
| 490196 | PES-32x32-13.5-80 | 32 | 13.5 | 43 | 32  | 11   | 4000   | 23  |
| 490201 | PES-32x40-13.5-80 | 32 | 13.5 | 43 | 40  | 14   | 4000   | 29  |
| 490206 | PES-32x50-13.5-80 | 32 | 13.5 | 43 | 50  | 18   | 4000   | 37  |
| 490211 | PES-32x63-13.5-80 | 32 | 13.5 | 43 | 63  | 22   | 4000   | 46  |
| 490216 | PES-40x20-13.5-80 | 40 | 13.5 | 54 | 20  | 7    | 7000   | 25  |
| 490221 | PES-40x25-13.5-80 | 40 | 13.5 | 54 | 25  | 9    | 7000   | 31  |
| 490226 | PES-40x32-13.5-80 | 40 | 13.5 | 54 | 32  | 11   | 7000   | 39  |
| 490231 | PES-40x40-13.5-80 | 40 | 13.5 | 54 | 40  | 14   | 7000   | 49  |
| 490236 | PES-40x50-13.5-80 | 40 | 13.5 | 54 | 50  | 18   | 7000   | 62  |
| 490241 | PES-40x63-13.5-80 | 40 | 13.5 | 54 | 63  | 22   | 7000   | 78  |
| 490246 | PES-40x80-13.5-80 | 40 | 13.5 | 54 | 80  | 28   | 7000   | 98  |
| 490251 | PES-50x25-17-80   | 50 | 17   | 68 | 25  | 9    | 12000  | 48  |
| 490256 | PES-50x32-17-80   | 50 | 17   | 68 | 32  | 11   | 12000  | 62  |
| 490261 | PES-50x40-17-80   | 50 | 17   | 68 | 40  | 14   | 12000  | 77  |
| 490266 | PES-50x50-17-80   | 50 | 17   | 68 | 50  | 18   | 12000  | 97  |
| 490271 | PES-50x63-17-80   | 50 | 17   | 68 | 63  | 22   | 12000  | 122 |
| 490276 | PES-50x80-17-80   | 50 | 17   | 68 | 80  | 28   | 12000  | 154 |
| 490281 | PES-50x100-17-80  | 50 | 17   | 68 | 100 | 35   | 12000  | 193 |
| 490291 | PES-63x32-17-80   | 63 | 17   | 85 | 32  | 3    | 18500  | 103 |
| 490296 | PES-63x40-17-80   | 63 | 17   | 85 | 40  | 14   | 18500  | 129 |
| 490301 | PES-63x50-17-80   | 63 | 17   | 85 | 50  | 18   | 18500  | 161 |
| 490306 | PES-63x63-17-80   | 63 | 17   | 85 | 63  | 22   | 18500  | 203 |
| 490311 | PES-63x80-17-80   | 63 | 17   | 85 | 80  | 28   | 18500  | 258 |
| 490316 | PES-63x100-17-80  | 63 | 17   | 85 | 100 | 35   | 18500  | 322 |
| 490321 | PES-63x125-17-80  | 63 | 17   | 85 | 125 | 43.7 | 18500  | 403 |





