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How does ambient temperature affect
TKPH calculations



Guide to Calculating OTR Tires TKPH

Introduction:

Ambient temperature significantly impacts TKPH (Tonne Kilometres per Hour) calculations, which are essential for assessing tire performance in heavy vehicles like dump trucks. Here's how temperature influences these calculations:

TKPH Overview

TKPH is a measure of a tire's load capacity in relation to its heat generation at a specified speed. It is typically calculated under standard conditions, specifically at an ambient temperature of 38°C (100°F). Deviations from this temperature necessitate adjustments to the TKPH values.

Effects of Ambient Temperature on TKPH

Correction Factors: When the ambient temperature differs from 38°C, correction coefficients are applied to modify the operating TKPH. For instance, higher temperatures can lead to increased wear and thermal stress on tires, necessitating a reduction in allowable TKPH to prevent tire failure.

1. Temperature Ranges and Coefficients:

- At temperatures above 38°C, the TKPH values are reduced by specific coefficients (e.g., at 40°C, coefficients might be around 0.928 for radial tires) to account for increased heat generation.
- Conversely, lower temperatures may allow for higher TKPH values, as tires can operate more efficiently without overheating.

2. Impact on Tire Performance:

- Higher ambient temperatures increase the likelihood of exceeding permissible limits for tire operation, leading to risks such as thermal delamination or blowouts. This necessitates careful monitoring and adjustment of operational parameters to maintain safety and performance.



3. Operational Adjustments:

- Operators may need to adjust load weights or reduce operational speeds during hotter conditions to keep within safe TKPH limits. This is crucial for maintaining tire integrity and extending service life

2. Real-World Applications: Studies show that as ambient temperatures rise, the actual site TKPH can increase due to higher average cycle speeds and load conditions, but this must be balanced against the potential for increased tire wear and failure rates

In summary, ambient temperature plays a crucial role in determining the effective TKPH for tires used in heavy vehicles. Adjustments based on temperature are necessary to ensure safe operation and optimal tire performance under varying environmental conditions.