Linkeo®

High Temperature
Flexible Exhaust Decoupler

Innovation for your future
The Linkeo® solution has reached the market after 10 years of research and development

Decoupling
With outstanding flexibility, Linkeo® can be used to filter engine vibrations and displacements that are transmitted to the exhaust line.

Thermal insulation
The Linkeo® design means that gases are kept at a very high temperature so that after-treatment pollution control systems operate correctly (particle filters, catalytic converters...). This is achieved in proportions that are distinctly higher than existing products.

Seal
Linkeo® is the only product with an outer casing made from high-temperature silicone, which gives it a perfect seal against gases and fluids that are present in the line (Ad blue).
Current flexible decouplers

A flexible decoupler is generally the link between the exhaust manifold and the exhaust line. An example of an exhaust system that has a flexible decoupler is shown in the figure to the right.

**DESIGN PROPERTIES**

**Temperature resistance**

Insulating material and end cap design were achieved through thermal analysis. The main purpose of this analysis is to achieve an acceptable temperature level over the entire area of the elastomeric bellows. Linkeo is designed to withstand hot exhaust gases up to 900°C.

**Large displacement capability**

The purpose of this new flexible decoupler product is to isolate the exhaust line from maximum powertrain displacement. An envelope curve is used to verify that the product’s displacement capability is compatible with engine displacements throughout the entire lifetime conditions (typically between + / - 25 mm axially and + / - 25 mm radially). Simultaneous radial and axial spacing would reduce maximum capacity; maximum displacement depends on the inside diameter and length of the product.

**Internal pressure**

The elastomeric bellows is exposed to various pressures depending on the application (exhaust or Turbo) and whether the engine is petrol or Diesel-driven.

For exhaust applications, the gas pressure is approximately 0.3 Bar. Bellows inflation due to this pressure is limited by the textile reinforcement.

For a Turbo application on the air inlet circuit, the service pressure inside the decoupler can exceed 4 bars. The bellows for these applications is reinforced.

**Test characteristics:**
- $T_{\text{gas}} = 900^\circ C$
- Gas engine: 7.5 L
- Skin temperature: 130°C

**Linkeo® section**

**Validation process:**

_durability component tests_

**Displacements with mounting tolerances**

Radial displacement (mm) vs. Linkeo length (mm) without insertion.

Linkeo®

a new concept for exhaust de
VIBRATION ISOLATION PERFORMANCE

The combination of a soft strip wound hose and an elastomeric bellows results in static and dynamic stiffness characteristics that are considerably lower than for a similarly designed metallic decoupler.

Several customer validations have shown significant reductions in the output signal between a metallic solution and Linkeo®

THERMAL PERFORMANCE

The decoupler insulation facilitates after-treatment component regeneration as the outlet temperature is higher compared with metallic products or even straight exhaust tubing.

A benchmark between Linkeo®, a straight pipe section of an exhaust system and a metallic decoupler are given below.

This insulation is also advantageous for transient conditions as after-treatment component light-off time can be reduced by several minutes. The time spent rough idling can then be reduced as a result of this insulation.
Product range and options

- **Existing production diameter in mm (inches):**
  64 (2.5") - 80 (3") - 90 (3.5") - 101.6 (4") - 115 (4.5")
  120 (4.7") - 127 (5") - 250 (10") - 300 (12")

  **Possible diameter range in mm (inches):**
  between 50 (2") and 300 (12")

- **Pressure:**
  Linkeo high pressure turbo, CAC and EGR application.
  - Typically 2 to 4 bar service pressure (30 to 60 Psi)
  Linkeo low pressure exhaust application
  - Typically 0.3 bar (5 Psi)

  **Expertise:**
  up to 4.5 bars (65 Psi) on 127 mm (5 inch) diameter

- **Gas temperature:**
  diesel circuit up to 750°C (1380°F)

  **Possibilities:**
  up to 900°C (1650°F) petrol circuit

- **External diameter:**
  for a low temperature application less than 700°C
  \( D_{EXT} = D_{IN} + 50 \text{ mm} \)
  for a high temperature application greater than 700°C
  \( D_{EXT} = D_{IN} + 60 \text{ mm} \)

- **Minimum length:**
  200 mm (8 inches) on a diameter less than 150 mm (6 inches)

  **for larger diameters:**
  300 mm (12 inches) on a diameter greater than 150 mm (6 inches)

- **Flanges and pipes**
  Flanges and pipes can be adapted to suit customer requirements
  (Marmon flanges, flared-end flanges...)

Espa is part of the Hutchinson Industry Fluid Transfer Systems department. This department designs, develops and manufactures a broad range of highly technical products (hoses, flexible hoses, piping and clamps) with a large variety of suitable materials.

Certifications

Certification:
- AS 9100
- JIS Q 9100
- EN 9100
- ISO 9001
- ISO/TS 16949

Please contact your sales representative who will give you a form on which you can express your needs.