Test sheet for synchronization of braking forces for semi-tractor/trailer combinations

General data

Truck owner

Company: _____

Street: _____

Postcode/City: _____

Telephone no.: _____

Fax no.: _____

Workshop

Company: _____

Street: _____

Postcode/City: _____

Telephone no.: _____

Fax no.: _____

Tester: _____ Test date: _____

Tactor data

Tractor for semi-trailer (SZM)

Vehicle manufactor: _____

Vehicle type: _____

Vehicle ID nO. (VIN): _____

Mileage: _____

Registration date: _____

Semi-trailer (SA)

Vehicle manufactor: _____

Vehicle type: _____

Vehicle ID nO. (VIN): _____

Mileage: _____

Registration date: _____

Testing conditions

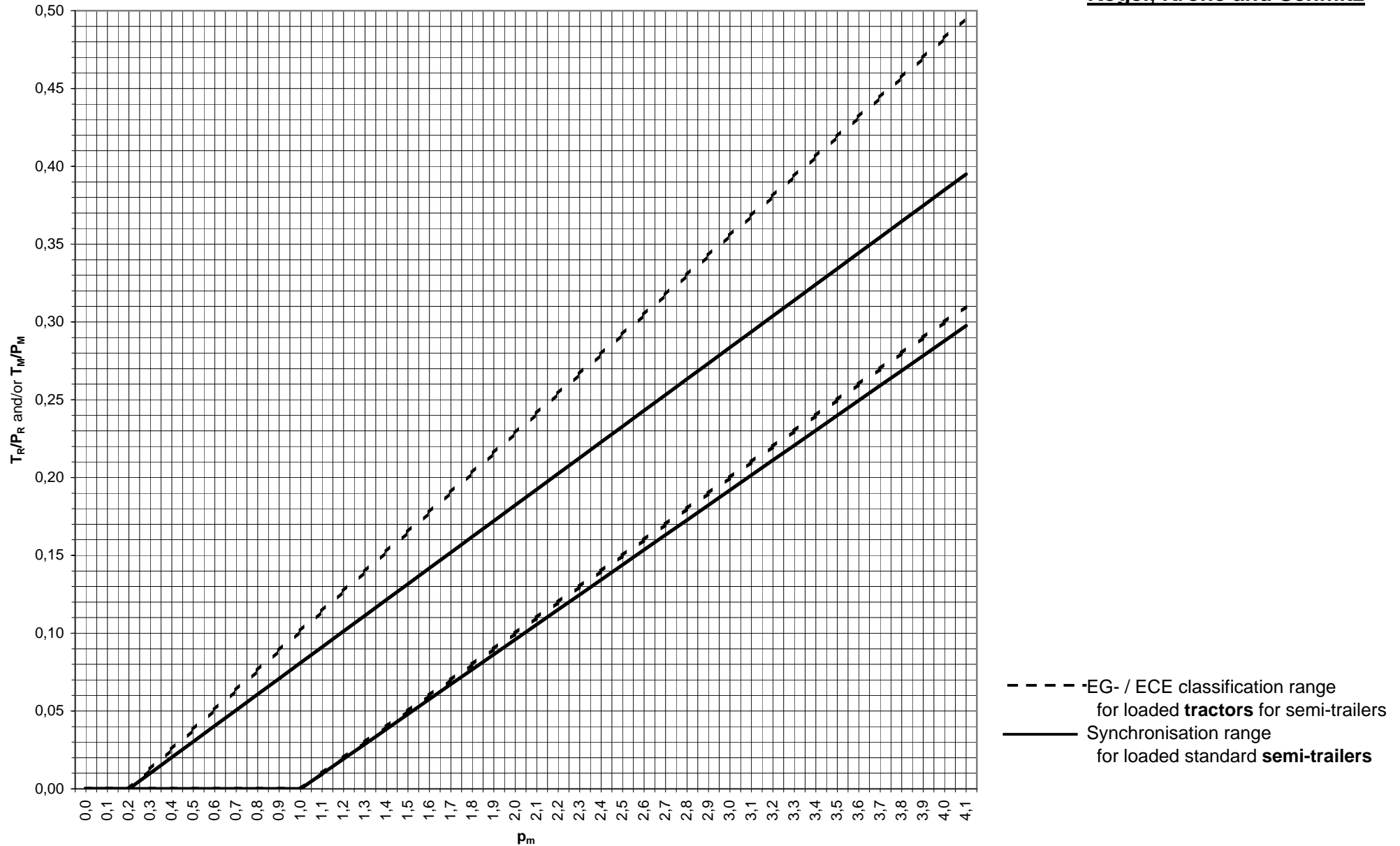Bevor synchronizing brake forces, the following conditions must be met:

1. For semi-trailer, roller braking forces of up to $p_m = 4$ bar must be reached.
2. For SA, test axle loads must be greater than 60 % of the maximum axle loads that form the basis for the brake calculation of SA.
3. For SZM, test axle loads must be equal to the maximum axle loads that from the basis for the brake calculation of SZM.
4. For SZM with EBS (electronic braking systems), obtain the relevant reference-diagrams (braking rate - p_m) from the tractor manufacturer.
5. For the different semi-tractor/trailer combinations, the following tests must be carried out depending on ABS or EBS configuration.

