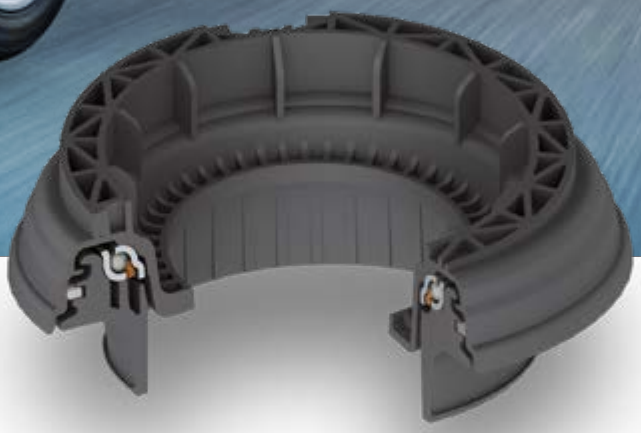
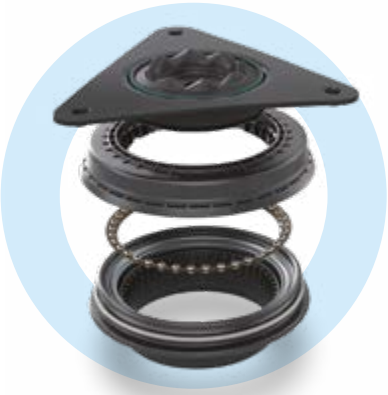
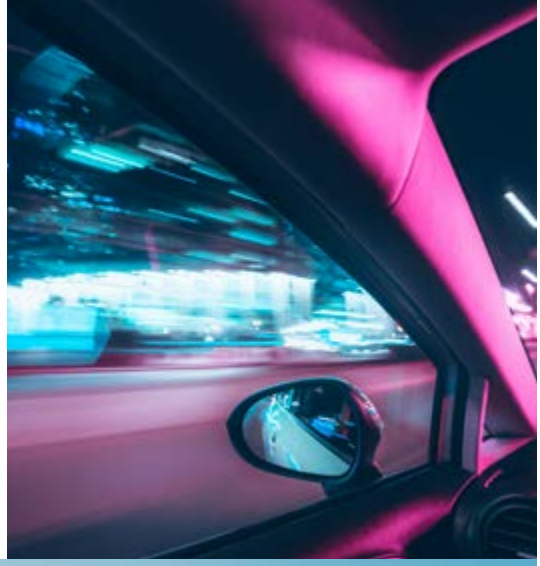
NTN

SUSPENSION BEARING RANGE FOR THE OEM

Designed to combine performance, precision and driving comfort







" For more than a century, NTN has been placing its engineering expertise at the service of the automotive industry by developing high-precision solutions dedicated to the mobility of tomorrow. Our teams design and validate each component according to the strictest standards, supporting manufacturers in meeting their performance and reliability challenges.

As a European leader in suspension systems, NTN relies on its recognised know-how to deliver products of the highest quality, combining innovation and reliability. Through optimised materials, controlled manufacturing processes and rigorous testing, we position ourselves among the world's leading automotive manufacturers."

Alain CAILLOT

Vice President NTN Europe
Manufacturing, Supply Chain & Engineering

A key player in the suspension market, NTN now offers one of the most comprehensive ranges on the market and adapted to each application, load distribution, or sealing required.

This range combines performance, precision and comfort to provide a smoother, more precise and more reliable driving experience.

In this catalogue, you will discover:

- an overview of the NTN suspension bearings, their design and their testing methods thus highlighting their technical relevance in the current automotive industry.
- a comprehensive technical overview of the suspension solutions product range, covering both external and internal design aspects.

In addition to this existing range of products, NTN is of course able to design, simulate, validate and develop any new product, dedicated to a single Customer application, with specific requirements. Based on its wide experience, NTN will support any Customer project to propose the best-in-class product, whatever its application is.

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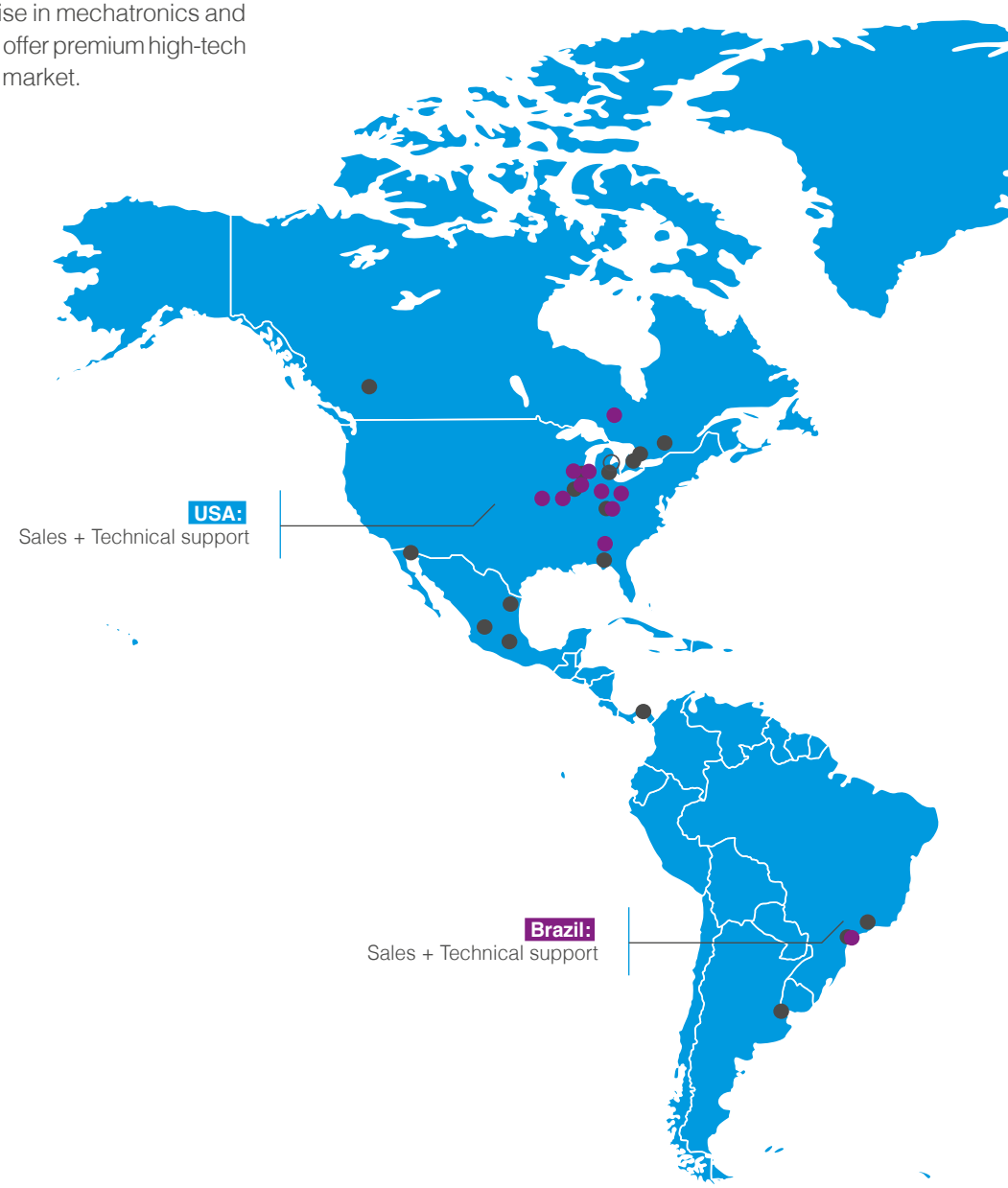
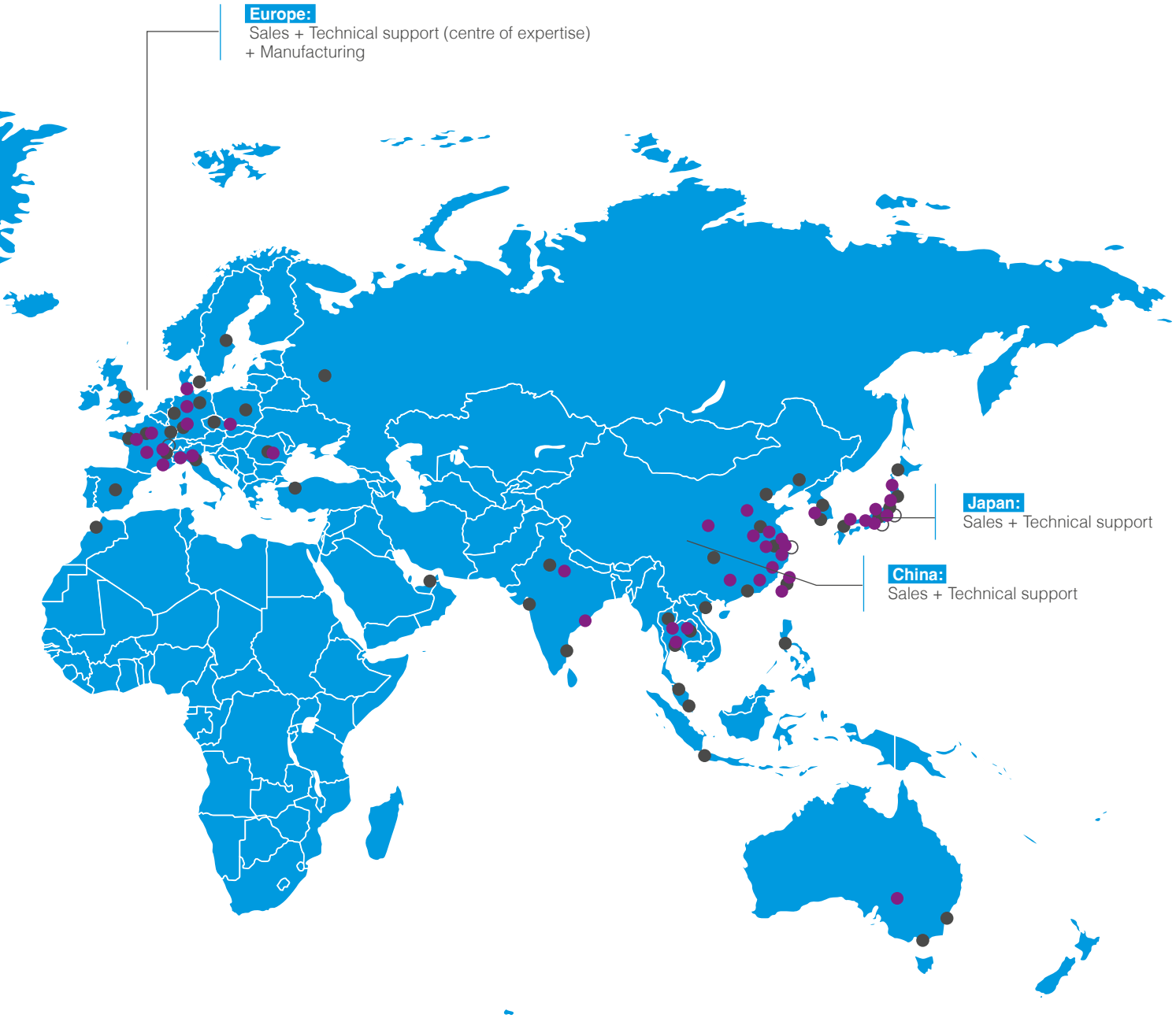
The strength of an international group combining know-how, expertise, high performance products and services

For more than 100 years, NTN has helped the world to move and grow. We are the world leaders in high-precision products for movement. Our expertise in mechatronics and engineering know-how enables us to offer premium high-tech solutions tailored to the needs of the market.

All around the world, we design and develop solutions to enhance your production performance. Our brands are marketed worldwide and provide you with the most suitable solutions to help build, together, a more fluid, more mobile and more harmonious society.




Europe:
Sales + Technical support (centre of expertise)
+ Manufacturing
Japan:
Sales + Technical support
China:
Sales + Technical support

NTN suspension bearings

Suspension systems are essential to gather the dynamic performance and comfort of modern vehicles. They fulfill a dual role by enhancing handling and braking response while ensuring passenger comfort by mitigating road noise, shocks, and vibrations. Achieving the right balance between these opposing objectives requires precise tuning, as performance and comfort are often in conflict.

Maintaining consistent contact between tires and the road is critical, since all dynamic forces for steering, acceleration, and braking are transmitted through the tire's contact patches. An effective suspension system not only preserves vehicle control but also shields structural components and onboard cargo from premature wear and impact damage.

Front and rear suspension architectures are often uniquely designed to optimize specific performance characteristics. These systems directly influence the vehicle's behavior under a wide range of driving conditions, from high-speed highway cruising to tight cornering on uneven terrain. Comfort becomes particularly important on long-distance journeys, where fatigue and stability are key concerns.

