



# SAF MODUL

7-14-t AIR SUSPENSION SYSTEM  
WITH DISC AND DRUM BRAKE  
17.5", 19.5" AND 22.5"

# THE MODUL FAMILY

One of the special advantages of the SAF MODUL system is its versatility



Individual solutions for economical transport services

## **SAF MODUL – as versatile as the transportation business**

Anybody driving up front in the transport business today must offer especially attractive, custom-made solutions, far beyond the standard range. This includes transport services that are efficient above all. SAF-HOLLAND offers you as a vehicle manufacturer, transportation company or hire company a complete system for this: SAF MODUL.

A special advantage of the SAF MODUL system is its versatility. Thanks to numerous combination options, you will get an optimal suspension system for your transport tasks. We gladly support you in your planning with tailor-made solutions.

# MODUL SERIES

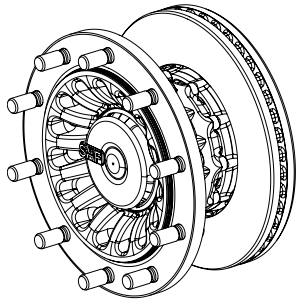
TRAILING ARM UNDER THE  
AXLE

CRANKED TRAILING ARM ON  
THE AXLE

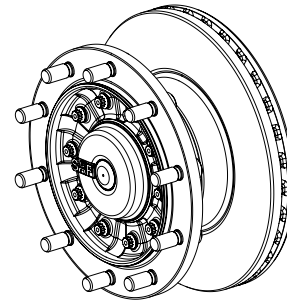
TRAILING ARM ON THE AXLE

EXTENDED SUSPENSION ARM  
TOLERANCE

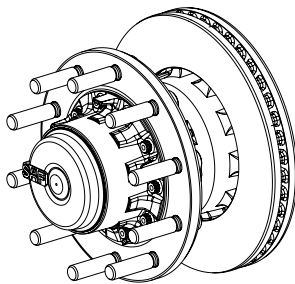
# RIGID AXLES (9–12 t axle load)



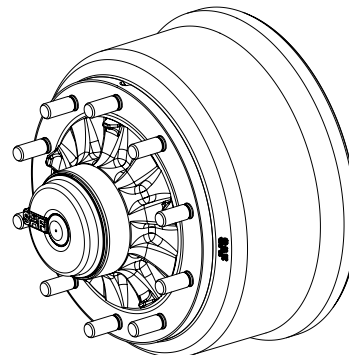
BI series (*INTEGRAL* head unit)  
with disc brakes for  
Single wheels ET120



B series (*AirVent* head unit)  
with disc brakes for  
Single wheels ET120



S and Z series  
with disc brakes for  
Single wheels ET0/twin wheels



S and Z series  
with drum brakes for  
Single wheels ET0/twin wheels

# RIGID AXLES (9–12 t axle load)

Absolutely flexible use and, at the same time, proven 100,000 times – thanks to the pre-set and therefore maintenance-free wheel bearing technology.

## WITH DISC BRAKES

Axle version	Single	Offset [mm]	Twin wheels	Axle load up to 105 km/h [t]	Brake size [mm]	Brake
B(l)9-19S	•	120		9	377 x 45	SAF SBS 1918
B(l)9-19K	•	120		9	377 x 45	KNORR SB6 (SN6)
SI9-19S	•	0		9	377 x 45	SAF SBS 1918
SI9-19K	•	0		9	377 x 45	KNORR SB6 (SN6)
ZI9-19S			•	9	377 x 45	SAF SBS 1918
ZI9-19K			•	9	377 x 45	KNORR SB6 (SN6)
SI11-19K	•	0		11	377 x 45	KNORR SB6 (SN6)
ZI11-19K			•	11	377 x 45	KNORR SB6 (SN6)
B(l)9-22S	•	120		9	430 x 45	SAF SBS 2220
B(l)9-22S01	•	120		9	430 x 45	SAF SBS 2220 K0
SI9-22S	•	0		9	430 x 45	SAF SBS 2220
SI9-22S01	•	0		9	430 x 45	SAF SBS 2220 K0
ZI9-22S			•	9	430 x 45	SAF SBS 2220
ZI9-22S01			•	9	430 x 45	SAF SBS 2220 K0
SI11-22K11	•	0		11	430 x 45	KNORR SB7 (SK7)
ZI11-22K11			•	11	430 x 45	KNORR SB7 (SK7)
SI12-22K10	•	0		12	430 x 45	KNORR SB7 (SN7)
ZI12-22K10			•	12	430 x 45	KNORR SB7 (SN7)

