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TÜV SÜD AUTOMOTIVE TIRE TEST - 2010

CUSTOMER: ZHONGCE

REPORT No.:76243920

TEST CRITERIA:




ROLLING RESISTANCE (ACC. TO ISO 28580)
ELECTRICAL RESISTANCE (ACC. TO ISO 16392)
WET BRAKING (ACC. TO ECE R-117)
WET HANDLING
DRY HANDLING
DRY BRAKING
FUEL CONSUMPTION

TIRE IDENTIFICATION TABLE (1/2)

TÜV-CODE	POSITION	DOT-CODE	BRAND	COMMERCIAL NAME	PRODUCTION COUNTRY	SIZE DESIGNATION	TREAD AND SIDEWALL INFORMATION	E / e - APPROVAL-NO.	UTQG-MARKING	SYMMETRY*	DIRECTIONALITY**	TREAD PROFILE
A1 M8	FL	7DHDDAJ 2510	GOODRIDE	Radial SP06	China	195/65 R15 91H	TR: 1 Polyester 2 Steel 1 Nylon SW: 1 Polyester	E4: 000183-S 0237644	TW: 500 Trac.: A Temp: A	A	N	
	FR	7DHDDAJ 2510										
	RL	7DHDDAJ 2510										
	RR	7DHDDAJ 2510										
	SPARE	7DHDDAJ 2510										
A2 H8	FL	7DHDDAJ 2510	GOODRIDE	Radial SP06	China	195/65 R15 91H	TR: 1 Polyester 2 Steel 1 Nylon SW: 1 Polyester	E4: 000183-S 0237644	TW: 500 Trac.: A Temp: A	A	N	
	FR	7DHDDAJ 2510										
	RL	7DHDDAJ 2510										
	RR	7DHDDAJ 2510										
	SPARE	7DHDDAJ 2510										
A3 C10	FL	7DHDDAJ 2510	GOODRIDE	Radial SP06	China	195/65 R15 91H	TR: 1 Polyester 2 Steel 1 Nylon SW: 1 Polyester	E4: 000183-S 0237644	TW: 500 Trac.: A Temp: A	A	N	
	FR	7DHDDAJ 2510										
	RL	7DHDDAJ 2510										
	RR	7DHDDAJ 2510										
	SPARE	7DHDDAJ 2510										
A4 K4	FL	7DHDDAJ 2510	GOODRIDE	Radial SP06	China	195/65 R15 91H	TR: 1 Polyester 2 Steel 1 Nylon SW: 1 Polyester	E4: 000183-S 0237644	TW: 500 Trac.: A Temp: A	A	N	
	FR	7DHDDAJ 2510										
	RL	7DHDDAJ 2510										
	RR	7DHDDAJ 2510										
	SPARE	7DHDDAJ 2510										

*) S: symmetric A: asymmetric **) U: unidirectional N: non-directional

TIRE IDENTIFICATION TABLE (2/2)