Vibration mounts and elastomer springs

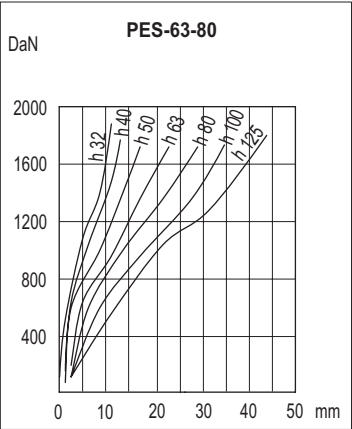
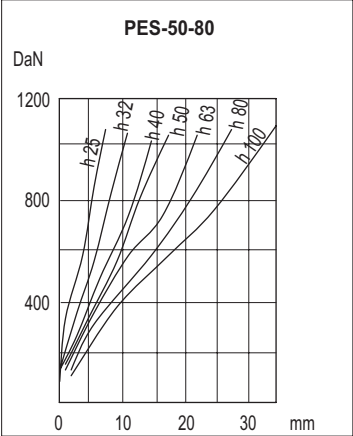
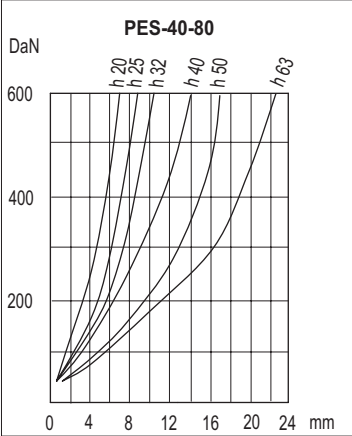
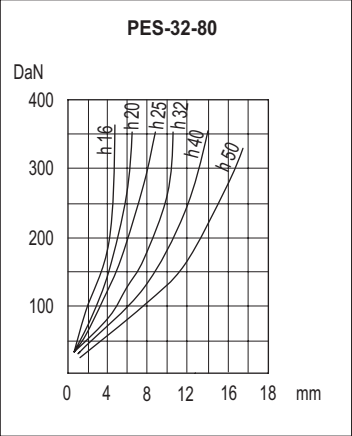
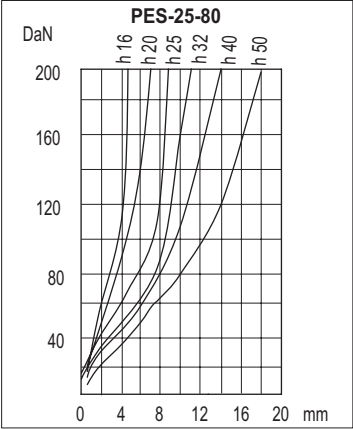
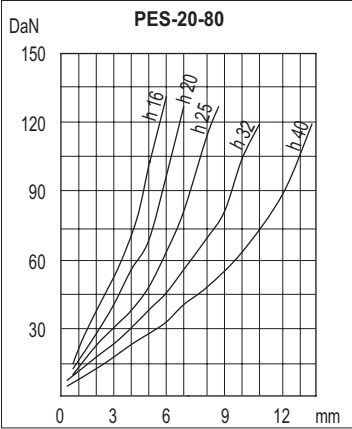
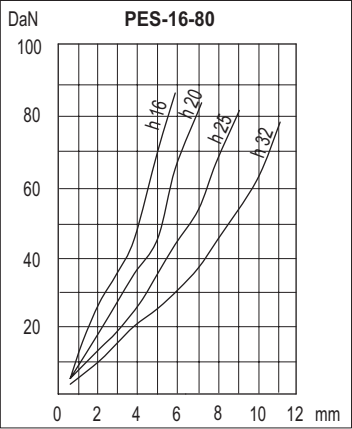