## WITH DISC BRAKES

Axle version	Test log*	Number of teeth of exciter ring	Wheels	Tyres
B(l)9-19S	TDB0870	90	10/280/355/M22x1,5	19,5"/20"/22,5"
B(l)9-19K	TDB0605	90	10/280/335/M22x1,5	19,5"/20"/22,5"
SI9-19S	TDB0870	90	10/280/355/M22x1,5	19,5"/20"/22,5"
			8/220/275/M22x1,5	
SI9-19K	TDB0605	90	10/280/355/M22x1,5	19,5"/20"/22,5"
			8/220/275/M22x1,5	
ZI9-19S	TDB0870	90	10/280/355/M22x1,5	19,5"
	TDB0878		8/220/275/M22x1,5	
ZI9-19K	TDB0606	90	10/280/355/M22x1,5	19,5"
			8/220/275/M22x1,5	
SI11-19K	TDB0605	90	10/280/355/M22x1,5	19,5"
			8/220/275/M22x1,5	
ZI11-19K	TDB0606	90	10/280/355/M22x1,5	19,5"
			8/220/275/M22x1,5	
B(l)9-22S	TDB0843	90	10/280/335/M22x1,5	20"/22,5"
B(l)9-22S01	36102214	90	10/280/335/M22x1,5	20"/22,5"
SI9-22S	TDB0843	90	10/280/335/M22x1,5	20"/22,5"
SI9-22S01	36102214	90	10/280/335/M22x1,5	20"/22,5"
ZI9-22S	TDB0843	90	10/280/335/M22x1,5	20"/22,5"
ZI9-22S01	36102214	90	10/280/335/M22x1,5	20"/22,5"
SI11-22K11	36101814	100	10/280/335/M22x1,5	20"/22,5"
ZI11-22K11	36101814	100	10/280/335/M22x1,5	20"/22,5"
SI12-22K10	TDB0590	100	10/280/335/M22x1,5	20"/22,5"
ZI12-22K10	TDB0590	100	10/280/335/M22x1,5	20"/22,5"

\*You will find the brake test reports at: <http://testreport.safholland.de>

# RIGID AXLES (9–12 t axle load)

Absolutely flexible use and, at the same time, proven 100,000 times – thanks to the pre-set and therefore maintenance-free wheel bearing technology.

## WITH DRUM BRAKES

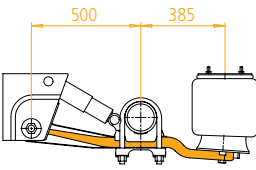
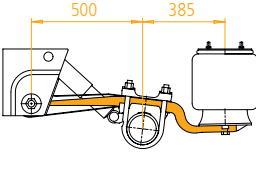
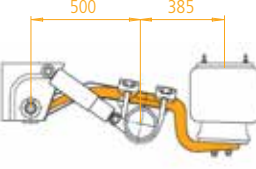
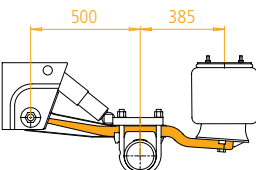
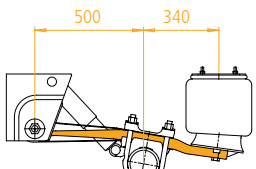
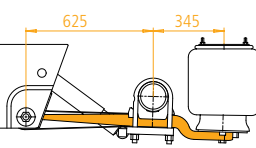
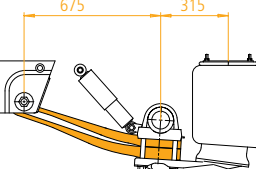
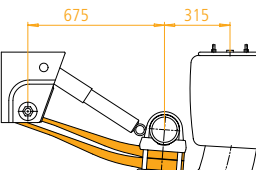
Axle version	Single	Offset [mm]	Twin wheels	Axle load up to 105 km/h [t]	Brake size [mm]	Brake
Z9-3020			•	9	300 x 200	SAF SNK
Z11-3020			•	11	300 x 200	SAF SNK
SKRZ12030S			•	12	300 x 200	SAF SNK
S9-3718	•	0		9	367 x 180	SAF SNK
Z9-3720			•	9	367 x 200	SAF SNK
Z11-3720			•	11	367 x 200	SAF SNK
SKRZ12037			•	12	367 x 200	SAF SNK
S9-4218	•	0		9	420 x 180	SAF SNK
Z9-4218			•	9	420 x 180	SAF SNK
S11-4220S10	•	0		11	420 x 200	SAF SNK
Z11-4220S10			•	11	420 x 200	SAF SNK
S12-4220S10	•	0		12	420 x 200	SAF SNK
Z12-4220S10			•	12	420 x 200	SAF SNK

