INTELLIGENT ENGINEERING

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Technical Explanation – Lateral and Longitudinal Suspension Levelling

Purpose of This Document

This document explains why a suspension spacer may be fitted to a caravan chassis and how ride height and suspension adjustments are used to ensure the caravan sits level, maintains correct ball weight, and tows safely.

Understanding Caravan Weight Distribution

Caravans rarely have perfectly even weight from side to side (lateral) or front to rear (longitudinal). Interior layouts, appliance locations, storage areas, and onboard systems naturally create weight differences across the vehicle.

Common contributors include:

- Kitchens with appliances such as refrigerators, cooktops, and sinks
- Water tanks, batteries, or utility systems
- Furniture and storage layouts that differ from one side to the other

In addition to side-to-side balance, suspension setup can also influence **tow ball weight**. One of the standard tuning methods available during vehicle setup is the selection of **different coil spring rates**. Adjusting spring rates can help ensure the caravan sits at the correct ride height while contributing to achieving a suitable and safe ball weight for towing.

These variations are a normal part of caravan design and are addressed during the final caravan design.

Chassis and Final Vehicle Setup

The chassis is manufactured before the caravan body and internal components are installed. Because of this, final side-to-side weight distribution, front to rear balance, and ride height are **engineered and specified in advance by the caravan manufacturer prior to chassis manufacture**.

These parameters are determined using the manufacturer's design data for the completed vehicle, including layout, component locations, and expected load distribution. Suspension configuration and ride height are therefore established to suit the intended final build. This ensures:

- The caravan sits level
- Suspension operates within its intended range
- Tow ball weight is within a safe operating range
- Safe and stable towing performance is maintained

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Role of Suspension Spacers

One of the standard methods used to achieve correct ride height and side-to-side balance is the installation of a suspension spacer. A spacer is a height adjustment component that helps compensate for normal weight variations within the finished caravan.

Your chassis may have been supplied with a spacer fitted as part of this levelling process.

It is important to note:

- The spacer is used purely for ride height and levelling purposes
- It does not change the structural capacity of the chassis
- It does not alter the engineered suspension performance

It is simply one of several accepted methods used to fine-tune how the completed caravan sits.

If Your Caravan Is Leaning

Over time, loading changes (such as personal gear, water levels, or accessories) can affect how level a caravan sits. If a lean is noticed, the suspension setup should be reassessed **only after the desired weight distribution of all loose items and belongings has been achieved.**

In certain cases, adjusting the spring rates or modifying/removing the spacer may assist in returning the caravan to a level ride height. **Any such modifications must only be performed by a qualified technician and require prior approval from Intelligent Engineering.** This ensures that correct suspension geometry, ride height, and safe towing characteristics are always maintained.

Summary

- Uneven weight distribution is not uncommon in caravans
- Spring rate selection can be used to help achieve correct ride height and ball weight
- Different spring rates are normally indicated with different colour markings
- Final ride height adjustments are made once the caravan is fully assembled
- Suspension spacers are a standard levelling method
- The spacer fitted to your chassis is part of this adjustment process
- If the caravan is leaning, the suspension setup should be professionally reviewed and adjusted if required only after all loose items and belongings have been removed or evenly packed
- A “side-to-side” lean of less than 10 mm is considered within normal operating tolerance and does not indicate a fault
- The goal is always to have a level drawbar while towing with a ball weight of approximately 10% of the overall weight of the caravan
- Never exceed the rated ATM of the caravan.