Advanced solutions have been developed to meet these demands, with particular attention given to top-mount and spring seat assemblies in MacPherson strut configurations. These components undergo rigorous validation, including corrosion and durability testing, ensuring that they meet the high standards required for long-term reliability and operational robustness.

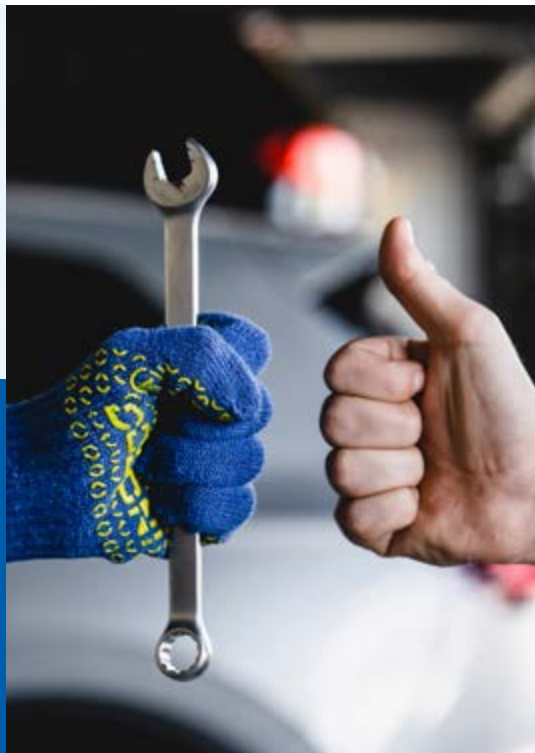
NTN is the world's leading OEM supplier of suspension bearings, producing over 90,000 bearings per day. NTN Europe conducts several and various dynamic testing at its test centre in Annecy, France.

Other testing includes mechanical, chemical, dimensional, and metallurgical testing on steel and plastic components to ensure the highest possible quality.

Why choose NTN products?

Major player and leader in MacPherson strut technology, producing 90,000 bearings per day. Thanks to its responsiveness, its innovation potential, its expertise and its production sites throughout the world, NTN is well-positioned as a partner to the biggest vehicle manufacturers when it comes to suspension systems.

Product quality, ensuring an optimal level of performance and safety for our customers.



Evolution of the MacPherson suspension bearing

In response to market needs, NTN has been able to develop its range with bearings which now include more and more functions like spring support, shock absorber bearing support; and which respond in an innovative way to the demands of the automotive manufacturers (smaller package space, ever greater level of comfort and road holding performance).

GENERATION 0

STEEL BEARING WITH THE TOP MOUNT OF THE SHOCK ABSORBER

GENERATION 1

STEEL BEARING ATTACHED TO THE UPPER OR LOWER SPRING SUPPORT

GENERATION 2

STEEL BEARING WITH INTEGRAL UPPER SPRING SUPPORT

GENERATION 2.5

STEEL BEARING WITH INTEGRAL UPPER SPRING SUPPORT AND SHOCK ABSORBER SUPPORT

NTN suspension bearing features

Modern suspension strut assemblies must meet increasingly demanding performance criteria to support both vehicle dynamics and driver experience. Central to this is the integration of ball-bearing struts, which offer significant advantages in terms of smooth operation, steering precision, and durability.

These assemblies are engineered to deliver constant and low torque across a wide range of operating conditions, including extreme temperatures, variable load levels, and changing wheel or spring positions. This ensures a consistent steering feeling, enhancing both comfort and driver confidence. The elimination of "stick-slip" behaviour, particularly under cold start conditions, further contributes to smooth and responsive steering input.

High-performance sealing systems are incorporated to safeguard internal components from contaminants, maintaining optimal function over time. The structural design emphasizes robustness, stiffness, and compactness, achieved through carefully selected materials and optimized geometries.

This rigidity is critical not only for enhancing vehicle handling and active safety, but also for supporting easier integration into modern, space-constrained chassis systems.

The compact nature of the design also facilitates simple steering assistance setups, contributing to overall system efficiency. A wide range of configurations ensures adaptability across vehicle platforms, while proven reliability and long-lasting performance underscore the system's role in maintaining safety, steering precision, and driving comfort throughout the vehicle's lifecycle.

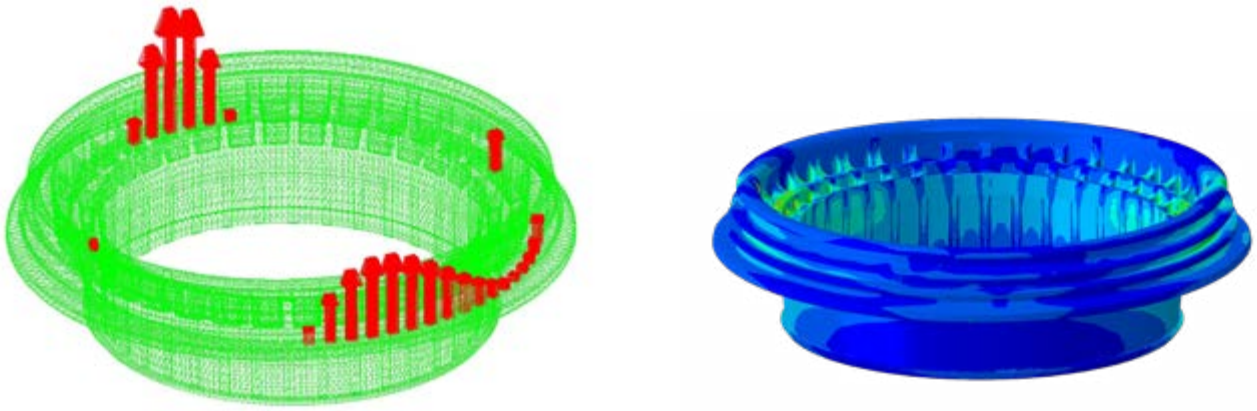
Simulation tools

From design to testing, NTN Europe invests extensively in the resources and capabilities required for product design and development.

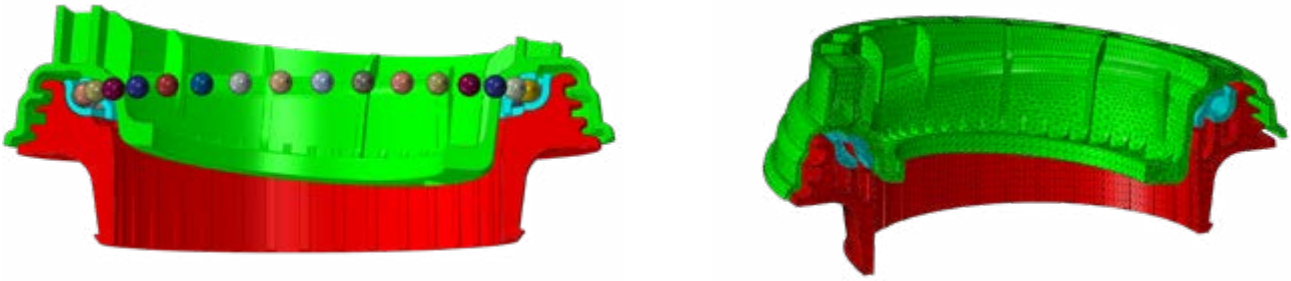
Using finite element numerical analysis of the strut bearing under customer-specific loadings we determine, for each part of the assembly:

- Deformation
- Displacements
- Stress
- Contact pressure

Thanks to an unwavering attention to detail, comprehensive computational analyses are conducted to ensure that each design precisely aligns with application-specific requirements. **This methodical approach not only guarantees optimal performance and reliability under real-world conditions but also enables the development of solutions that remain cost-effective**. By integrating simulation-driven design with material efficiency and manufacturing feasibility, engineers are able to strike a critical balance between technical excellence and commercial viability.



Simulating spring induces stress on the strut.



Finite Element simulation of the complete Strut bearing, with optimized mesh on components

Testing facilities

After the design phase, our prototypes are rigorously tested according to internal and client specifications, these tests are designed to put the suspension bearings under conditions which reflect their application on vehicles. These tests allow us to validate the following characteristics:

- Endurance
- Shock
- Pull-apart
- Loading distribution measurement
- Sealing
- Torque

Among others, we use the following testing equipment:

Full Mac Pherson
Assembly testing: this machine emulates the full range of motion and strains applied to the bearing in prolonged cycles, thus testing for endurance.

BBP2 & BBP3:
this testing machine tests for endurance and sealing by applying cycles of compression and release, all the while projecting a high-pressure stream of muddy water.

BBP2

BBP3

Test bench fatigue: False Brinelling Effect, structural fatigue

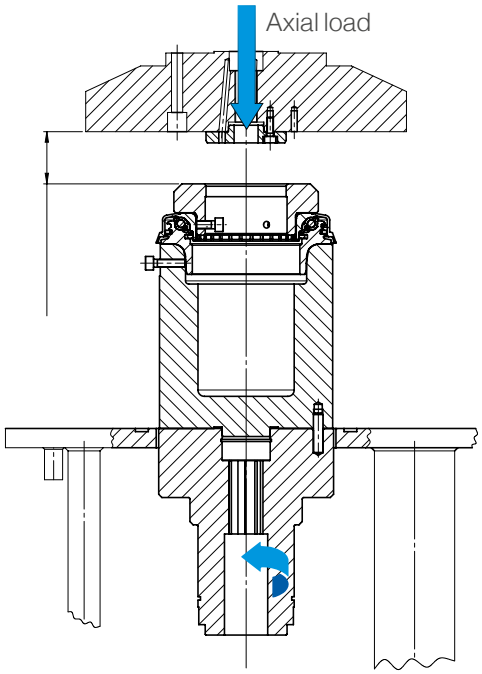
Test bench description

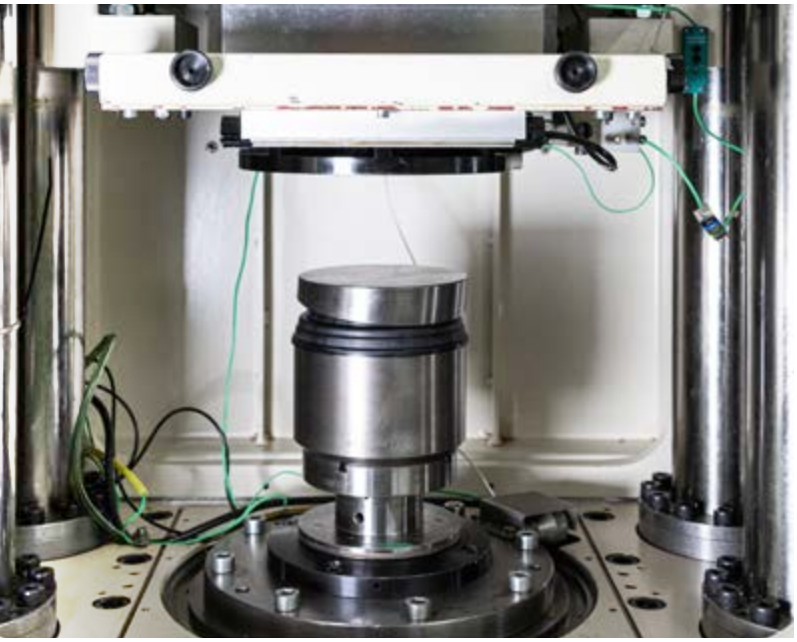
Axial load	0 to 25 000
Radial load	0 N
Vertical Vibration	+/- 6mm, up to 20Hz
Temperature	Ambient

Torque test bench: torque measurement

Test bench description

Axial load	0 to 10 000 N
Radial load	0 N
Oscillations	+5° at 1Hz
Rotation speed	10 rpm
Temperature	Ambient





Bearing analysis centre

With the support of NTN's Technical Assistance Service (SAT), each bearing is backed by a dedicated team of experts whose mission is to understand, analyse, and optimise performance under the most demanding conditions. Much like a scientific investigation, every expertise begins with a systematic assessment of the product in its real application environment, considering factors such as design integration, operating conditions, assembly practices, and maintenance procedures.

By combining first-level visual and mechanical inspections with advanced analytical methods including microscopic surface observations, laboratory testing, and failure mode reconstruction SAT engineers are able to establish precise scenarios of damage progression and identify the true root causes of failure.

This technical depth ensures that our recommendations are not generic, but tailored solutions that directly address the customer's application challenges, whether they relate to design, manufacturing, or usage.

Beyond analysis, the SAT also contributes proactively to development phases, validating prototype performance, refining mounting guidelines, and supporting design improvements that extend product life and reliability. Acting as an indispensable link between engineering, manufacturing, and the field, the SAT transforms complex data into clear, actionable insights, ensuring that NTN bearings deliver not only exceptional durability and consistency, but also measurable value across their entire service life.

Innovation

At NTN Europe, innovation is at the core of our strategy. Our approach is structured around four key pillars:

- Mobility
- Ecoresponsible Industry
- Digitalisation and services
- New Technologies (IoT, connectivity).