## WITH DRUM BRAKES

Axle version	Test log*	Number of teeth of exciter ring	Wheels	Tyres
Z9-3020	TDB0487	80	10/175/225/M22x1,5	15"/17,5"
Z11-3020	TDB0487	80	10/175/225/M22x1,5	15"/17,5"
SKRZ12030S	TDB0882	80	10/175/225/M22x1,6	15"/17,5"
S9-3718	TDB0459	90	8/220/275/M22x1,5	19,5"
			10/280/335/M22x1,5	
Z9-3720	TDB0460	90	8/220/275/M22x1,5	19,5"
			10/175/225/M22x1,5	
Z11-3720	TDB0460	90	8/220/275/M22x1,5	19,5"
			10/175/225/M22x1,5	
SKRZ12037	TDB0460	90	8/220/275/M22x1,5	19,5"
			10/175/225/M22x1,5	
S9-4218	TDB0381	90	10/280/335/M22x1,5	20"/22,5"
Z9-4218	TDB0483	90	10/280/335/M22x1,5	20"/22,5"
S11-4220S10	TDB0455	100	10/280/335/M22x1,5	20"/22,5"
Z11-4220S10	TDB0455	100	10/280/335/M22x1,5	20"/22,5"
S12-4220S10	TDB0455	100	10/280/335/M22x1,5	20"/22,5"
Z12-4220S10	TDB0455	100	10/280/335/M22x1,5	20"/22,5"

\*You will find the brake test reports at: <http://testreport.safholland.de>

## ALL MODUL SERIES AT A GLANCE

<ul style="list-style-type: none"> <li>Air spring type</li> <li>Identifier</li> <li>Diameter</li> <li>Total suspension travel</li> </ul>	Model series	Features	Trailing arm variants					Nominal height range	2618V 29	2918V 27 2919V*	2923V 31 2924V*	2926V 30 2927V*	3138 not available
			100 x 48	100 x 52	100 x 43/43	100 x 60	100 x 54/54		300	42 350	41 350	47 350	390
	U	Trailing arm under the axle	•	•	•			170 to 380	180 d	180 c	200 c	260 c	
	M	Cranked trailing arm on the axle	•	•	•			340 to 530	180 d	180 c	200 c	260 c	
	MT	Cranked trailing arm on the axle		•				250 to 410	180 d	180 c	200 c		
	O	Trailing arm on the axle	•	•	•			400 to 600	180 d	180 c	200 c	260 c	
	EO	Trailing arm on the axle	•	•	•			390 to 540	190 b	190 a	220 a		
	HU	Trailing arm under the axle, extended arm tolerance				•	•	220 to 315			260	300	
	AR 421	Trailing arm under the axle, extended arm tolerance					•	250 to 500				310	
	AR 421H	Trailing arm under the axle, extended arm tolerance					•	380 to 480					420 with 9 t 400 with 10 t

All dimensions in mm

\*Technical combination options for all air spring diameter 350 mm with composite piston on request  
You will find the Design Manual SAF MODUL at: <http://designmanual.safholland.de>

a = 04 425 0099 02	b = 04 425 0107 02	c = 04 425 0114 02	d = 04 425 0133 02	Axle load pressure gauge with specifications in [kg]
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# HEAD UNIT DRUM BRAKE

