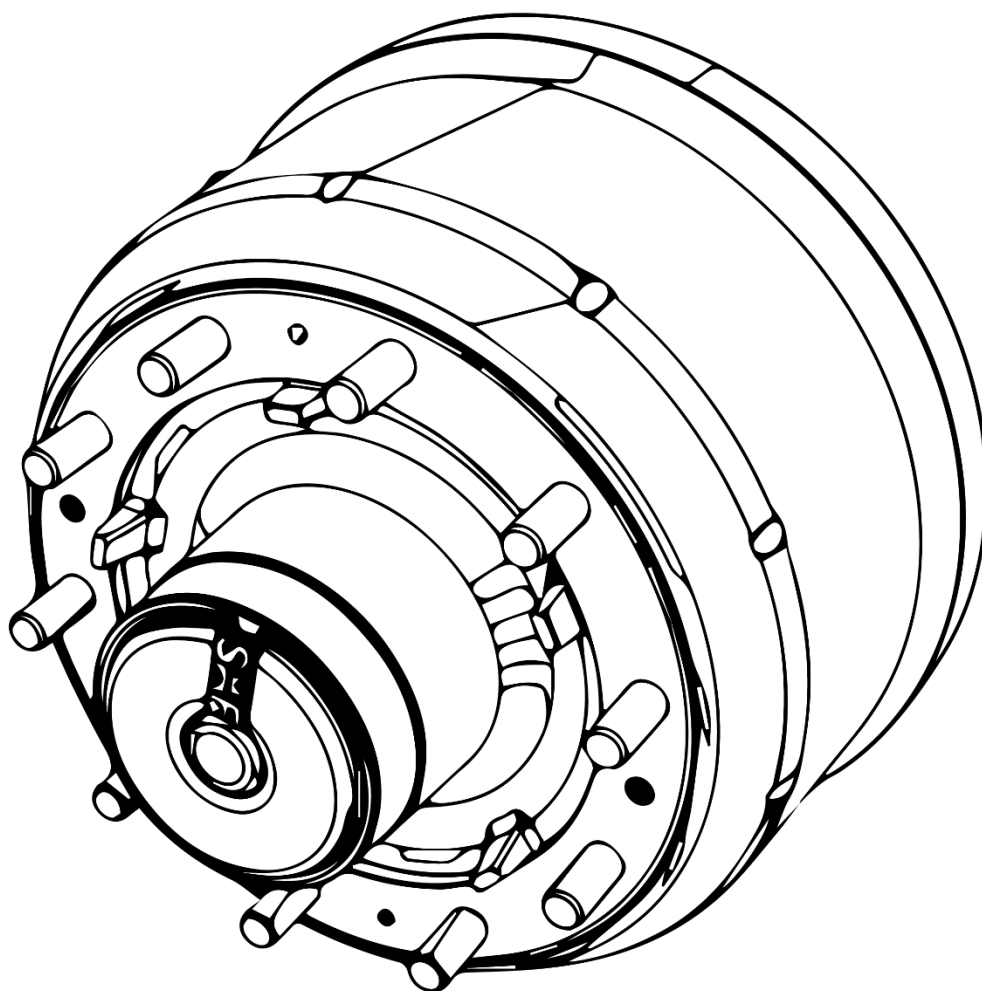


Recommendation for preparation of a brake calculation (valid for the geographically Europe without Scandinavia and UK)



Dear customer,

This recommendation helps you to familiarise yourself with the products from SAF-HOLLAND with instructions for their proper use.

The recommendation contains important instructions on how to operate the product safely, properly and economically. Adherence to it helps prevent hazards, faults and reduce down-time and increase the reliability and service life of the product. Read the operating manual through carefully and follow the instructions accurately.

It must be ensured that the persons involved in the design and calculation of brakes on trailer vehicles, are able to view this recommendation.

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1. General information

1.1 Proper use

The product has been constructed using state-of-the-art technology and in accordance with the recognised rules of technical safety. However, its use may result in hazards for the operator or third parts or damage to the device or other objects of material value.

Proper use also includes:

- Adherence to the manual and implementation of the steps stipulated in the operating manual.
- Adherence to all maintenance and care instructions and additional inspections.
- The use of the listed consumable and their disposal in an environmentally friendly manner

Operationally safe function can only be guaranteed if all the instructions, adjustments and performance limits for the product are adhered to.

Recommendation for preparation of a brake calculation

(Valid for geographical Europe without Scandinavia and UK)

In order to ensure optimum braking values over the service life of the brake, we would like to provide a recommendation for the design of the brake calculation for SAF-HOLLAND products.

The following table describes the values for the design of the percentage braking depending on the vehicle type and brake system.

Vehicle Type	SAF Holland – Recommendation for				
	Legal	Conventional brake system		EBS (Electronic Brake System)	
	Regulation	Laden	Unladen	Laden	Unladen
Drawbar trailer	50 %	60 – 63 %	As possible on upper corridor range but not higher than 85%	Ca. 61.5 %	No requirement in case of guaranteed ABS operation
Semi-trailer	45 %	55 – 58 %		Ca. 56.5 %	
Central axle trailer	50 %	60 – 63 %		Ca. 61.5 %	

General recommendation/requirements:

- In principle, the statutory regulation ECE R13 or country-specific regulations are binding.
- The legally required minimum braking should be achieved without advance.
- For lever lengths > 150 mm (drum brake), ensure that long-stroke diaphragm cylinders are used.
- For air brake systems with spring brake cylinders, overload protection valves must always be used.
- The controlled service brake pressure should not exceed 6.8 bar.
- When designing the brake calculation, it is important to take into account the country-specific regulations, the geographical area of use and the operating conditions (degree of vehicle load and & braking behaviour) of the vehicle operator.
- The programmed air bellows pressure should be taken from the SAF design documentation and must be checked in practice by the vehicle manufacturer.
- In order to arrive at the theoretical deceleration values for the homologation test it may be necessary to conditioning the brakes (formation of carbon abrasion).
- After approx. 5,000 km, a tractor-trailer synchronization test or a brake adjustment test must be carried out.

Recommendation for the electronic brake system (EBS):

The parking brake effect, including rolling friction, must be designed for $z \geq 0.26$ (26 %).

Recommendation related to the brake type:

1. Disc brake:

- Set pressure at $p_m / p_z = 0.6 / 0.4$ bar
- Deceleration values loaded should be at 2 bar
 - 19.5-inch disc brake between 12 - 13 %
 - 22.5-inch disc brake between 13 - 14 %

2. Drum brake:

- Set pressure at $p_m / p_z = 0.7 / 0.5$ bar
- Deceleration values loaded should be at 2 bar
 - 300mm drum brake at approx. 12 %
 - 367mm drum brake at approx. 13 %
 - 420mm drum brake between 14 - 16 %
(420mm unladen with ABS at 6.5 bar up to 90%)

Vehicles with mainly high loads and high brake applications should be designed at the lower values of the percentage design recommendation.

Vehicles with mainly low loads and low brake applications should be designed at the upper values of the percentage design recommendation.

Design recommendation for the hot braking effect (type III braking):

In order to ensure the conformity of your production, we recommend (see UN Regulation No. 13, paragraph 8) that a tolerance of 4% points of deceleration be included in the calculation of the hot brake performance (deceleration type III according to UN R13, Annex 11, Appendix 2, paragraph 4.3).

Notes

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