Closely connected to product industrialization, our RID department (Research, Innovation & Development) is involved in the very early stages of each project. We mobilise our R&D expertise, advanced testing capabilities and trusted partner network to co-develop or enhance your products. This collaboration ensures solutions that are innovative, robust, and competitive.

Innovation projects are monitored using the TRL (Technology Readiness Level) framework, ensuring a controlled maturity ramp-up so that only fully validated solutions are brought to our customers.

By working with NTN, you benefit from the strength of a century-old group and from an open-minded innovation culture with a strong taste for challenge. A concrete example of this success is the eco-designed strut bearing presented below.

We are proud to introduce **our new eco-designed strut bearing**, specifically developed for **high load** applications, combining **stiffness, lightweight** and **compactness** to enhance vehicle performance. Thanks to its **aluminum spring seat** and the use of **recycled polyamide**, it offers an optimized architecture to withstand high loads while remaining cost competitive and **reducing environmental impact**.

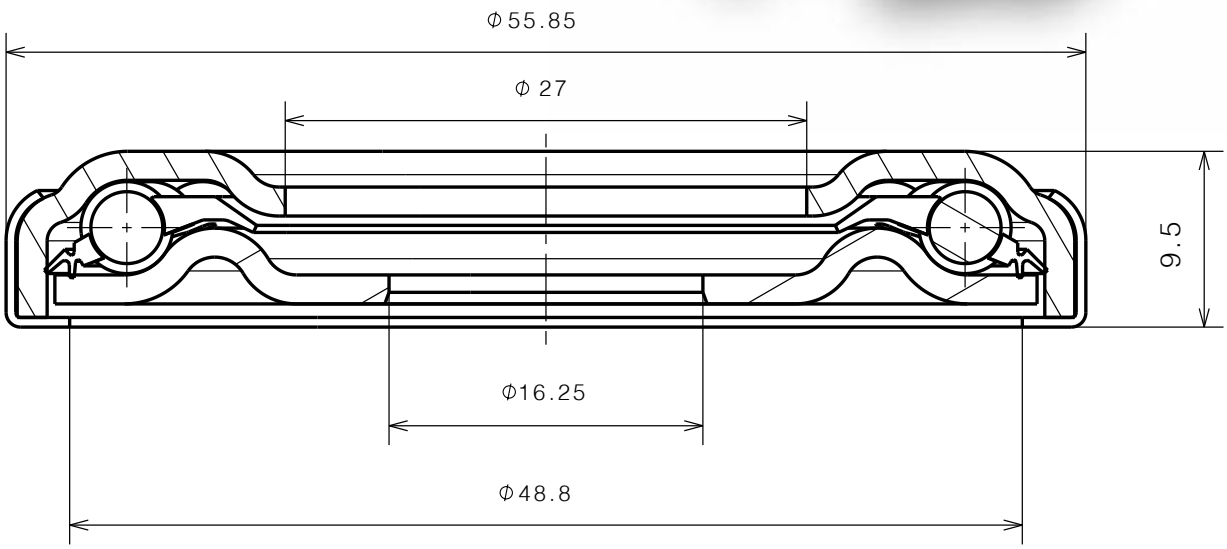
Based on a complete Life Cycle Assessment carried out in accordance with ISO 14040, this solution delivers a **41% reduction** in CO_2 equivalent emissions compared with a conventional strut bearing, while also benefiting from an improved end of life thanks to the well-established aluminum circular economy. We are already working on its integration into various customer platforms to optimize the design according to your specifications and provide a solution that can be rapidly deployed on your future vehicle projects.

This strut bearing is generating strong interest on the market: representative prototypes can be provided for your bench and vehicle testing, under conditions close to your real-life applications. It illustrates NTN's commitment to bringing efficient solutions to market, supporting a more sustainable mobility.

NTN suspension bearing offer

Generation 0

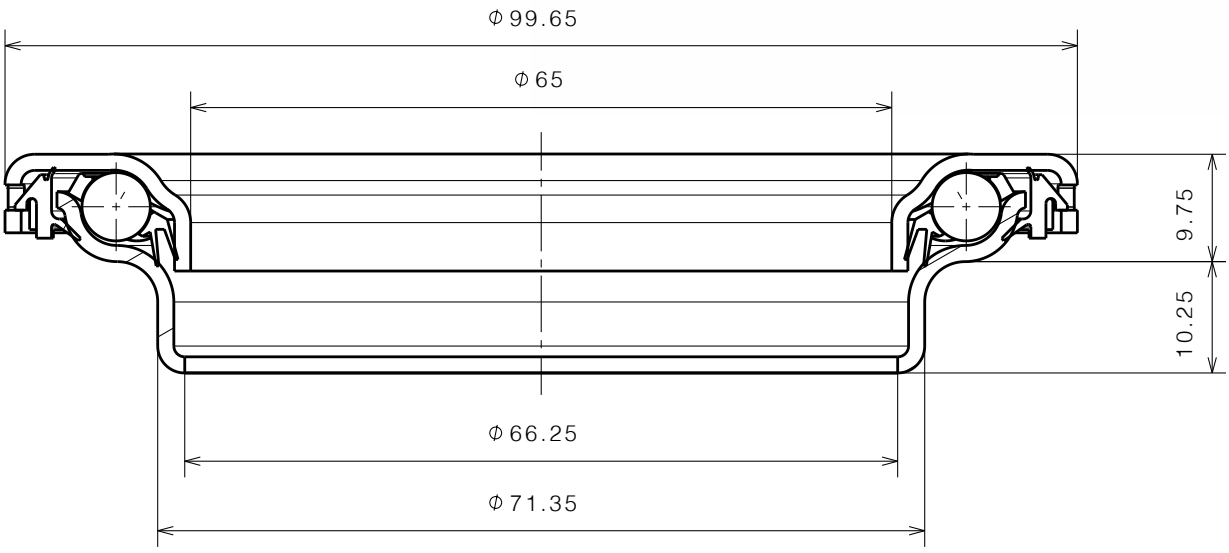
GEN0 - AP40016S01



Ø Block clamping (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
27	55.85	48.8	n/a	16.25	9.5	n/a	26000	74

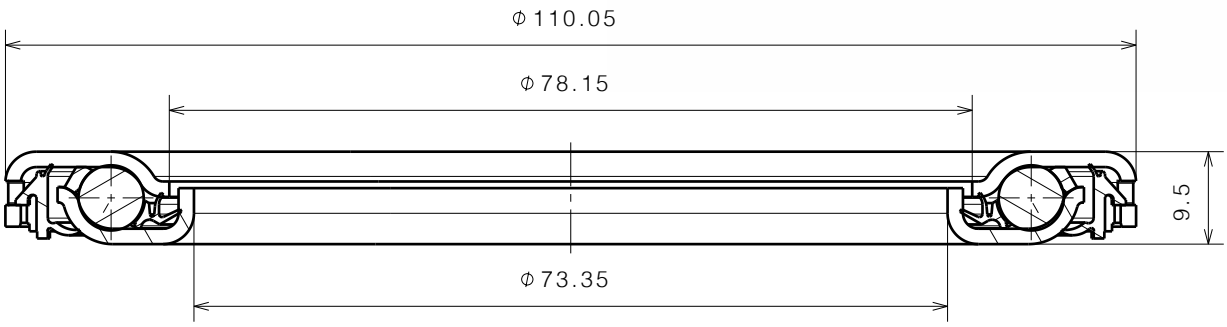
Generation 1

GEN1 - AP12006S05



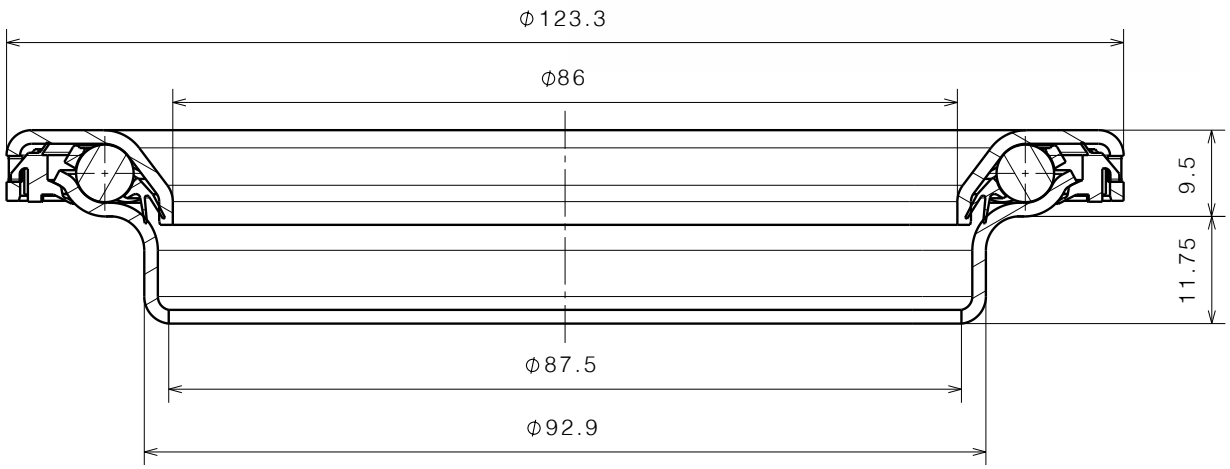
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
65	65	99.65	n/a	71.35	66.25	9.75	10.25	40500	175

GEN1 - AP40277S05



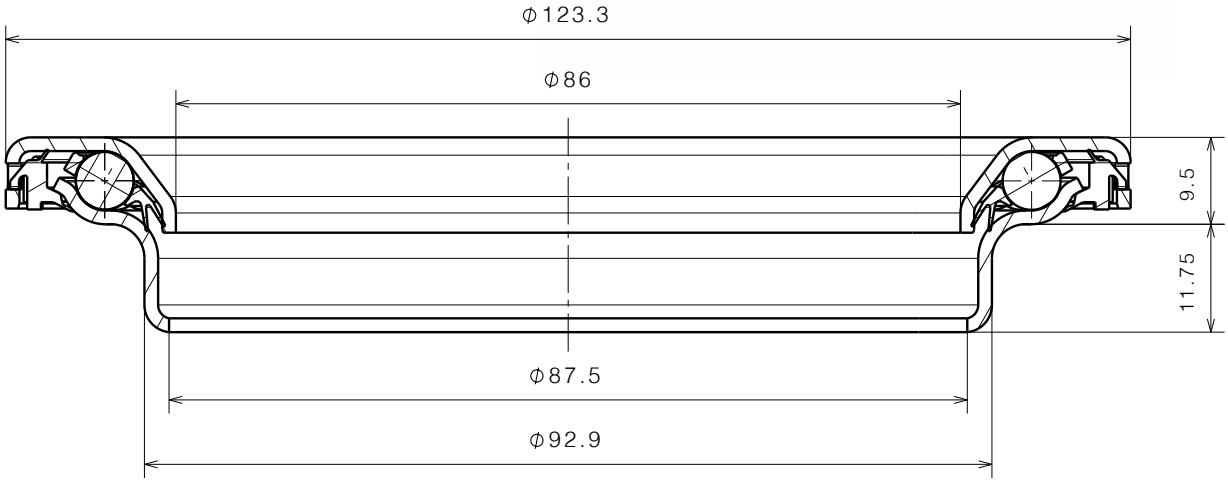
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
78.15	78.15	110.05	n/a	n/a	73.35	9.5	n/a	33000	158

GEN1 - AP40644



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
86	86	123.3	n/a	92.9	87.5	9.5	11.75	41000	221

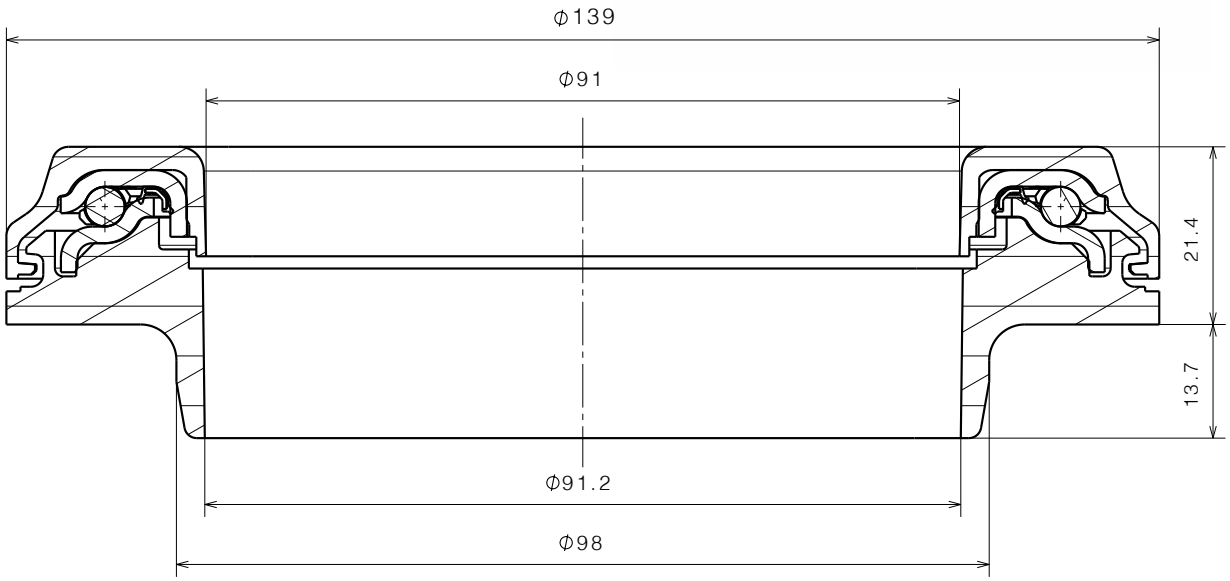
GEN1 - AP41951



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
86	86	123.3	n/a	92.9	87.5	9.5	11.75	62000	272