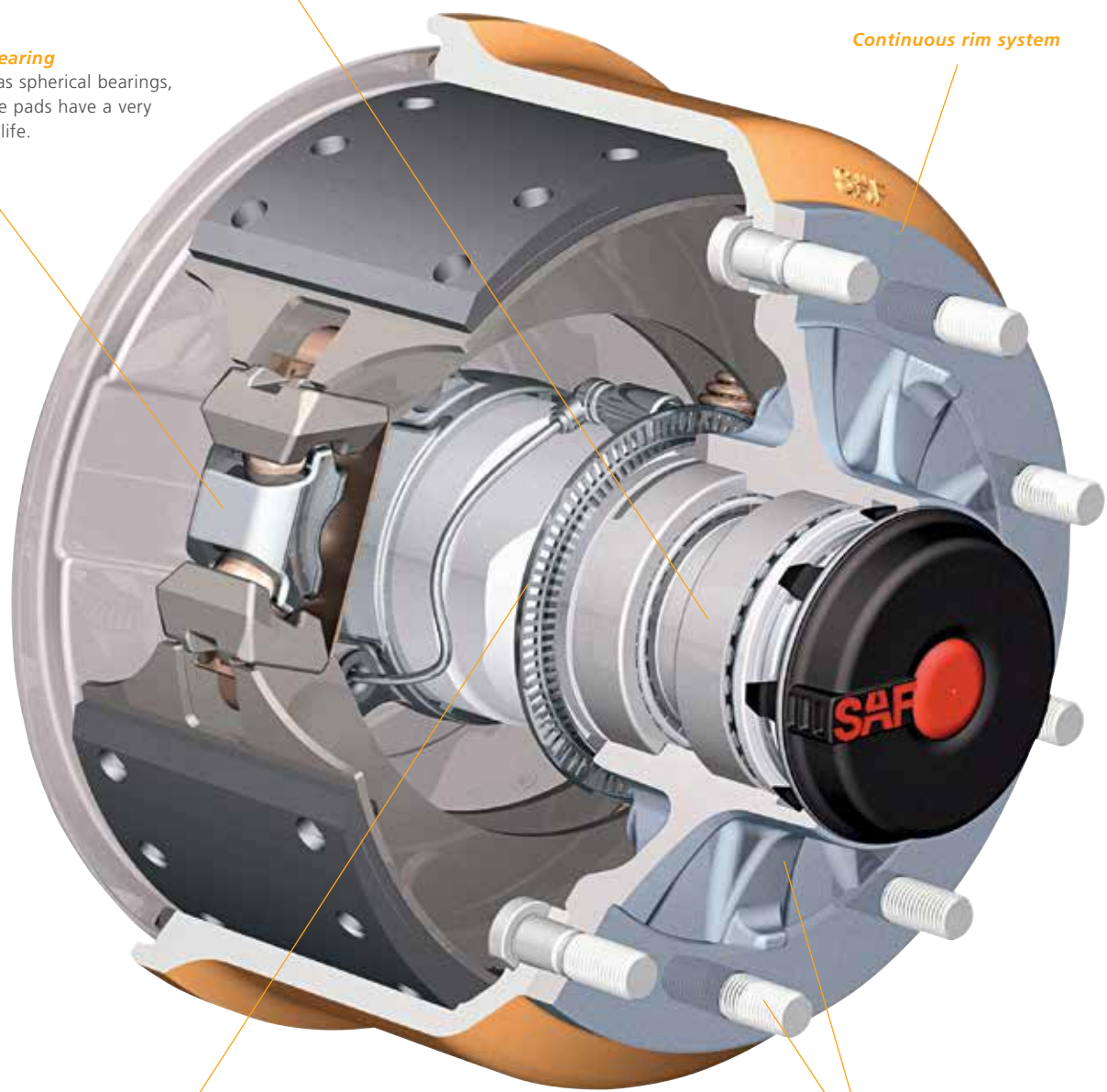
## **SAF hub unit**

The SAF hub unit is a compact unit of the hub and the bearing. It is fully factory-adjusted and encapsulated. The SAF hub unit is maintenance-free.

## **Spherical bearing**

The brake has spherical bearings, i.e. the brake pads have a very long service life.

## **Continuous rim system**



## **ABS preparation as standard**

## **Corrosion protection**

Targeted long-term corrosion protection on the hub, hub caps and screw connections, wheel bolts and nuts.