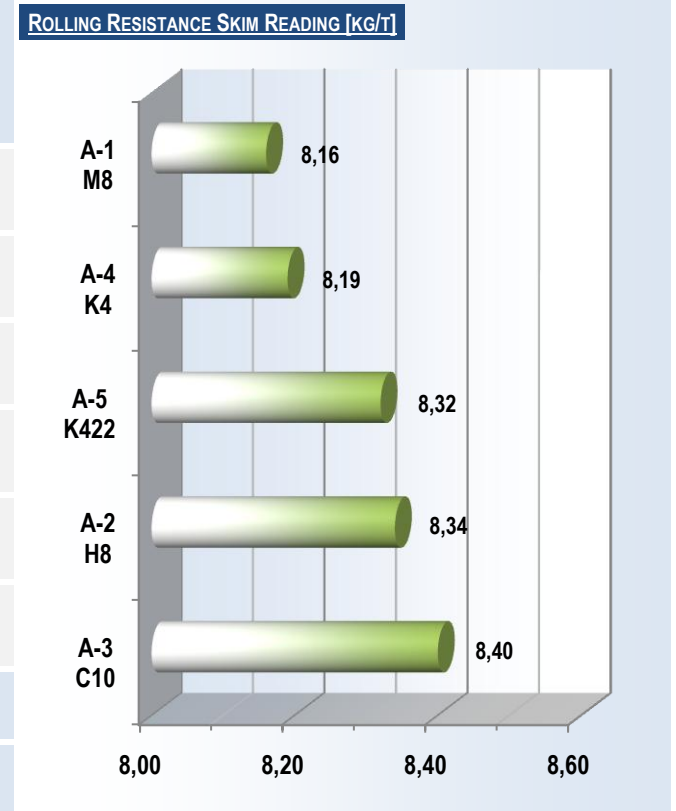
TÜV-CODE	POSITION	DOT-CODE	BRAND	COMMERCIAL NAME	PRODUCTION COUNTRY	SIZE DESIGNATION	TREAD AND SIDEWALL INFORMATION	E / e - APPROVAL-NO.	UTQG-MARKING	SYMMETRY*	DIRECTIONALITY**	TREAD PROFILE
A5 K422	FL	7DHDDAJ 2510	GOODRIDE	Radial SP06	China	195/65 R15 91H	TR: 1 Polyester 2 Steel 1 Nylon SW: 1 Polyester	E4: 000183-S 0237644	TW: 500 Trac.: A Temp: A	A	N	
	FR	7DHDDAJ 2510										
	RL	7DHDDAJ 2510										
	RR	7DHDDAJ 2510										
	SPARE	7DHDDAJ 2510										
AR	FL	HDTA6KTX 1510	Michelin	Energy Saver	Italy	195/65 R15 91H	TR: 1 Polyester 2 Steel 1 Nylon SW: 1 Polyester	e2: 020651-S E2: 022542	TW: 400 Trac.: A Temp: A	N	N	
	FR	HDTA6KTX 1510										
	RL	HDTA6KTX 1510										
	RR	HDTA6KTX 1510										
	SPARE	-										
SRTT	FL	ANKABBV 1108	Uniroyal	Tiger Paw	USA	P175/75 R14	TR: 1 Polyester 2 Steel SW: 1 Polyester	-	TW: 280 Trac.: B Temp.: C	N	N	
	FR	ANKABBV 1108										
	RL	ANKABBV 1108										
	RR	ANKABBV 1108										

*) S: symmetric A: asymmetric **) U: unidirectional N: non-directional

DATASHEET: ROLLING RESISTANCE MEASUREMENTS
ROLLING RESISTANCE

Customer:	Zhongce	Test location:	Garching (D)
Order-No.:	76243920	Test rig:	H8/ZF1
Test standard:	ISO 28580	Drum-Ø [mm]:	2000
Test method:	Electrical power method / Torque method	Tire size:	195/65 R15 91H
Speed(s) [kph]:	80	Tire inflation [bar]:	2.1
Test rim:	6Jx15	Test load [kg]:	492

TIRE	A-1	A-2	A-3	A-4	A-4	A-5	ROLLING RESISTANCE SKIM READING [kg/t]
	M8	H8	C10	K4	K4 (ZF1) <i>Torque method</i>	K422	
T _{Ambient} [°C]:	23,9	24,6	25,4	25,7	20,6	25,6	
Tire Width [mm]:	200	200	200	200	200	200	
Tire Weight [kg]:	7,606	7,727	7,687	7,794	7,794	8,041	
Static Circumference [mm]:	1987	1985	1985	1987	1990	1986	
Rolling Radius (at 80 kph) [mm]:	290,9	290,5	291,0	290,7	288,9	290,7	
Rolling Circumference (at 80 kph) [mm]:	1917,0	1917,0	1916,0	1918,0	1919,6	1917,0	
Skim test reading: F_R [N]:	39,4	40,2	40,5	39,4	38,4	40,1	
Skim test reading: C_R [kg/t]:	8,16	8,34	8,40	8,19	7,95	8,32	