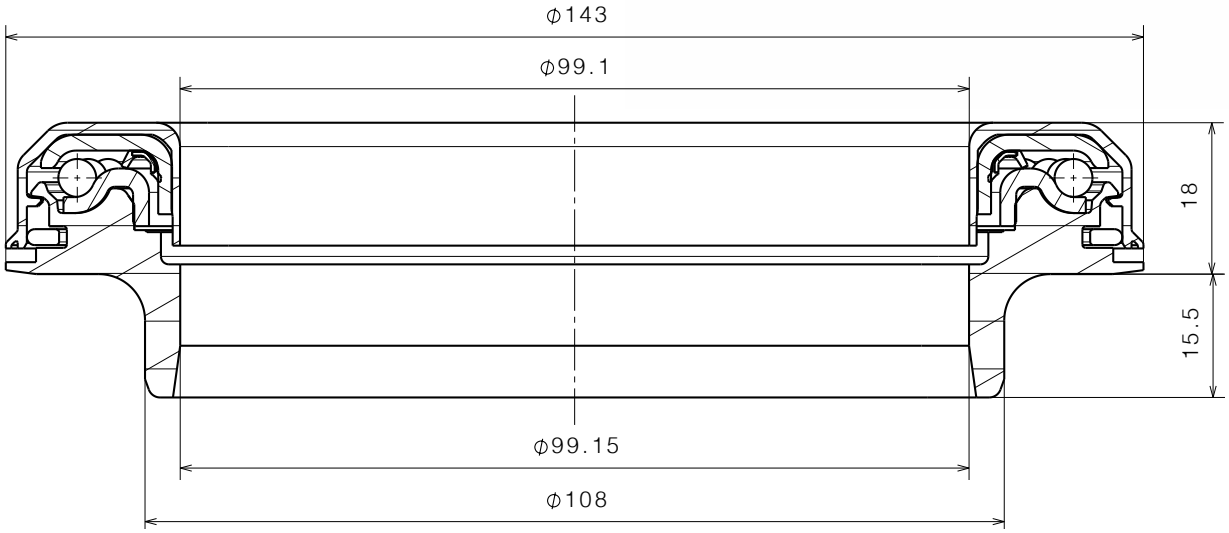
Generation 2

GEN2 - AP40978S13



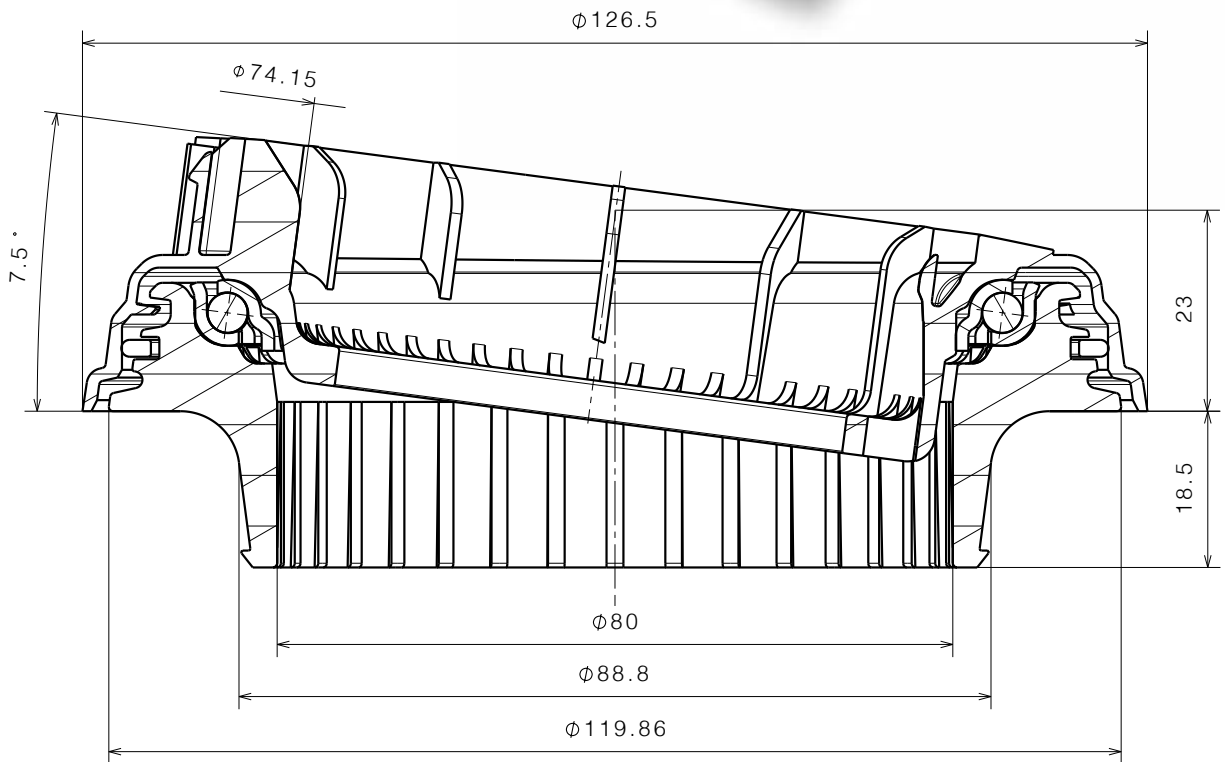
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (kg)
91	91.2	139	139	98	91.2	21.4	13.7	44300	0.390

GEN2 - AP42124S02



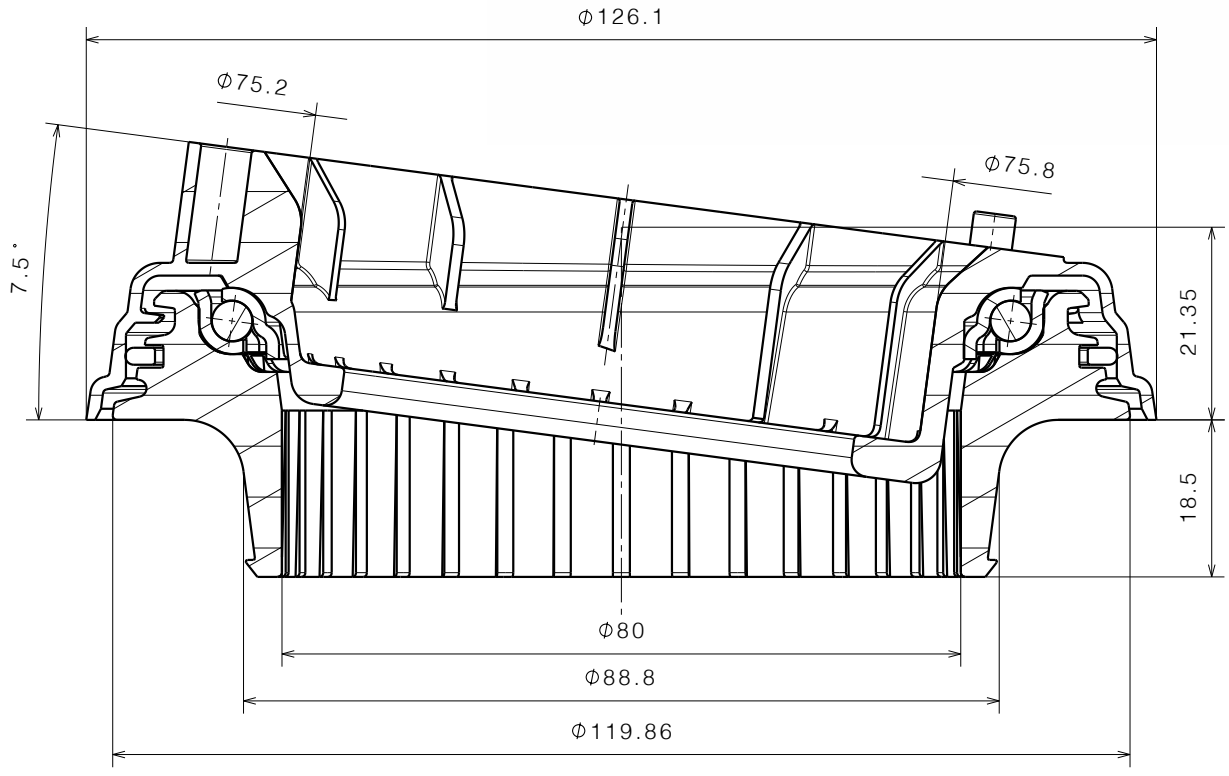
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
99.1	99.1	143	143	108	99.15	18	15.5	33500	373

GEN2 - AP45609S01



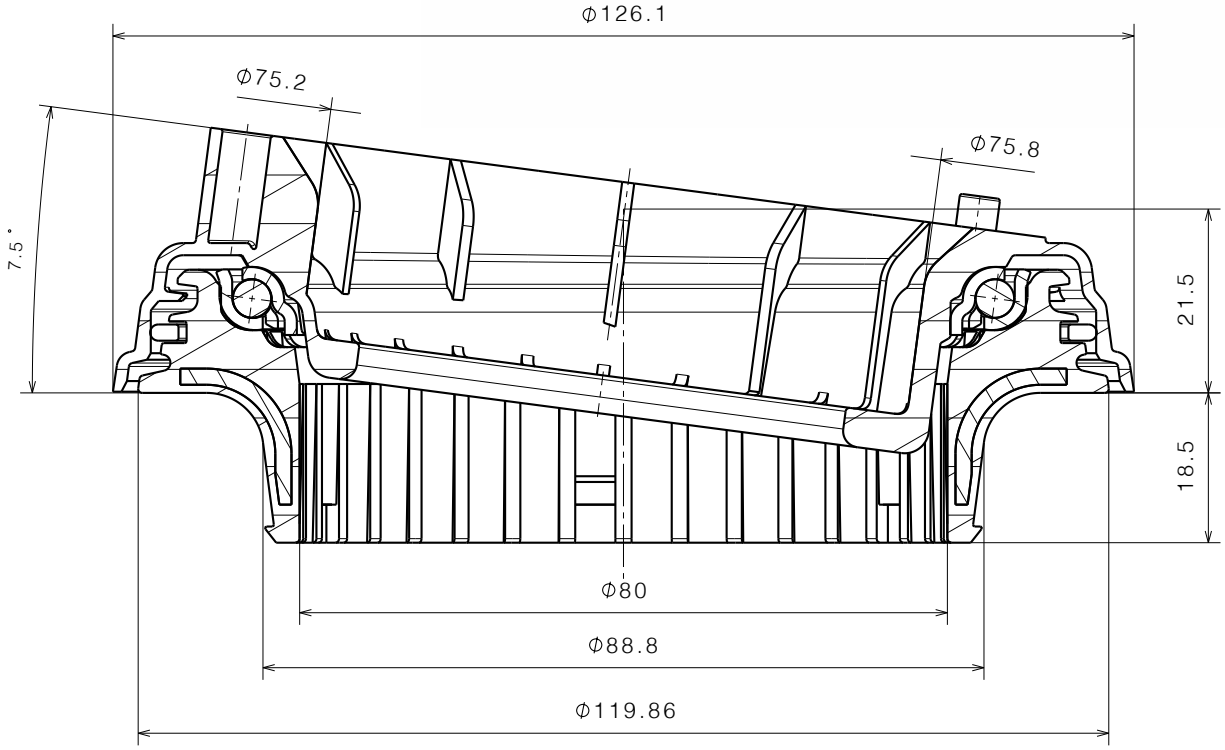
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
74.15	74.75	126.5	119.86	88.8	80	23	18.5	37500	270