# DRUM BRAKE

## WELL THOUGHT-OUT AND SOPHISTICATED MECHANICS

**What counts is the quality: Regardless of whether you want to equip the SAF MODUL suspension system with a drum brake or disc brake – what you always get is the safety of prime quality.**

This is why SAF-HOLLAND has been working closely and exclusively with recognised and internationally successful supply partners. This ensures that with SAF-HOLLAND you not only drive a particularly economic air suspension system but a comfortably safe one, to boot.



*Front cam shaft-compact bearing*



*Rear cam shaft-compact bearing*

### **Cam shaft-compact bearing**

As a pre-assembled unit with no individual parts – and thanks to its compact dimensions – the cam shaft-compact bearing can be replaced easily and quickly at any time. The bearing comes with permanent corrosion protection, merely requiring lubrication at regular intervals. You save on time, money – and weight.

### **SAF brake pads**

SAF brake pads are asymmetrically shaped by computer modelling and are subject to strict production control on an ongoing basis. Special material mixes and the unique form are convincing arguments in actual practice due to their long service life and best possible safety. SAF-HOLLAND quality pays off: If the pads must be replaced, the use of SAF-HOLLAND original parts is highly recommended.



#### **Spherical bearing**

The brake shoes on the SAF axle are mounted around a spherical head. Thanks to their unique geometry, the shoes can move in all directions, distributing the force more evenly across the pads, which therefore can be used much longer.



#### **Precise cam roller guide**

The precision-machined S-cams precisely control the movement of the brake shoes and the contact pressure to guarantee optimum braking.



#### **Replacing brake shoes in seconds**

For the SAF axle, all you need is a screwdriver and a steady hand – thus replacing the brake shoes is ingeniously simple and done in a matter of seconds.



#### **Finish-ground contoured brake lining**

Machining is not necessary even after repair. After the very first drum rotation, you can rely again on the full braking power of your SAF axle.



#### **Fewer parts**

The SAF INTRADRUM saves space in storage, and the effort involved in maintenance and repair is considerably reduced.

# HEAD UNIT DISC BRAKE

## **INTEGRAL advantage 1**

Compared to a design with one-piece brake disc and closed wheel flange, now 100 % more heat-emitting surface.

## **INTEGRAL advantage 2**

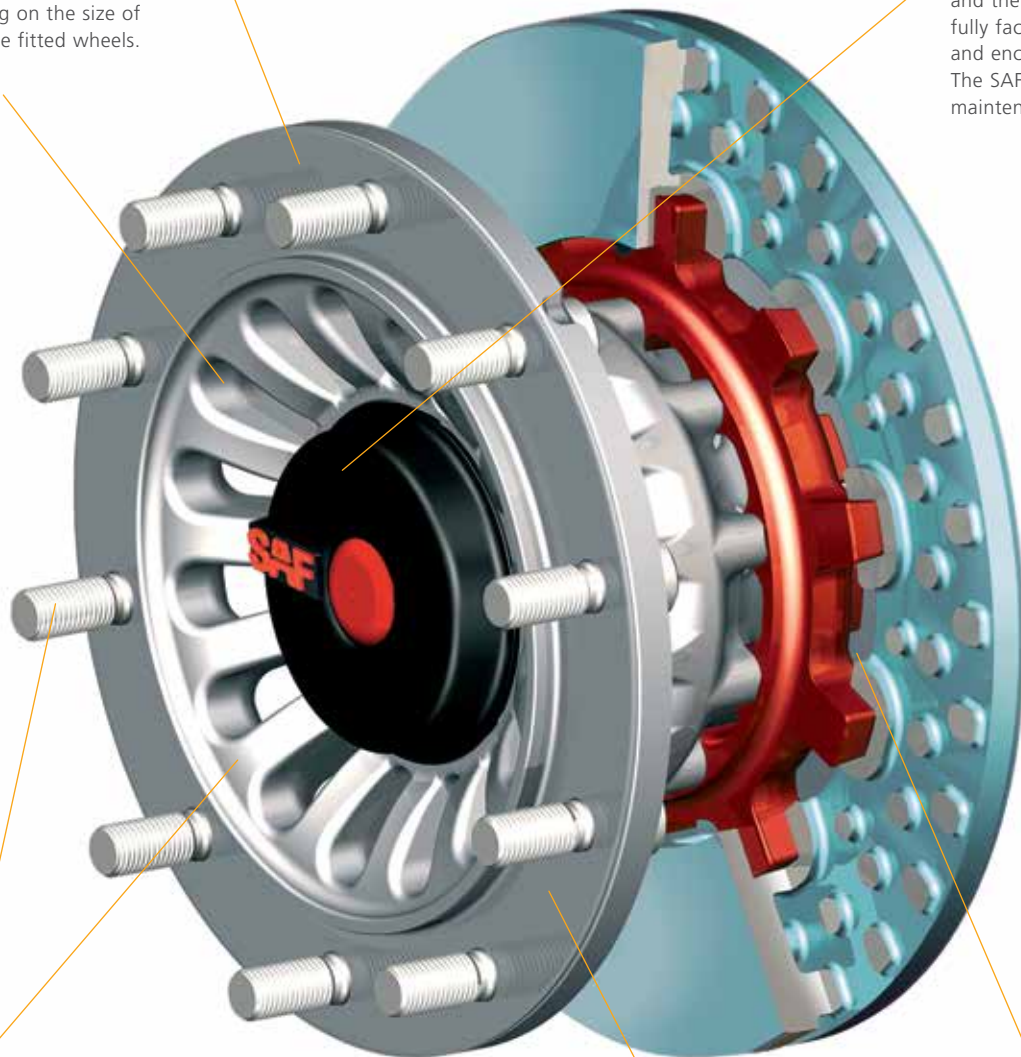
With 15 large radiator-like ventilation cross-sections in the wheel flange, the *INTEGRAL* achieves at least 60 % more ventilation cross-section compared to a design with closed wheel flange – depending on the size of the openings in the fitted wheels.