PES-90

| Code   | Description       | d1 | d2   | d3 | h   | h1   | F1 [N] | Δ   |
|--------|-------------------|----|------|----|-----|------|--------|-----|
| 490107 | PES-16x16-6.5-90  | 16 | 6.5  | 21 | 16  | 4.8  | 1400   | 3   |
| 490112 | PES-16x20-6.5-90  | 16 | 6.5  | 21 | 20  | 6    | 1400   | 4   |
| 490117 | PES-16x25-6.5-90  | 16 | 6.5  | 21 | 25  | 8    | 1400   | 5   |
| 490122 | PES-16x32-6.5-90  | 16 | 6.5  | 21 | 32  | 9.6  | 1400   | 6   |
| 490127 | PES-20x16-8.5-90  | 20 | 8.5  | 27 | 16  | 5    | 1500   | 5   |
| 490132 | PES-20x20-8.5-90  | 20 | 8.5  | 27 | 20  | 6    | 1500   | 6   |
| 490137 | PES-20x25-8.5-90  | 20 | 8.5  | 27 | 25  | 8    | 1500   | 8   |
| 490142 | PES-20x32-8.5-90  | 20 | 8.5  | 27 | 32  | 10   | 1500   | 10  |
| 490147 | PES-20x40-8.5-90  | 20 | 8.5  | 27 | 40  | 12   | 1500   | 12  |
| 490152 | PES-25x16-10.5-90 | 25 | 10.5 | 33 | 16  | 5    | 4000   | 7   |
| 490157 | PES-25x20-10.5-90 | 25 | 10.5 | 33 | 20  | 6    | 4000   | 9   |
| 490162 | PES-25x25-10.5-90 | 25 | 10.5 | 33 | 25  | 8    | 4000   | 11  |
| 490167 | PES-25x32-10.5-90 | 25 | 10.5 | 33 | 32  | 10   | 4000   | 15  |
| 490172 | PES-25x40-10.5-90 | 25 | 10.5 | 33 | 40  | 12   | 4000   | 18  |
| 490177 | PES-25x50-10.5-90 | 25 | 10.5 | 33 | 50  | 15   | 4000   | 23  |
| 490182 | PES-32x16-13.5-90 | 32 | 13.5 | 42 | 16  | 5    | 5800   | 12  |
| 490187 | PES-32x20-13.5-90 | 32 | 13.5 | 42 | 20  | 6    | 5800   | 15  |
| 490192 | PES-32x25-13.5-90 | 32 | 13.5 | 42 | 25  | 8    | 5800   | 18  |
| 490197 | PES-32x32-13.5-90 | 32 | 13.5 | 42 | 32  | 10   | 5800   | 23  |
| 490202 | PES-32x40-13.5-90 | 32 | 13.5 | 42 | 40  | 12   | 5800   | 29  |
| 490207 | PES-32x50-13.5-90 | 32 | 13.5 | 42 | 50  | 15   | 5800   | 37  |
| 490212 | PES-32x63-13.5-90 | 32 | 13.5 | 42 | 63  | 18.9 | 5800   | 46  |
| 490217 | PES-40x20-13.5-90 | 40 | 13.5 | 52 | 20  | 6    | 9000   | 25  |
| 490222 | PES-40x25-13.5-90 | 40 | 13.5 | 52 | 25  | 8    | 9000   | 31  |
| 490227 | PES-40x32-13.5-90 | 40 | 13.5 | 52 | 32  | 10   | 9000   | 39  |
| 490232 | PES-40x40-13.5-90 | 40 | 13.5 | 52 | 40  | 12   | 9000   | 49  |
| 490237 | PES-40x50-13.5-90 | 40 | 13.5 | 52 | 50  | 15   | 9000   | 62  |
| 490242 | PES-40x63-13.5-90 | 40 | 13.5 | 52 | 63  | 18.9 | 9000   | 78  |
| 490247 | PES-40x80-13.5-90 | 40 | 13.5 | 52 | 80  | 24   | 9000   | 98  |
| 490252 | PES-50x25-17-90   | 50 | 17   | 65 | 25  | 8    | 18000  | 48  |
| 490257 | PES-50x32-17-90   | 50 | 17   | 65 | 32  | 10   | 18000  | 62  |
| 490262 | PES-50x40-17-90   | 50 | 17   | 65 | 40  | 12   | 18000  | 77  |
| 490267 | PES-50x50-17-90   | 50 | 17   | 65 | 50  | 15   | 18000  | 97  |
| 490272 | PES-50x63-17-90   | 50 | 17   | 65 | 63  | 18.9 | 18000  | 122 |
| 490277 | PES-50x80-17-90   | 50 | 17   | 65 | 80  | 24   | 18000  | 154 |
| 490282 | PES-50x100-17-90  | 50 | 17   | 65 | 100 | 30   | 18000  | 193 |
| 490292 | PES-63x32-17-90   | 63 | 17   | 76 | 32  | 10   | 25000  | 103 |
| 490297 | PES-63x40-17-90   | 63 | 17   | 76 | 40  | 12   | 25000  | 129 |
| 490302 | PES-63x50-17-90   | 63 | 17   | 76 | 50  | 15   | 25000  | 161 |
| 490307 | PES-63x63-17-90   | 63 | 17   | 76 | 63  | 18.9 | 25000  | 203 |
| 490312 | PES-63x80-17-90   | 63 | 17   | 76 | 80  | 24   | 25000  | 258 |
| 490317 | PES-63x100-17-90  | 63 | 17   | 76 | 100 | 30   | 25000  | 322 |
| 490322 | PES-63x125-17-90  | 63 | 17   | 76 | 125 | 37.5 | 25000  | 403 |