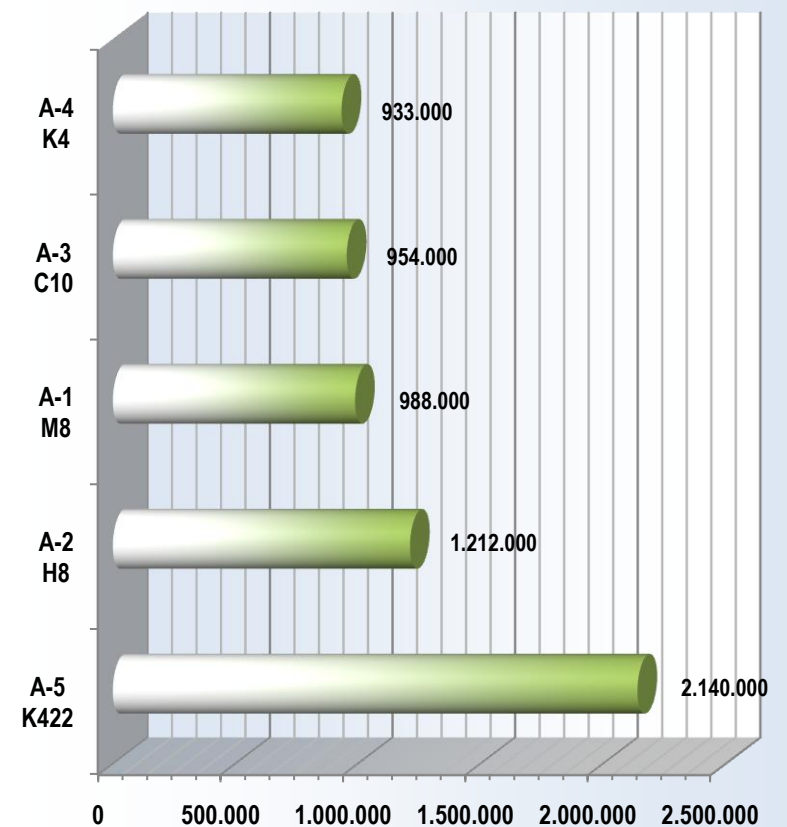


Above values refer to 2 meter drum (reference in ISO 28580) and are not converted to flat surface.

DATASHEET: ELECTRICAL RESISTANCE MEASUREMENTS
ELECTRICAL RESISTANCE

Customer:	Zhongce	Test location:	Garching (D)
Order-No.:	76243920	Tire size:	195/65 R15 91H
Test standard:	ISO 16392	Condition Humidity [%]:	~37
Test method:	Electrical Resistance	Condition Temperature [°C]:	~23
Test rim:	6Jx15 H2	Test load [N]:	4827

TIRE	A-1 M8	A-2 H8	A-3 C10	A-4 K4	A-5 K422
Tire Pressure [kPa]:	2,4	2,4	2,4	2,4	2,4
Temperature [°C]:	20,9	20,6	20,7	20,6	20,6
Humidity [%]:	35,4	35,0	34,7	35,0	34,6
Applied Voltage [V]:	100	100 / 1000	100	100	100 /1000
first measurement max. [Ω]:	5,01E+05	8,60E+05	4,62E+05	5,13E+05	1,11E+06
first measurement end [Ω]:	4,49E+05	7,43E+05	4,01E+05	4,65E+05	9,78E+05
second measurement max. [Ω]:	9,64E+05	1,13E+06	8,42E+05	9,12E+05	1,84E+06
second measurement end [Ω]:	7,95E+05	9,10E+05	6,71E+05	7,20E+05	1,52E+06
third measurement max. [Ω]:	1,23E+06	1,52E+06	1,27E+06	1,26E+06	2,64E+06
third measurement end [Ω]:	9,88E+05	1,21E+06	9,54E+05	9,33E+05	2,14E+06
Highest Result end [Ω]:	9,88E+05	1,21E+06	9,54E+05	9,33E+05	2,14E+06

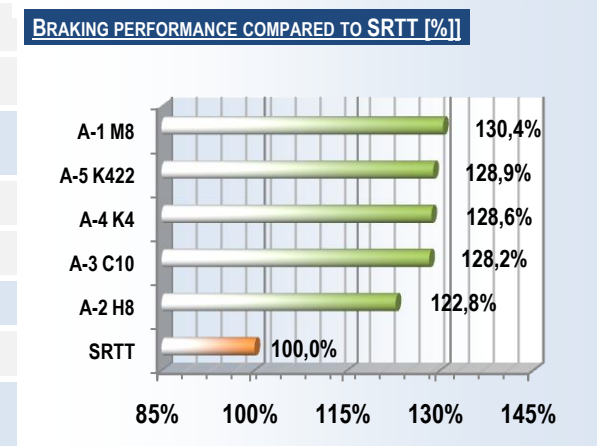
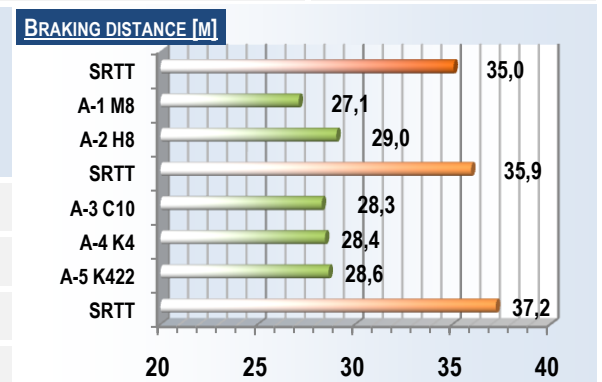
ELECTRICAL RESISTANCE [Ω]