## **SAF INTEGRAL [ET 120]**

The figure shows the disc brake *INTEGRAL* [ET 120]. For disc brakes with an 9-t axle load for Single ET 120 wheels, the SAF AirVent head unit with optimised disc brake technology is available at a great price-performance ratio (axle versions B9-19 and B9-22).

## **SAF hub unit**

The SAF hub unit is a compact unit of the hub and the bearing. It is fully factory-adjusted and encapsulated. The SAF hub unit is maintenance-free.



## **Corrosion protection**

Targeted long-term corrosion protection on the hub, hub caps and screw connections, wheel bolts and nuts.

## **Continuous rim system**

## **INTEGRAL advantage 3**

Significantly lower heat transfer due to small contact areas between the *INTEGRAL* disc and wheel hub.

# DISC BRAKE TARGETED AND INNOVATIVE *INTEGRAL* TECHNOLOGY

**Unique in the world for use in disc-brake trailers –  
SAF *INTEGRAL*DISC.**

Disc brakes technology has stood the test in the commercial vehicle segment. As a pioneer in this field, SAF-HOLLAND has systematically and consistently developed its advantages for actual practical use: The patented *INTEGRAL* TECHNOLOGY from SAF-HOLLAND is unique in the industry, safe and at the same time economic.

## SAF-HOLLAND PATENT



### *THE SOLUTION: INTEGRAL TECHNOLOGY*

*The INTEGRAL disc is cast onto a splined high-tensile adapter ring and bolted to the wheel hub as a unit. The connection between the adapter ring and the brake disc has absolutely no play – without the two parts being fused together. This is the advantage: By composite casting of disc and adapter, the disc can expand radially and contract again during cooling down.*

### CONVENTIONAL DISC



Major risks due to umbrella effect

### INTEGRAL DISC



Radial expansion significantly reduces the risk!

### *Optimum temperature distribution*

The dreaded hot spots in conventional brake discs, which could result in stresses in the material and possible cracks up to the failure of the disc, are avoided – and: Since the braking surfaces in every operating state stay absolutely flat, the pads keep for far longer.