GEN2 - AP43444S04



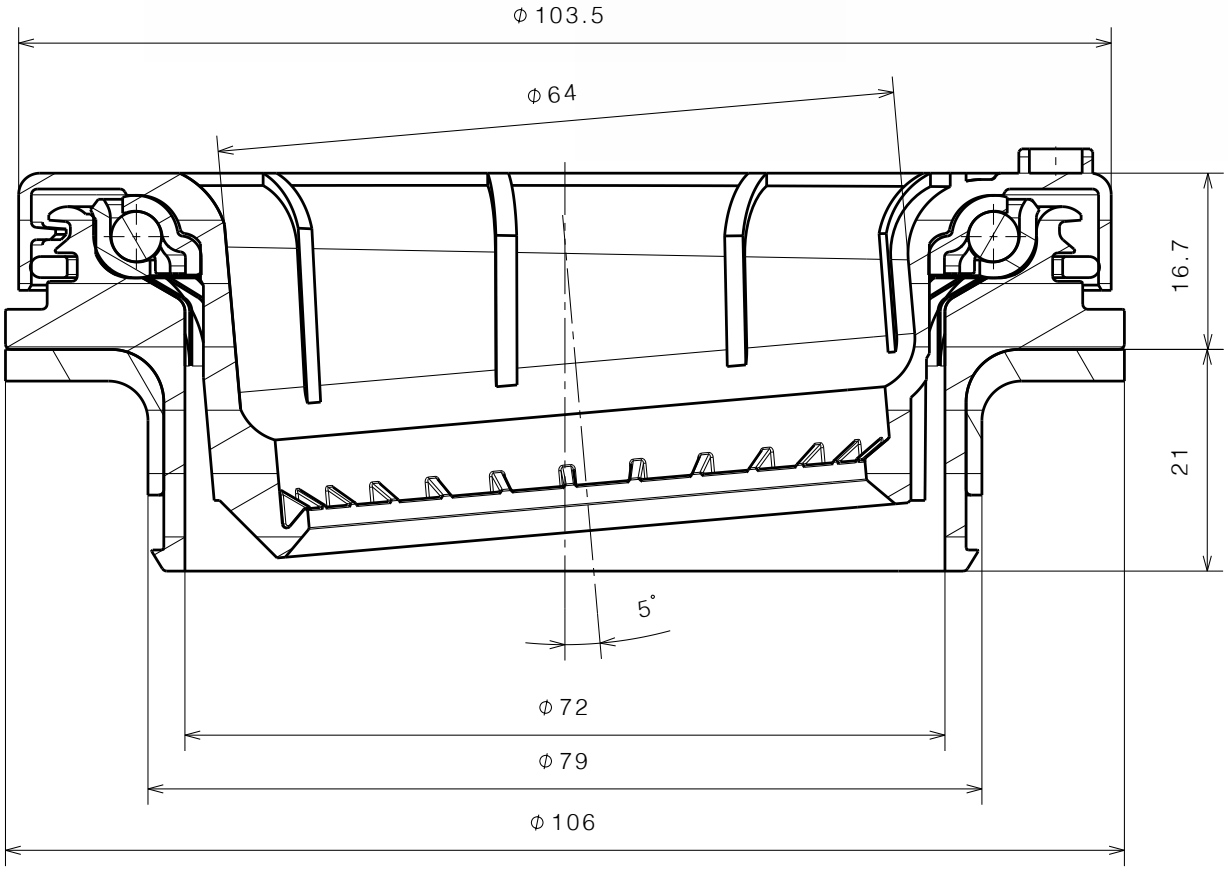
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
75.2	75.8	126.1	119.75	88.8	80	21.5	18.5	37500	267

GEN2 - AP43444S05



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
75.2	75.8	126.1	119.75	88.8	80	21.5	18.5	37500	337

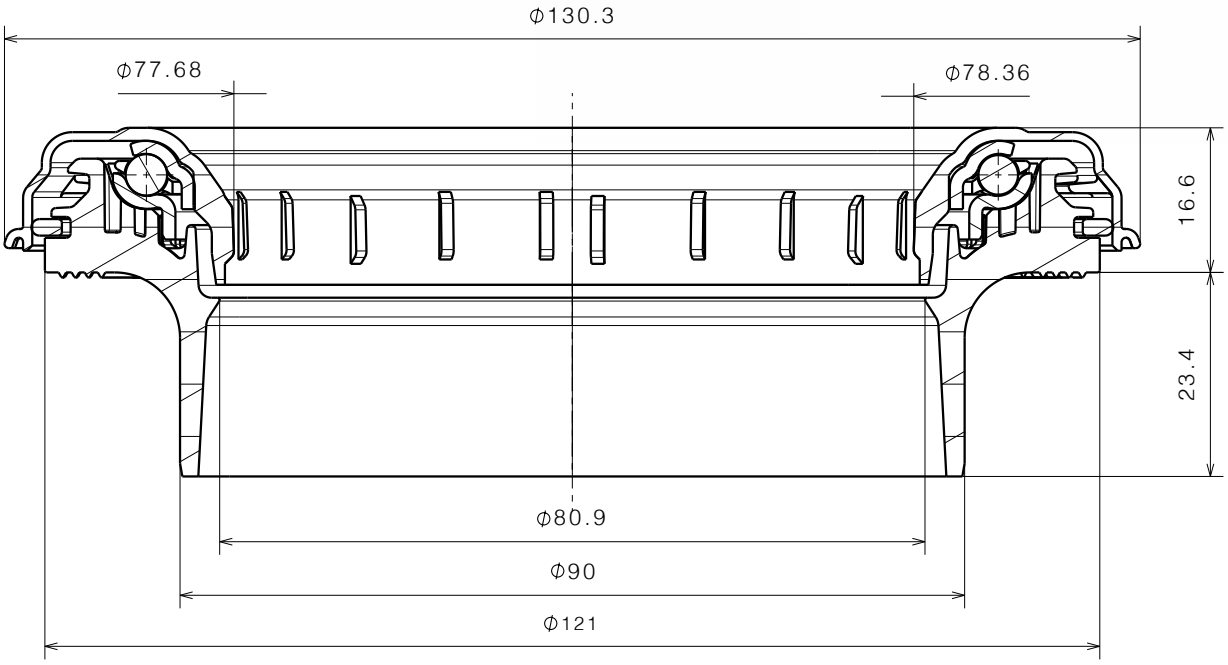
GEN2 - AP44417S22



*Can be delivered with filtration included

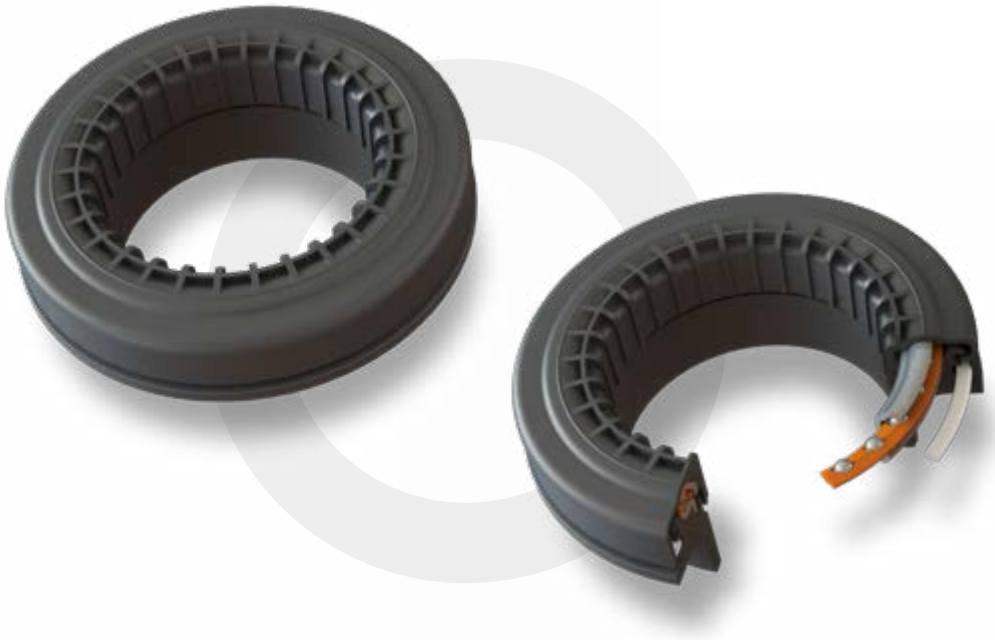
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
64	n/a	103.5	106	79	n/a	16.7	19.7	33000	216

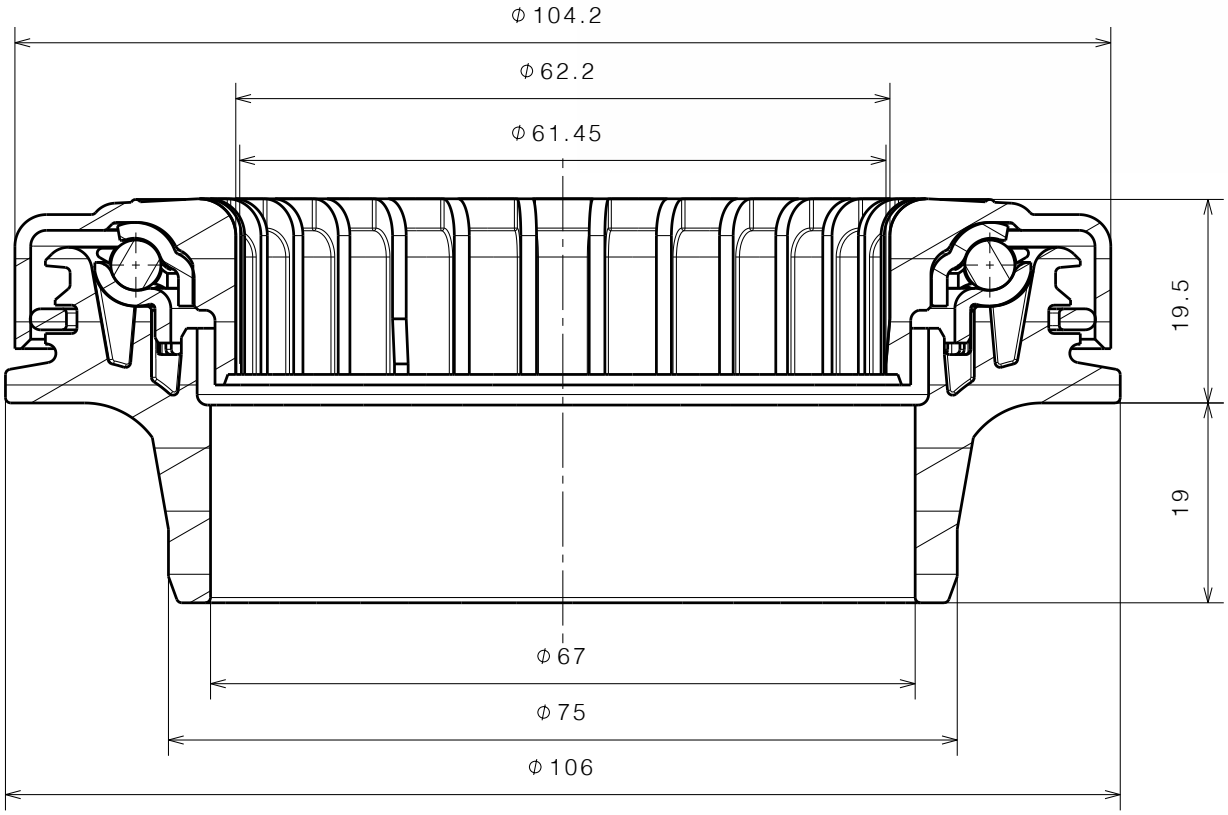
GEN2 - AP42824S07



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
77.68	78.36	130.3	121	90	80.9	16.6	23.4	42000	244

