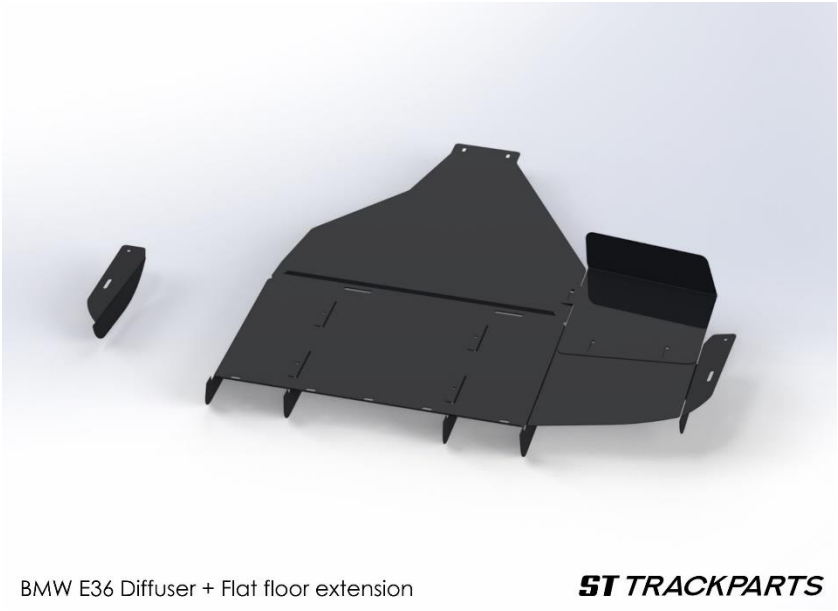
ST TRACKPARTS

ST Trackparts BMW E36 Diffuser Specification

The ST Trackparts diffuser has been assessed for its suitability in an automotive application.



BMW E36 Diffuser + Flat floor extension

Component Details:

- **Material:** 5754 Aluminium
- **Thickness:** 1.5 mm
- **Configuration:** 90-Degree Bends
- **Application:** Air Diffuser for BMW E36

Material Properties:
5754 Aluminum is a highly durable, corrosion-resistant material commonly used in automotive and aerospace applications. It has a minimum yield strength of approximately 200 MPa (Megapascals), meaning it can withstand significant forces without permanent deformation, making it ideal for exterior components like a diffuser that may be exposed to environmental stressors.

The 1.5 mm thickness of the diffuser ensures a balance between lightweight performance and structural integrity, reducing overall vehicle weight while maintaining sufficient strength to handle aerodynamic loads. The aluminum's excellent corrosion resistance further enhances the diffuser's longevity, even under harsh road conditions.

Strength Analysis:
The primary forces come from air pressure acting on the surface and the fins of the diffuser. 5754 aluminum alloy, with a yield strength of approximately 200 MPa (Megapascals), is more than capable of handling these forces without deformation. To put this into perspective, the pressure exerted on a diffuser at 300 km/h (40 km/h over the top speed of the E36 M3) is typically in the range of 3 to 10 kPa (kilopascals). Translating that into forces, even at the upper end, a force of around 10 kPa acting on a 1 square meter diffuser would result in a total load of 10 kN (kilonewtons).

The yield strength of 5754 aluminum at 200 MPa translates to it being able to withstand much higher pressures—200 N/mm^2—before deforming. A force of 10 kN distributed over a 1.5 mm thick aluminum sheet would generate stress of about 6.67 MPa, which is significantly below the 200 MPa limit of the material. This means the diffuser can easily resist deformation under these conditions, even at speeds reaching 300 km/h.

The 90-degree bend in the diffuser fins adds structural rigidity to the overall component. Bending metal at 90 degrees significantly increases its stiffness, especially in thin sheets, as it creates a more rigid section that resists bending and torsional forces.

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