# RECOMMENDATIONS FOR USE AND EQUIPMENT FEATURES

Use	Axle load up to 105 km/h [t]	Spring centre [NR = no restriction] [mm]	Trailing arm [width x thickness] [mm]	Axle body [S = standard] [R = reinforced]	Air springs [Diameter] [mm]	Note
Standard Western Europe, or on-road use	9	NR	100 x 48	S	300 / 350	For container and coil vehicles: Quick ventilation or arrester cables
	11	NR	100 x 52	S	350	
	12	> 1050	100 x 52	S	350	
		NR	100 x 43/43			
Mega trailer	9	NR	100 x 60	S	350	Long stroke
	11	NR	100 x 54/54	S	350	
Eastern Europe or similar conditions	9	NR	100 x 52	R	350	For container and coil vehicles: Quick ventilation or arrester cables
	11	> 1050	100 x 52	R	350	
		NR	100 x 43/43			
Dump trucks, Western Europe	9	NR	100 x 52	R	350	Quick ventilation or arrester cables
Dump truck, heavy duty	9	> 1050	100 x 52	R	350	Quick ventilation or arrester cables
		NR	100 x 43/43			
	11	> 1050	100 x 52	R	350	
		NR	100 x 43/43			
	12	NR	100 x 43/43	R	350	
Use for wood	9	NR	100 x 52	R	350	Quick ventilation or arrester cables
	11	> 1050	100 x 52	R	350	
		NR	100 x 43/43			
	12	NR	100 x 43/43	R	350	

For selecting a suspension system that is ideal for your purpose, please ask your SAF HOLLAND representative or your vehicle manufacturer.

# OPTIONS FOR THE AIR SUSPENSIONS



SAF TWO-SIDE AND ROCKER LIFT

- customised solution for each and every purpose
- very simple retrofit
- optional axle lift variants available on request



SAF CROSS MEMBER

- allows a continuous longitudinal chassis beam even with a combination of rigid and steering axles



SAF ADJUSTABLE HANGER BRACKET

- considerable simplification of the wheel alignment
- drain hole for frame dip coating
- also available in stainless steel
- bolt-on versions available



SAF ALUMINIUM HANGER BRACKET

- for vehicles with aluminium frame



# OPTIONS FOR THE AXLES



## SAF ABS SENSING

- exciter ring and sensor holder (as standard/pre-assembled)
- can be activated using simple and reliable plug connections



## SAF HUBODOMETER

- measures the exact mileage of trailers
- simple retrofit
- quick and reliable mounting



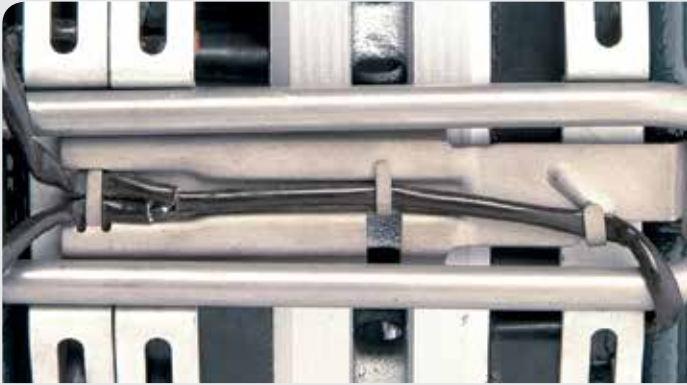
## SAF SLACK ADJUSTER

- automatically adjusted
- robust, stable and low-maintenance
- simple, reliable and rapid installation
- range of installation positions due to flexible control arm



## SAF BRAKE CHAMBERS

- complete surface coating
- high-quality internal components
- fully integrated air connections



SAF WEAR SENSOR PADS

- simple retrofit
- can be connected to the Trailer EBS or to a separate control and display unit

**Also available:**

- axles with 7t axle load
- axles with 13–14t axle load
- friction-steered axles
- axles for forced steering



SAF TIRE PILOT

- tyre-inflating system for trailers and semi-trailers

SHOULD YOU HAVE ANY QUESTIONS ABOUT TECHNICAL COMBINATION OPTIONS, PLEASE CONTACT YOUR SAF-HOLLAND REPRESENTATIVE OR YOUR VEHICLE MANUFACTURER.



TRAILER AXLES AND  
SUSPENSION SYSTEMS



COUPLING AND LIFTING  
TECHNOLOGY



SUSPENSIONS FOR  
TRUCKS AND BUSES

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