The threshold for normal applications according to ISO 16392 lies at max. $10^{10} \Omega$

DATASHEET: WET GRIP PERFORMANCE (according to ECE R117)
WET BRAKING ECE R117

Customer:	Zhongce	Test Tire Load:	FL/FR: 450/450	Order No.:	76243920
Date:	8-Sep-10		RL/RR: 450/450	Test Location:	Boxberg (D)
Air Temperature [°C]:	min:14.0 max:15.5	Rim Size:	6Jx14 (SRTT)	BPN & texture depth [mm]:	BPN: 60 / 0.42
Surface Temperature [°C]:	min:16.1 max:16.4		6Jx15	Tire Inflation [bar]:	FA:2.2 RA:2.2
ABS:	on	Tire Size:	P195/75 R14 (SRTT)	v₁ [kph]:	80
Test Vehicle:	Golf VI 1.4 TSI		195/65 R15 91H	v₂ [kph]:	20

	SRTT	A-1 M8	A-2 H8	SRTT (rep. 1)	A-3 C10	A-4 K4	A-5 K422	SRTT (rep. 2)
Stopping distance								
Value s ₁ [m]	35,2	27,3	29,0	35,7	27,9	28,9	28,9	37,1
Value s ₂ [m]	35,2	27,1	29,1	36,0	28,0	28,2	28,8	37,2
Value s ₃ [m]	34,7	27,0	29,0	36,1	27,8	28,3	28,4	37,3
Value s ₄ [m]	-	27,0	28,8	-	28,8	28,7	28,2	-
Value s ₅ [m]	-	27,2	29,3	-	28,3	28,3	28,6	-
Value s ₆ [m]	-	26,9	28,9	-	28,8	28,2	28,8	-
Mean Value [m]	35,0	27,1	29,0	35,9	28,3	28,4	28,6	37,2
Standard Variation (σ_{n-1}) [m]	0,24	0,13	0,16	0,17	0,41	0,27	0,25	0,08
Coefficient of Variation [%]	0,67%	0,50%	0,54%	0,47%	1,44%	0,95%	0,87%	0,22%
Mean Deceleration [m/s²]	6,61	8,55	7,98	6,44	8,19	8,14	8,09	6,22
Reference Value [m/s ²]	6,61	6,55	6,50	6,44	6,39	6,33	6,28	6,22
Wet Grip Index (G)	1,000	1,304	1,228	1,000	1,282	1,286	1,289	1,000