PES-92

| Code   | Description       | d1 | d2   | d3 | h   | h1  | F1 [N] | Δ   |
|--------|-------------------|----|------|----|-----|-----|--------|-----|
| 490108 | PES-16x16-6.5-92  | 16 | 6.5  | 19 | 16  | 4.8 | 1300   | 4   |
| 490113 | PES-16x20-6.5-92  | 16 | 6.5  | 19 | 20  | 6   | 1300   | 4   |
| 490118 | PES-16x25-6.5-92  | 16 | 6.5  | 19 | 25  | 8   | 1300   | 6   |
| 490123 | PES-16x32-6.5-92  | 16 | 6.5  | 19 | 32  | 10  | 1300   | 7   |
| 490128 | PES-20x16-8.5-92  | 20 | 8.5  | 26 | 16  | 5   | 2000   | 5   |
| 490133 | PES-20x20-8.5-92  | 20 | 8.5  | 26 | 20  | 6   | 2000   | 6   |
| 490138 | PES-20x25-8.5-92  | 20 | 8.5  | 26 | 25  | 8   | 2000   | 8   |
| 490143 | PES-20x32-8.5-92  | 20 | 8.5  | 26 | 32  | 10  | 2000   | 10  |
| 490148 | PES-20x40-8.5-92  | 20 | 8.5  | 26 | 40  | 12  | 2000   | 13  |
| 490153 | PES-25x16-10.5-92 | 25 | 10.5 | 30 | 16  | 5   | 3000   | 9   |
| 490158 | PES-25x20-10.5-92 | 25 | 10.5 | 30 | 20  | 6   | 3000   | 11  |
| 490163 | PES-25x25-10.5-92 | 25 | 10.5 | 30 | 25  | 8   | 3000   | 13  |
| 490168 | PES-25x32-10.5-92 | 25 | 10.5 | 30 | 32  | 10  | 3000   | 17  |
| 490173 | PES-25x40-10.5-92 | 25 | 10.5 | 30 | 40  | 12  | 3000   | 21  |
| 490178 | PES-25x50-10.5-92 | 25 | 10.5 | 30 | 50  | 15  | 3000   | 26  |
| 490183 | PES-32x16-13.5-92 | 32 | 13.5 | 41 | 16  | 5   | 5800   | 13  |
| 490188 | PES-32x20-13.5-92 | 32 | 13.5 | 41 | 20  | 6   | 5800   | 16  |
| 490193 | PES-32x25-13.5-92 | 32 | 13.5 | 41 | 25  | 8   | 5800   | 20  |
| 490198 | PES-32x32-13.5-92 | 32 | 13.5 | 41 | 32  | 10  | 5800   | 25  |
| 490203 | PES-32x40-13.5-92 | 32 | 13.5 | 41 | 40  | 12  | 5800   | 31  |
| 490208 | PES-32x50-13.5-92 | 32 | 13.5 | 41 | 50  | 15  | 5800   | 39  |
| 490213 | PES-32x63-13.5-92 | 32 | 13.5 | 41 | 63  | 19  | 5800   | 50  |
| 490218 | PES-40x20-13.5-92 | 40 | 13.5 | 50 | 20  | 6   | 12000  | 27  |
| 490223 | PES-40x25-13.5-92 | 40 | 13.5 | 50 | 25  | 8   | 12000  | 33  |
| 490228 | PES-40x32-13.5-92 | 40 | 13.5 | 50 | 32  | 10  | 12000  | 43  |
| 490233 | PES-40x40-13.5-92 | 40 | 13.5 | 50 | 40  | 12  | 12000  | 53  |
| 490238 | PES-40x50-13.5-92 | 40 | 13.5 | 50 | 50  | 15  | 12000  | 67  |
| 490243 | PES-40x63-13.5-92 | 40 | 13.5 | 50 | 63  | 19  | 12000  | 84  |
| 490248 | PES-40x80-13.5-92 | 40 | 13.5 | 50 | 80  | 24  | 12000  | 107 |
| 490253 | PES-50x25-17-92   | 50 | 17   | 62 | 25  | 8   | 17000  | 52  |
| 490258 | PES-50x32-17-92   | 50 | 17   | 62 | 32  | 10  | 17000  | 66  |
| 490263 | PES-50x40-17-92   | 50 | 17   | 62 | 40  | 12  | 17000  | 83  |
| 490268 | PES-50x50-17-92   | 50 | 17   | 62 | 50  | 15  | 17000  | 104 |
| 490273 | PES-50x63-17-92   | 50 | 17   | 62 | 63  | 19  | 17000  | 131 |
| 490278 | PES-50x80-17-92   | 50 | 17   | 62 | 80  | 24  | 17000  | 166 |
| 490283 | PES-50x100-17-92  | 50 | 17   | 62 | 100 | 30  | 17000  | 208 |
| 490293 | PES-63x32-17-92   | 63 | 17   | 78 | 32  | 10  | 25000  | 112 |
| 490298 | PES-63x40-17-92   | 63 | 17   | 78 | 40  | 12  | 25000  | 140 |
| 490303 | PES-63x50-17-92   | 63 | 17   | 78 | 50  | 15  | 25000  | 175 |
| 490308 | PES-63x63-17-92   | 63 | 17   | 78 | 63  | 19  | 25000  | 220 |
| 490313 | PES-63x80-17-92   | 63 | 17   | 78 | 80  | 24  | 25000  | 279 |
| 490318 | PES-63x100-17-92  | 63 | 17   | 78 | 100 | 30  | 25000  | 349 |
| 490323 | PES-63x125-17-92  | 63 | 17   | 78 | 125 | 38  | 25000  | 437 |



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