Braking system	Test type for **tractor for semi-trailers (SZM)**
ABS	standard method => satic test on roller brake tester
EBS	comparison of static roller braking values to the reference values from manufactor

Braking system	Test type for **semi-trailers (SA)**
ABS	standard method => satic test on roller brake tester
EBS	standard method => satic test on roller brake tester; set the EBS in to test mode according to manufactor spezifications SA.

Test sheet for synchronization of braking forces for semi-tractor/trailer combinations

Tractor for semi-trailer (SZM) test

VIN: _____

Controlled pressure at coupling head of control line yellow p_m [bar]	1st axle					2nd axle					3rd axle					Total	
	permiss. axle load: _____ [kg] Test axle load: _____ [kg]					permiss. axle load: _____ [kg] Test axle load: _____ [kg]					permiss. axle load: _____ [kg] Test axle load: _____ [kg]					_____ [kg] [kg]	
	pressure on brake cylind.	Braking forces		Refernce values for SZM with EBS		pressure on brake cylind.	Braking forces		Refernce values for SZM with EBS		pressure on brake cylind.	Braking forces		Refernce values for SZM with EBS		Total brake force	braking rate
		T_1	T_1				T_1	T_1				T_1	T_1				
	p_{z1}	left	right	min.	max.	p_{z1}	right	min.	min.	max.	p_{z1}	right	min.	min.	max.	T_M	T_M/P_M
	[bar]	[daN]	[daN]	[daN]	[daN]	[bar]	[daN]	[daN]	[daN]	[daN]	[bar]	[daN]	[daN]	[daN]	[daN]	[daN]	
0,0																	
0,5																	
1,0																	
1,5																	
2,0																	
2,5																	
3,0																	
4,0																	

Semi-trailer (SA) test

VIN: _____

Controlled pressure at coupling head of control line yellow p_m [bar]	1st axle				2nd axle				3rd axle				Gesamt	
	permiss. axle load: 9.000 [kg] Test axle load P_R: _____ [kg] (> 5.400 kg)				permiss. axle load: 9.000 [kg] Test axle load P_R: _____ [kg] (> 5.400 kg)				permiss. axle load: 9.000 [kg] Test axle load P_R: _____ [kg] (> 5.400 kg)				27.000 [kg] [kg]	
	pressure on brake cylind.	Braking forces			pressure on brake cylind.	Braking forces			pressure on brake cylind.	Braking forces			Total brake force	braking rate
		T_1	T_1			T_2	T_2			T_3	T_3			
	p_{z1}	left	right		p_{z1}	left	right		p_{z1}	left	right		T_R	T_R/P_R
	[bar]	[daN]	[daN]		[bar]	[daN]	[daN]		[bar]	[daN]	[daN]		[daN]	
0,0														
0,5														
1,0														
1,5														
2,0														
2,5														
3,0														
4,0														

Test sheet for synchronization of braking forces for semi-tractor/trailer combinations

Classification and synchronization range for tractor for semi-trailers and standard semi-trailers manufactured by

Kögel, Krone and Schmitz

Legend:
- – – – EG- / ECE classification range for loaded **tractors** for semi-trailers
- ——— Synchronisation range for loaded standard **semi-trailers**

Y-axis: T_R/P_R and/or T_M/P_M

X-axis: p_m

Notes / remarks   **Attention !**   Always secure against accidental movement that could cause damage or injury !

Standard-semi-trailers

For semi-trailer synchronization range, semi-trailers manufacutreed by Kögel, Krone and Schmitz were standardized as followos:

Vehicle data fot standard semi-trailers:					
Number of axles					3 Achsen
Wheelbase	E	min.:	6,45 [m]	max.:	9,00 [m]
Centre of gravity high /loaded h_R bel		min.:	1,70 [m]	max.:	1,80 [m]
Aggregate load	P_R			max.:	27000 [kg]

SZM test

A) SZM with EBS (electronic braking system)

If the roller braking forces lie within the range of the refernce values, it is assumed that the statically calculated values coorespond to the dynamic vallues
(driving mode) of SZM

B) SZM with ABV brake system

For evaluation, use the plotted EC / ECE classification range on page 3.

SA test

For testing, the respective controller must be set to "full load".

For SA with EBS, the braking system must be set to the test mode.

For example: Test mode of WABCO-EBS   Parking brake and/or service bake pressure = 0 bar (pm = pressure at coupling head of control line = 0 bar).
Then switch on ignition.

Remarks:

For both tests, it is assumed that the brake systems are operating properly. If the roller braking forces lie withhin the specified ranges or between the min. and max.
reference values of SA, then it is assumed that there is adequate braking force distribution within the semi-tractor/trailer combination.
If any aberrations are noticed in brake behaviour of the semi-truck despite tested values which lie within the correct range, the test results are to be communicated to
the MANUFACTURER of the tractor for examination. Afterwards, the new correction parameter(s) must be programmed into the SA.