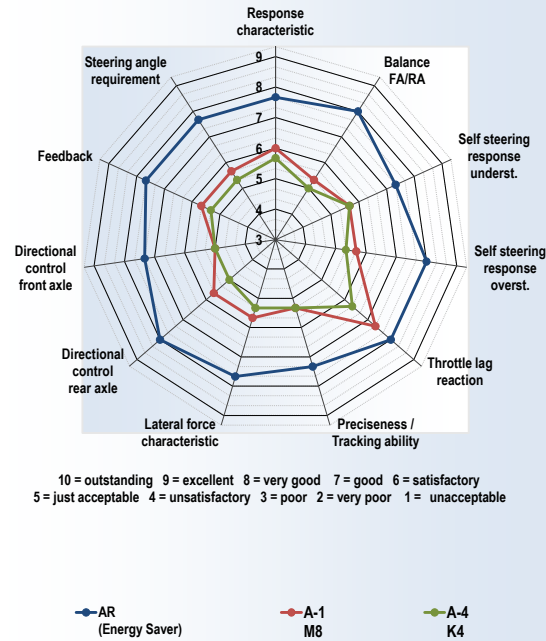
DATASHEET: WET HANDLING

WET HANDLING

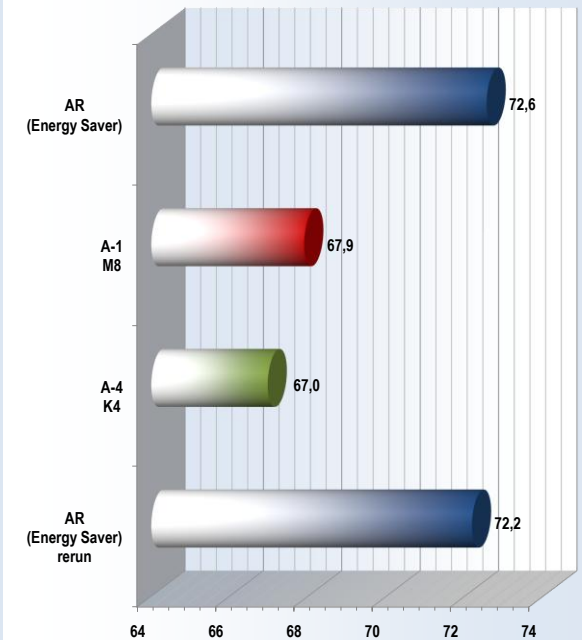
Date:	21-Sep-10	Air Temperature [°C]:	min: 14.0 max: 15.5	Surface Condition:	wet handling , clockwise	Tire Inflation [bar]:	FA:2.2 RA:2.2	Test Vehicle:	VW Golf V 1.9 TDI
Test Location:	Wachauring (A)	Surface Temperature [°C]:	min: 15.5 max: 19.4	Weather Condition:	sunny	Driver:	Stauder	Track Length [m]:	1050

	AR (Energy Saver)			A-1 M8			A-4 K4			AR (Energy Saver) rerun		
Response characteristic	8-	slow	med. direct	sharp	6	slow	med. direct	sharp	6-	slow	med. direct	sharp
Steering angle requirement	8-				6-				5+			
Feedback	8-				6-				5+			
Directional control front axle	7+				5				5			
Directional control rear axle	8				6-				5			
Lateral force characteristic	8-				6-				5+			
Preciseness /Tracking ability	7+				5+				5+			
Throttle lag reaction	8	none	slight	med. strong	7+	none	slight	med. strong	6+	none	slight	med. strong
Self steering response overst.	8	none	slight	med. strong	6-	none	slight	med. strong	5+	none	slight	med. strong
Self steering response underst.	7+	none	slight	med. strong	6-	none	slight	med. strong	6-	none	slight	med. strong
Balance FA/RA	8				5+				5			
Average rating (out of 10)	7,70				5,73				5,39			
Rating compared to Michelin [%]	100,0%				74,4%				70,1%			
Lap 1 [mm:s,ss]	52,00				55,76				56,46			52,31
Lap 2 [mm:s,ss]	52,29				55,60				56,46			52,35
Lap 3 [mm:s,ss]	52,01				55,65				56,43			52,45
Average lap time [mm:s,ss]	52,10				55,67				56,45			52,37
Resulting speed [kph]	72,6				67,9				67,0			72,2
Reference value [kph]	72,55				72,43				72,30			72,18
Speed compared to Michelin [%]	100,0%				93,7%				92,6%			100,0%
Overall result compared to Michelin [%] (Rating:Speed = 1:2)	100,0%				87,3%				85,1%			-

WET HANDLING RATINGS (INDIVIDUAL)



WET HANDLING, AVERAGE SPEED [KM/H]



Subjective Assessment:

A1 - M8
 This tire shows a slightly degressive lateral force characteristic, but is still ok. The center point of the steering is a little bit spongy and less defined than the reference tire. The feedback performance is also too low. The rear axle is permanently pushing in fast turns but stays mostly stable. This tire demands many corrections to the driver and offers a quite bad preciseness. In total slightly more balanced than the SP06+ tires.

A4 - K4
 The lateral force characteristic of this brand is a little bit better than A-1, the center point feeling is similar to A1 but the feedback is on a lower level. This tire requires larger steering angles, the rear axle is very instable and is not always able to follow front axle, what results in many steering corrections. The throttle lag reaction behaviour is slightly more balanced than A1 but the directional control performance is on a lower level.