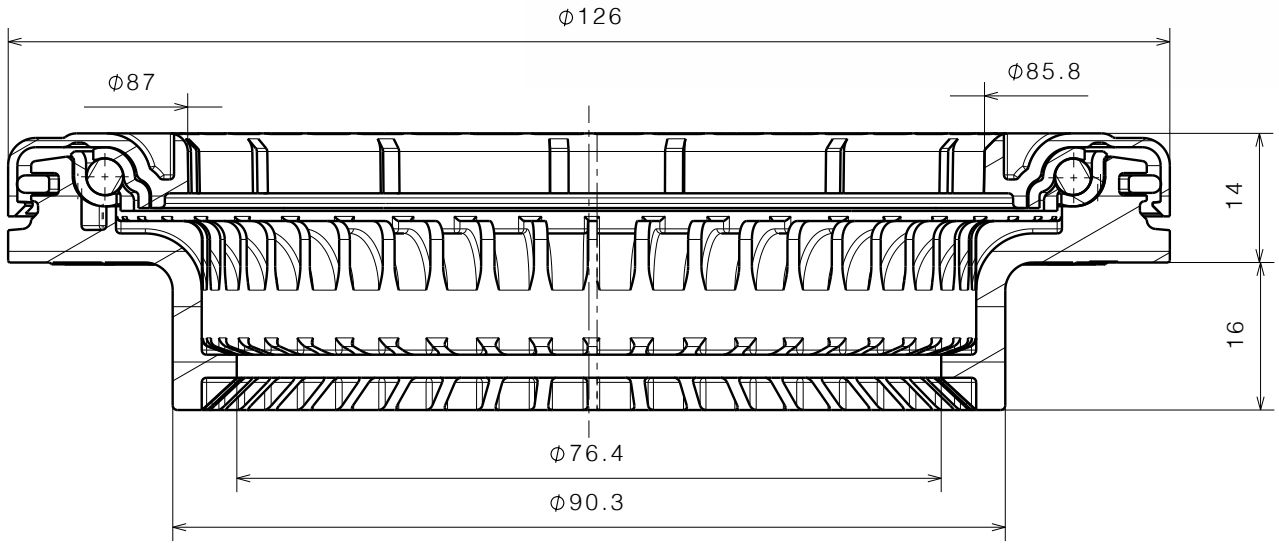
GEN2 - AP42200S09





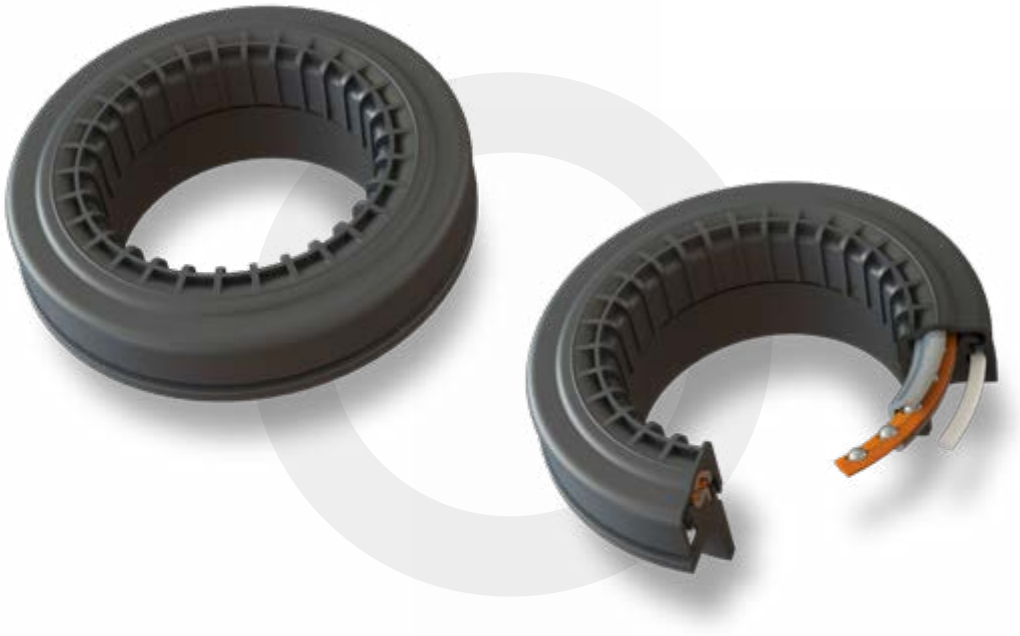
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
61.45	62.2	104.2	106	75	67	19.5	19	33000	188

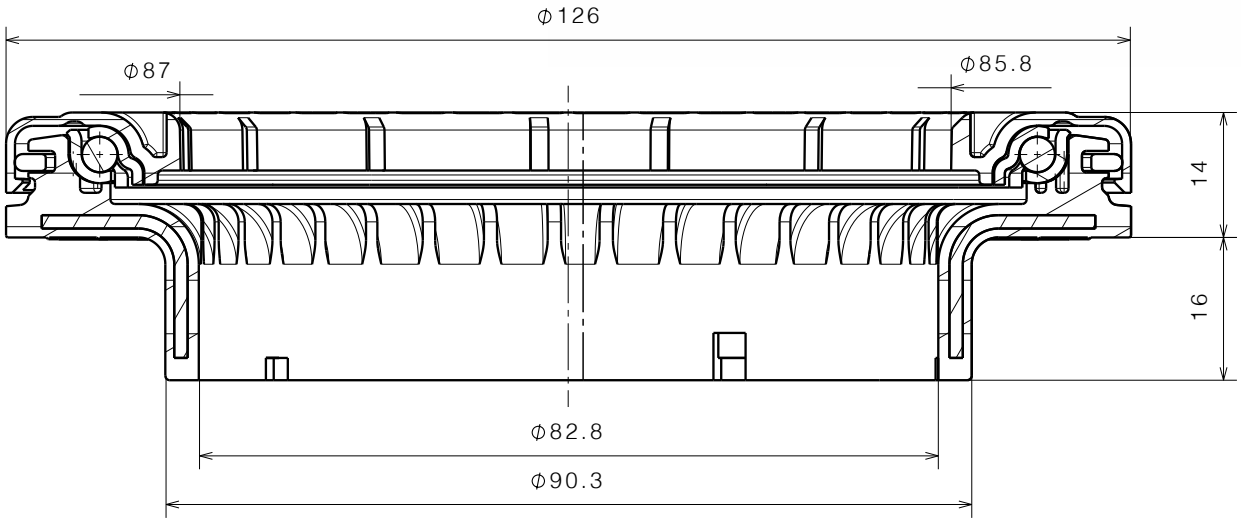
GEN2 - AP43885S21



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
85.8	87	126	126	90.3	76.4	14	16	32400	190

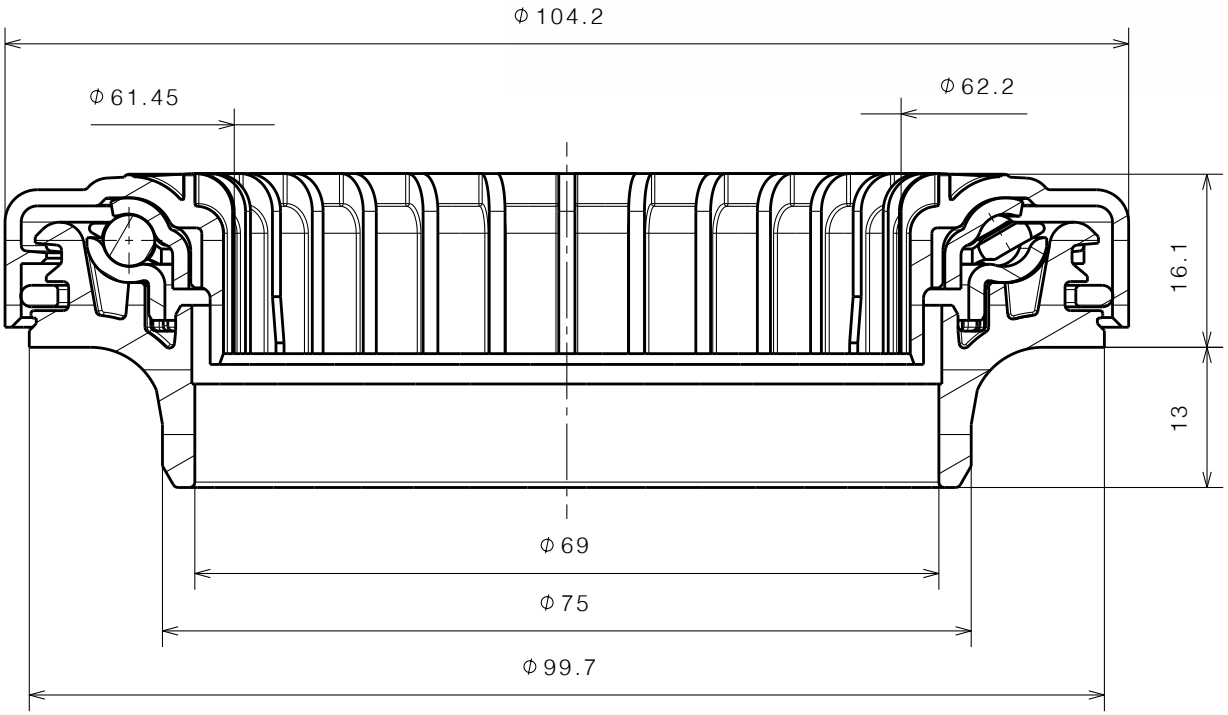
GEN2 - AP45047S04





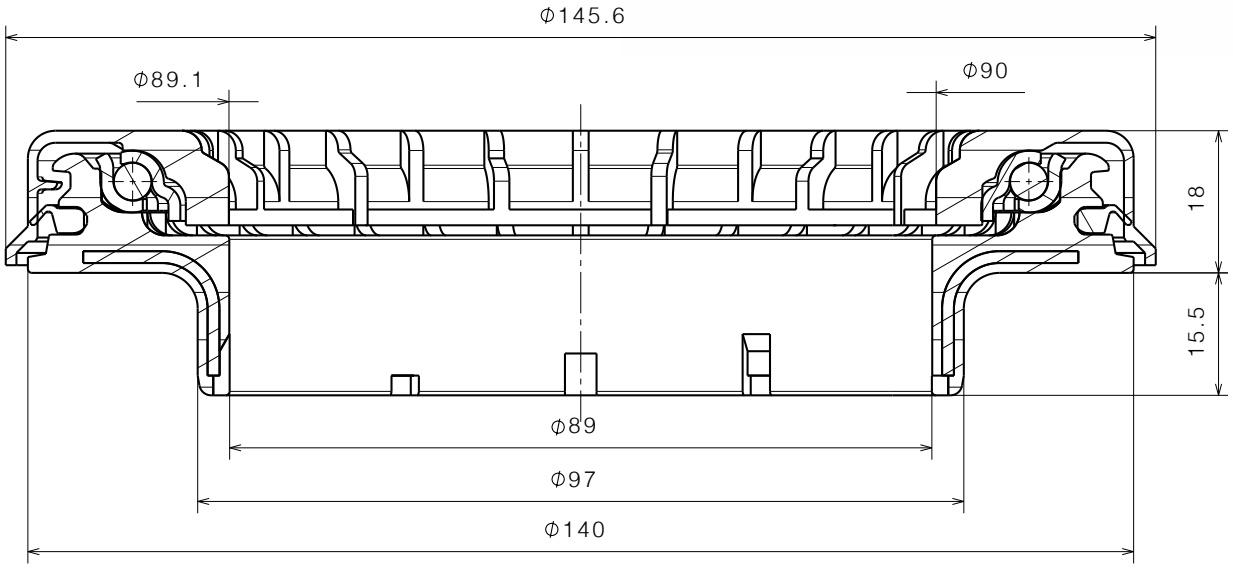
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
85.8	87	126	126	90.3	82.8	14	16	32400	270

GEN2 - AP43807S08



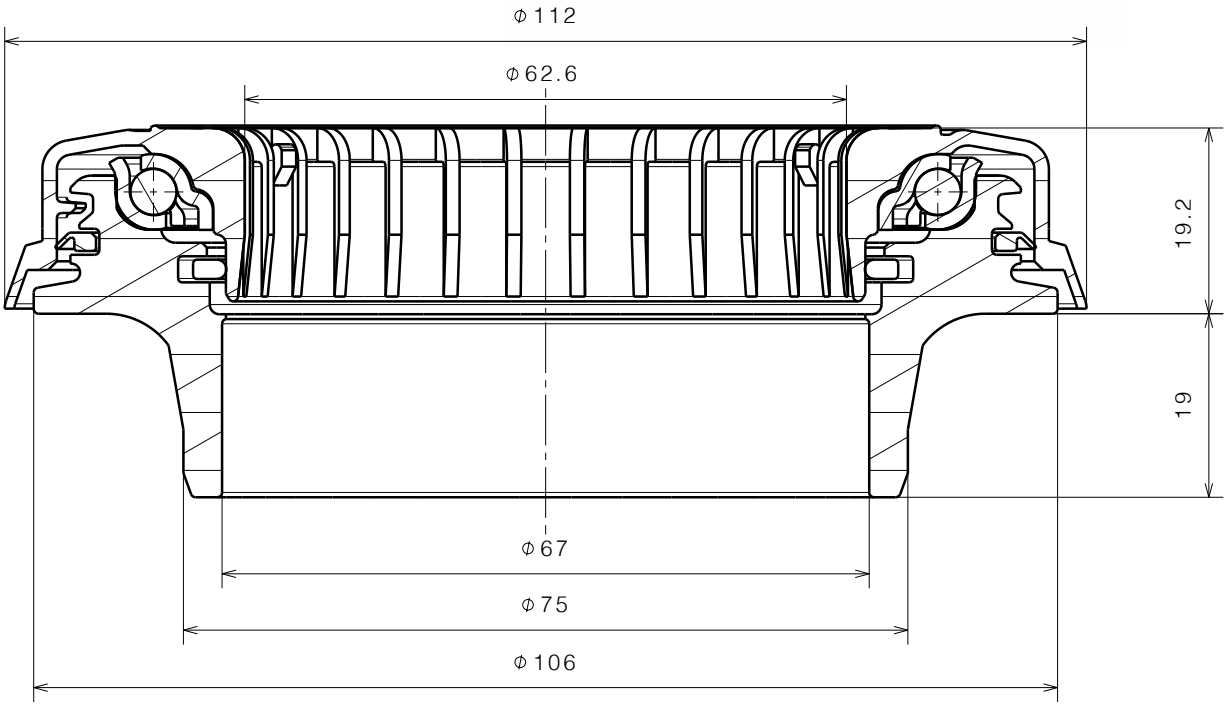
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
61.45	62.2	104.2	99.7	75	69	16.1	13	17500	155

GEN2 - AP44288S11



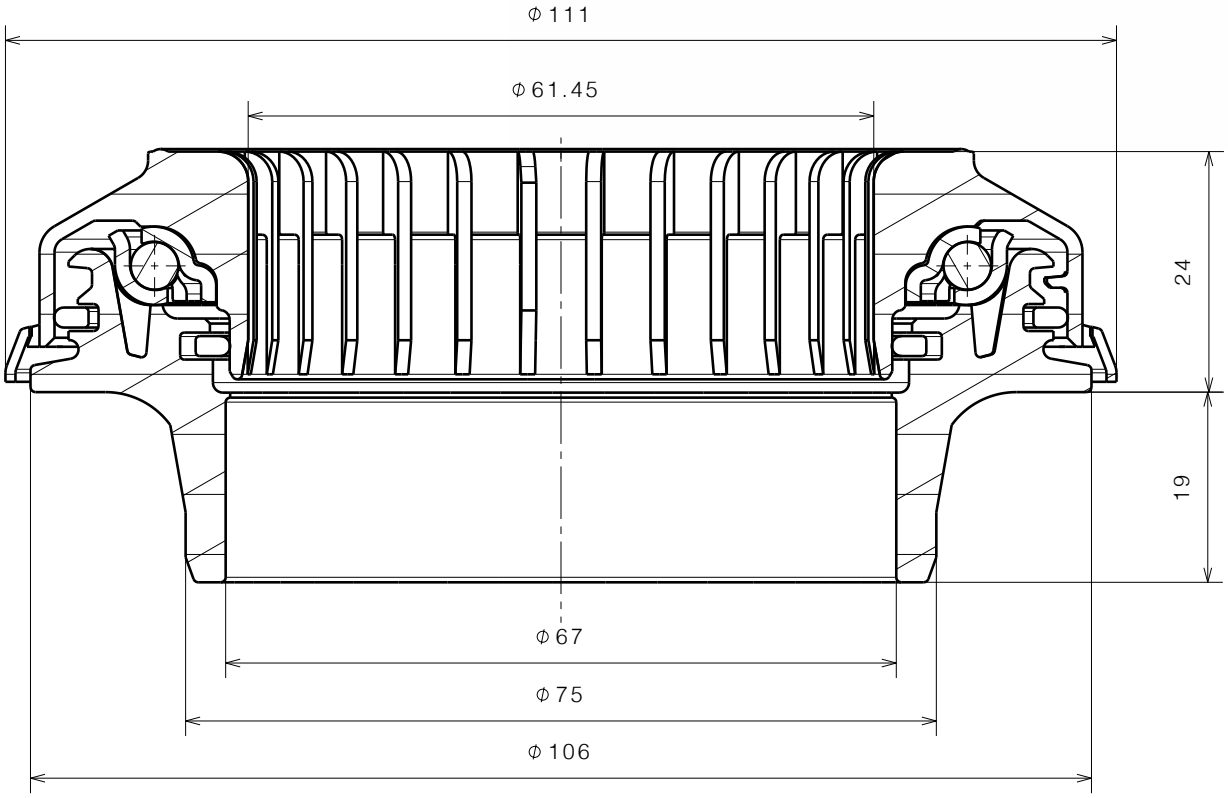
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
89.1	90	145.6	140	97	89	18	15.5	42100	388

GEN2 - AP44326S01



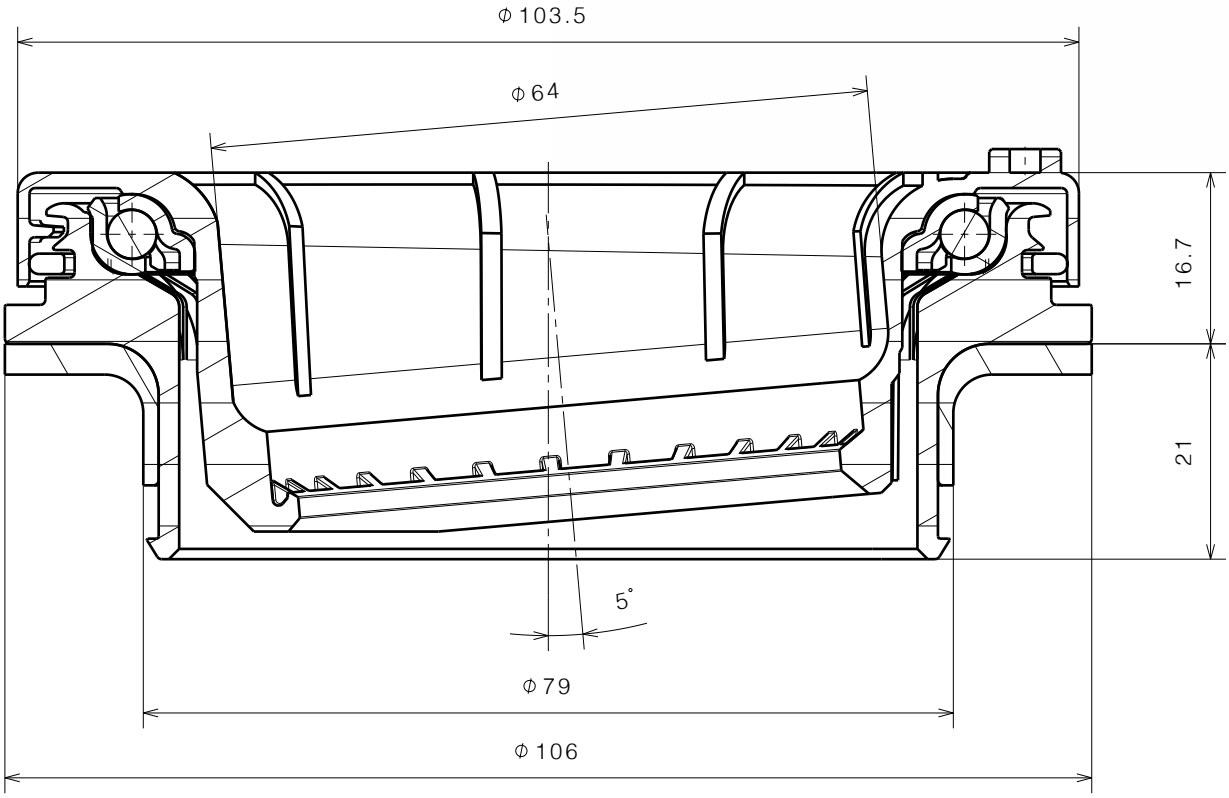
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
62.6	n/a	112	106	75	67	19.2	19	33000	195

GEN2 - AP45017S01



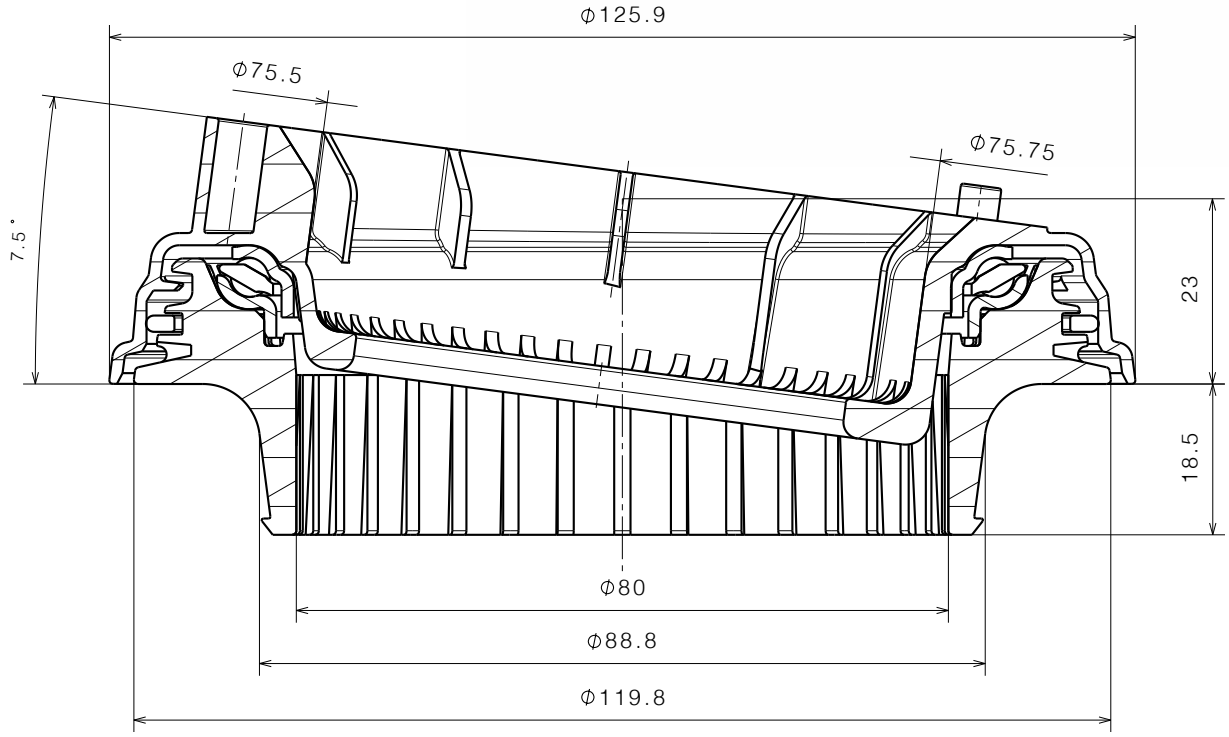
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
61.45	n/a	111	106	75	67	24	19	33000	204

GEN2 - AP46418S01



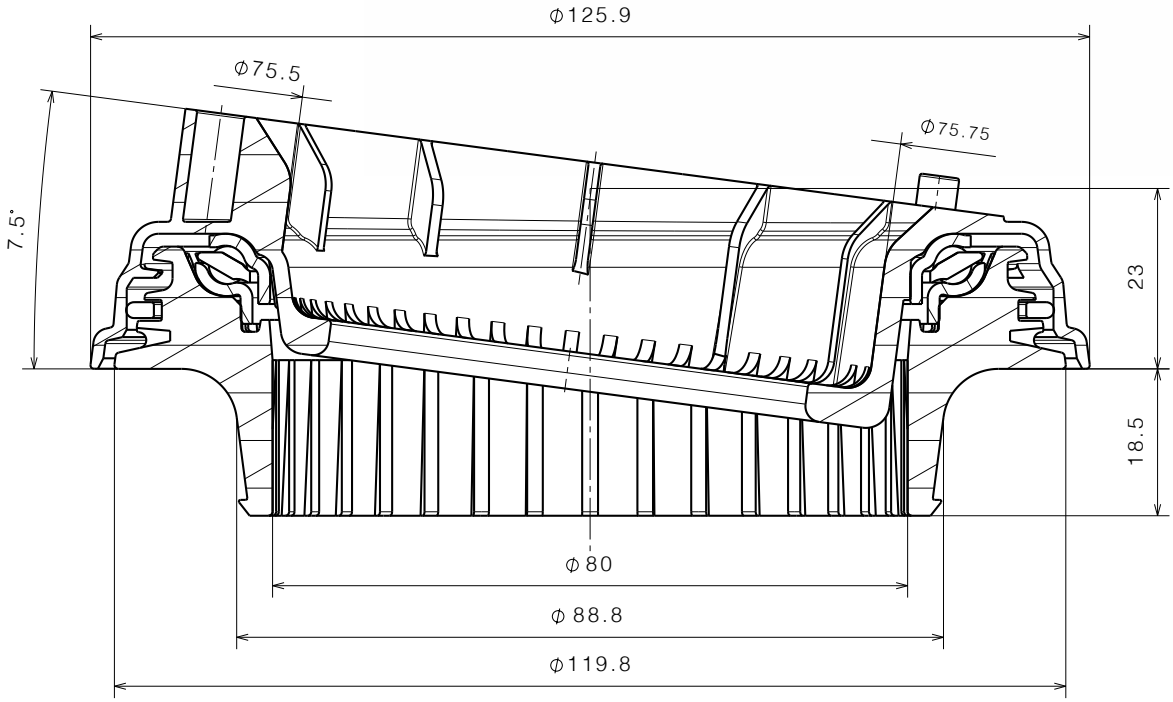
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
64	n/a	103.5	106	79	n/a	16.7	19.7	33000	217

GEN2 - AP42373S12



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
75.5	75.75	103.5	125.9	88.8	80	18.5	23	37500	271

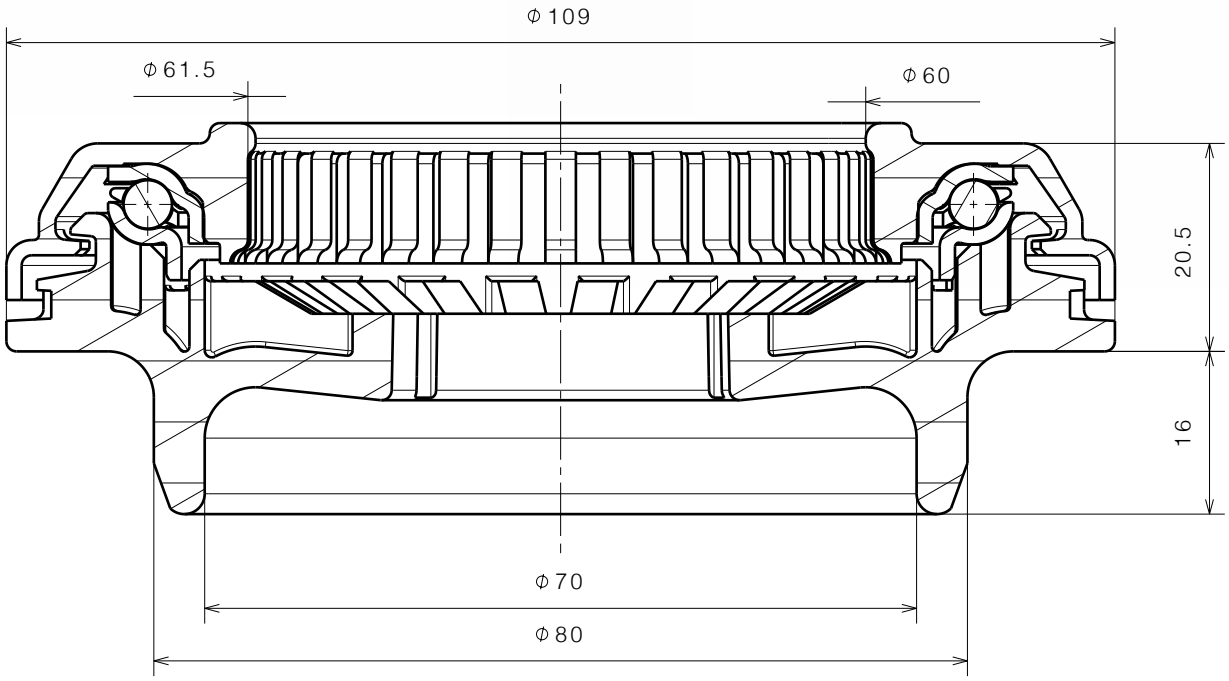
GEN2 - AP42373S16



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
75.5	75.75	103.5	125.9	88.8	80	18.5	23	37500	361

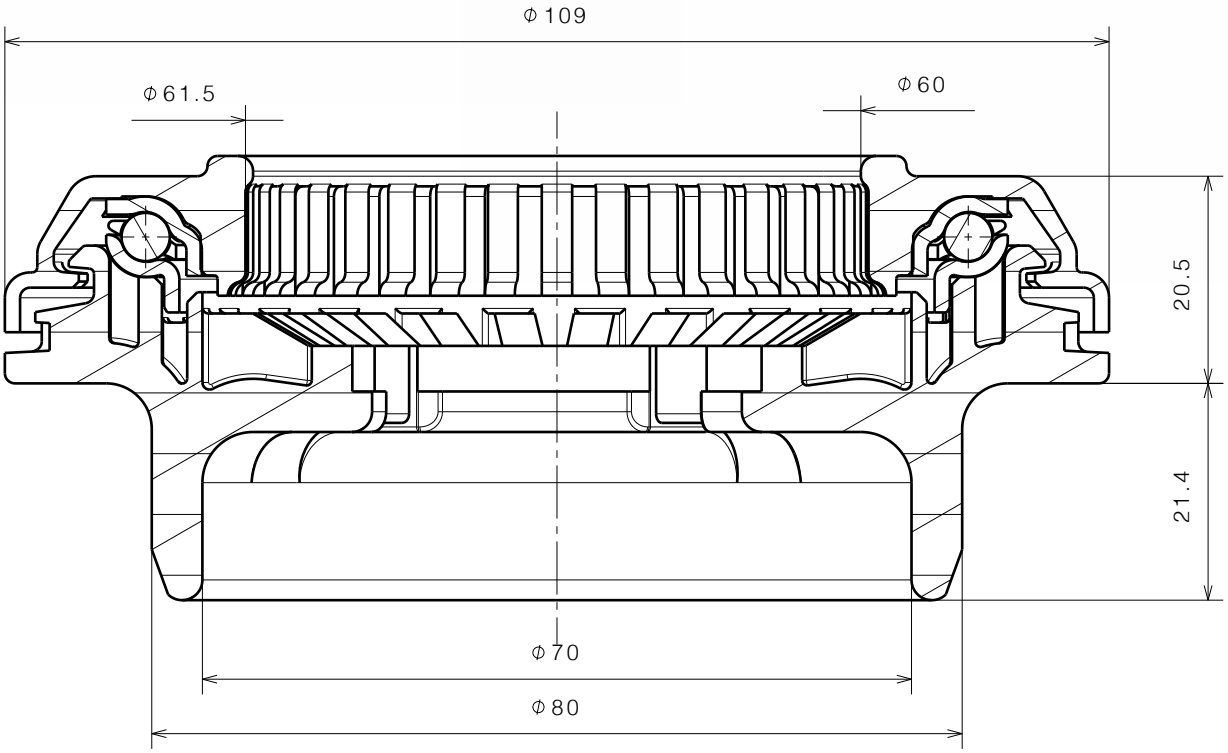
Generation 2.5

GEN 2.5 - AP41443S20



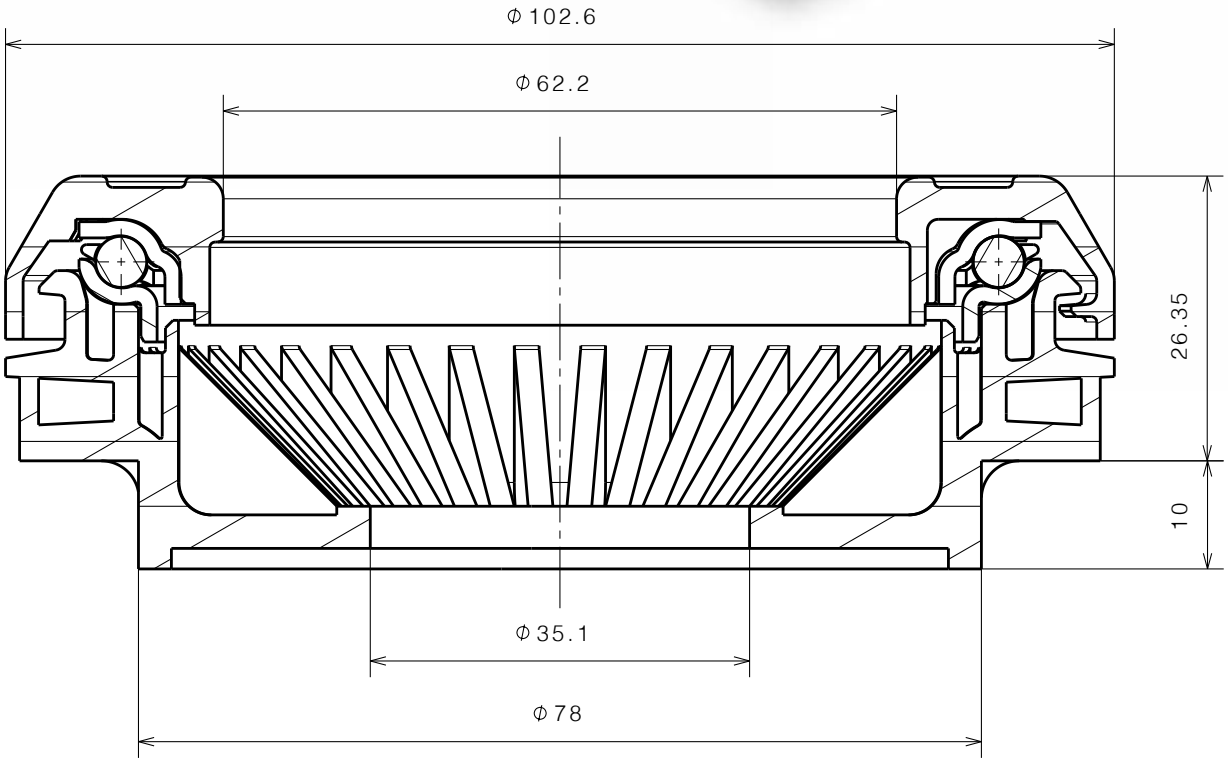
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
60	61.5	109	109	80	70	20.5	16	33000	234

GEN 2.5 - AP41443S21



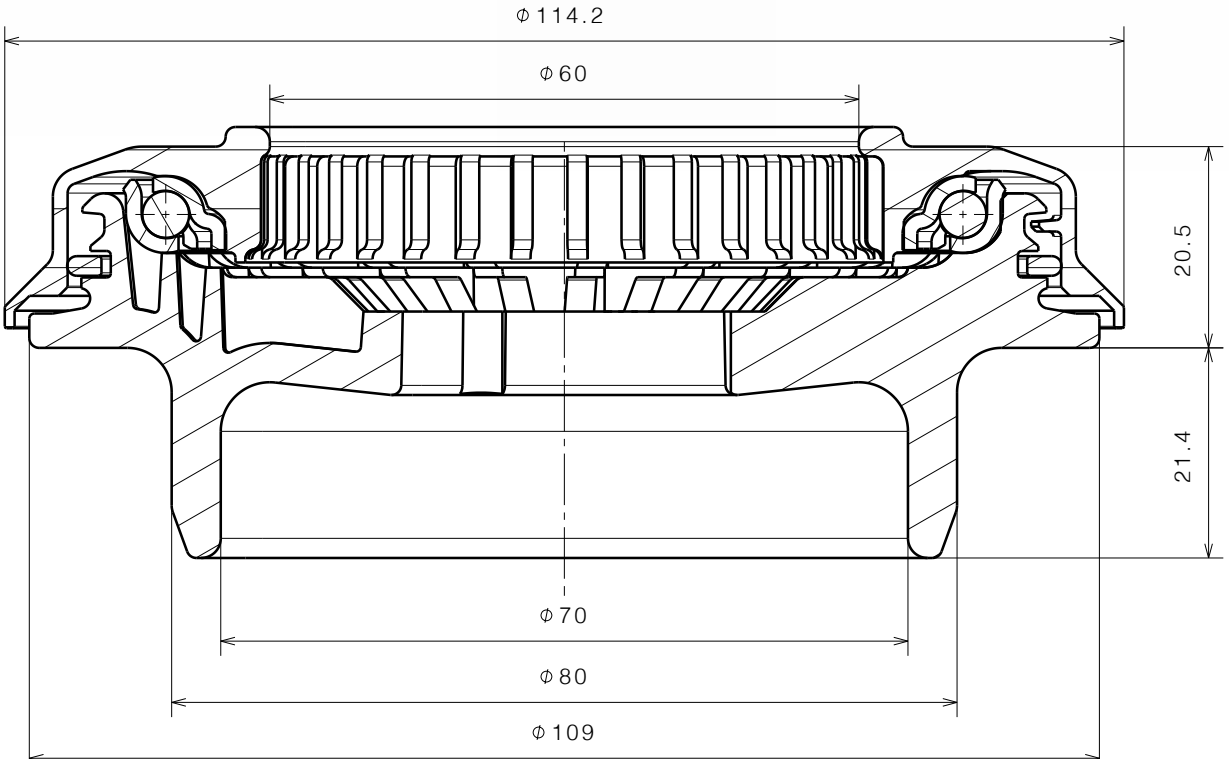
Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
60	61.5	109	109	80	70	20.5	21.4	33000	249

GEN 2.5 - AP45148S01



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
62.2	n/a	102.6	102.6	78	35.1	26.35	10	32800	227

GEN 2.5 - AP43828S07



Ø Block clamping (mm)	Ø Block centring (mm)	Ø Ext. COUV (mm)	Ø Ext. SUAP (mm)	Ø Spring centring (mm)	Ø Int. SUAP (mm)	Strut height (mm)	Spring centring height (mm)	C0 (N)	Mass (g)
60	n/a	114.2	109	80	70	20.5	21.4	32800	244

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