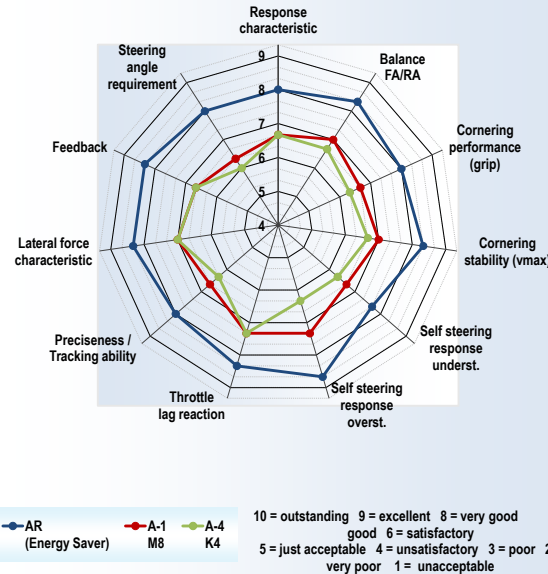
DATASHEET: DRY HANDLING

DRY HANDLING

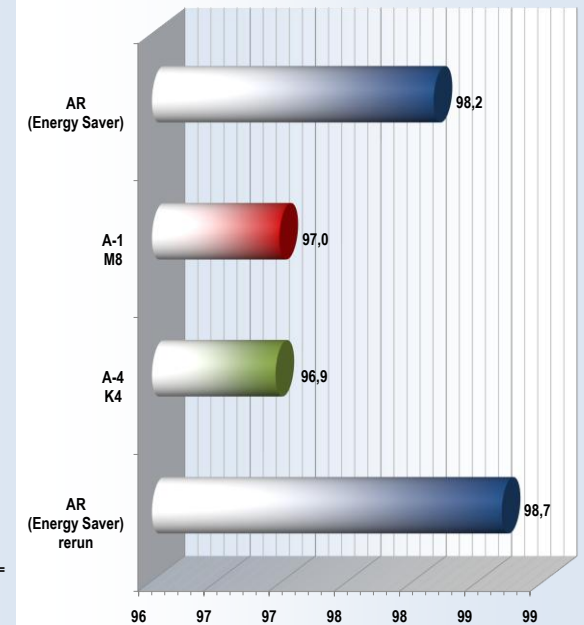
Date:	23-Sep-10	Air Temperature [°C]:	min: 23.0 max: 23.5	Surface Condition:	dry asphalt, clockwise	Tire Inflation [bar]:	FA: 2.2 RA: 2.2	Test Vehicle:	VW Golf V 1.9 TDI
Test Location:	ATP Papenburg (D)	Surface Temperature [°C]:	min: 24.2 max: 24.9	Weather Condition:	sunny	Driver:	Staude	Track Length [m]:	2600

	AR (Energy Saver)	A-1 M8	A-4 K4	AR (Energy Saver) rerun
Response characteristic	8	7-	7-	-
Steering angle requirement	8	6+	6	-
Feedback	8+	7-	7-	-
Lateral force characteristic	8+	7	7	-
Preciseness / Tracking ability	8	7-	6+	-
Throttle lag reaction	8+	7+	7+	-
Self steering response overst.	9-	7+	6+	-
Self steering response underst.	8-	7-	6+	-
Cornering stability (vmax)	8+	7	7-	-
Cornering performance (grip)	8	7-	6+	-
Balance FA/RA	8+	7	7-	-
Average rating (out of 10)	8,18	6,85	6,58	-
Rating compared to Michelin [%]	100,0%	83,7%	80,4%	-
Lap 1 [mm:s,ss]	01:35,35	01:36,60	01:36,42	01:34,86
Lap 2 [mm:s,ss]	01:35,31	01:36,49	01:36,54	01:34,76
Lap 3 [mm:s,ss]	01:35,42	01:36,47	01:36,69	01:34,95
Average Lap Time [mm:s,ss]	01:35,36	01:36,52	01:36,55	01:34,86
Resulting Speed [kph]	98,2	97,0	96,9	98,7
Reference Value [kph]	98,15	98,33	98,50	98,68
Speed compared to Michelin [%]	100,0%	98,6%	98,4%	100,0%
Overall Result compared to Michelin [%] (Rating:Speed = 1:2)	100,0%	93,7%	92,4%	-

DRY HANDLING RATINGS (INDIVIDUAL)



DRY HANDLING AVERAGE SPEED [km/h]



Subjective Assessment:

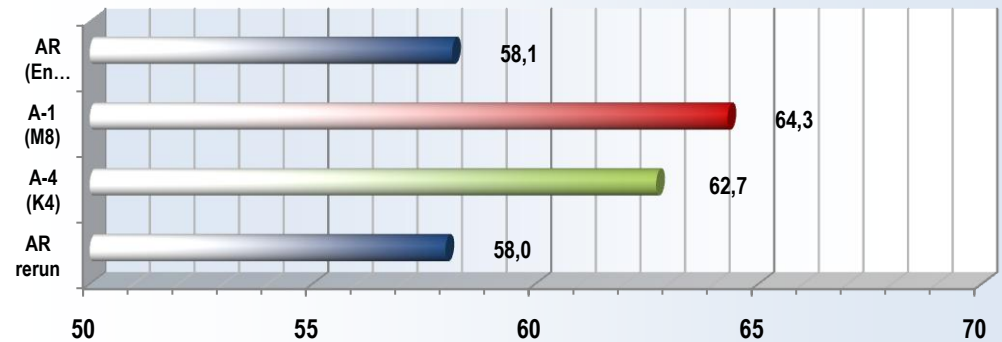
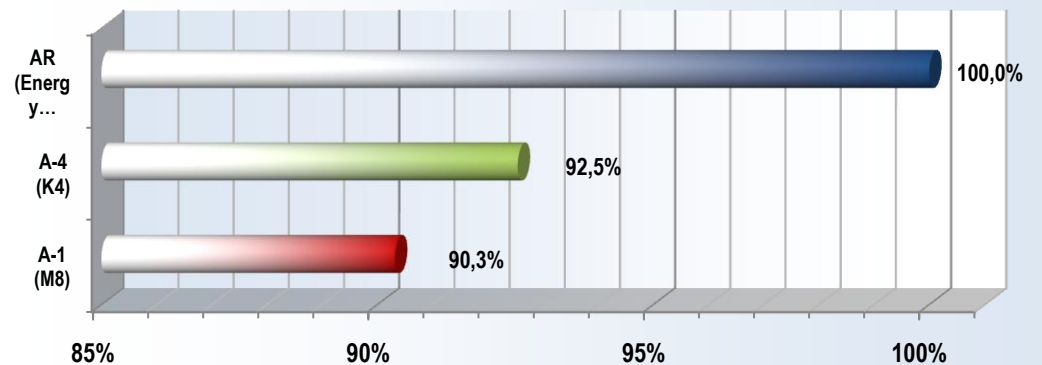
A-1 M8
 Compared to the reference slightly delayed response characteristic. While the feedback performance at small steering angles is good, the performance drops with increasing steering angles and leaves a slightly inharmonical overall impression combined with a loss of preciseness. With increasing tire temperature (number of test laps) the total performance drops slightly causing that the balance between front axle and rear axle gets worse and larger steering angles are required.

A-4 K4
 This tire behaves quite similar to M8 offering nearly the same response characteristic. The feedback is generally slightly better and keeps more stable at larger steering angles. The performance also drops with increasing number of laps resulting a worse balance, feedback and larger steering angles than at the beginning of the test. The rear axle is permanently pushing causing higher attention to the driver and demanding more corrections. The throttle lag reaction of this tire is similar to M8.

DATASHEET: DRY BRAKING PERFORMANCE
DRY BRAKING

Customer:	Zhongce	Rim Size:	6Jx15	Order No.:	76243920
Date:	14-Oct-10			Test Location:	Oberschleißheim (D)
Air Temperature [°C]:	min:10.2 max:13.2				
Surface Temperature [°C]:	min:11.6 max:15.5	Tire Size:	195/65 R15 91H	Tire Inflation [bar]:	FA: 2.0 RA: 2.0
ABS:	on			v₁ [kph]:	120
Test Vehicle:	Golf VI 1.4 TSI			v₂ [kph]:	0

Stopping distance	AR (Energy Saver)	A-1 (M8)	A-4 (K4)	AR rerun
Value s ₁ [m]	57,9	63,8	61,8	57,2
Value s ₂ [m]	58,0	63,4	62,0	57,8
Value s ₃ [m]	57,9	65,2	63,6	58,7
Value s ₄ [m]	58,7	64,2	63,6	58,2
Value s ₅ [m]	-	64,4	62,9	-
Value s ₆ [m]	-	64,0	62,3	-
Value s ₇ [m]	-	64,4	62,5	-
Value s ₈ [m]	-	65,0	62,9	-
Mean Value [m]	58,1	64,3	62,7	58,0
Standard Variation (σ_{n-1}) [m]	0,33	0,56	0,63	0,55
Coefficient of Variation [%]	0,58%	0,87%	1,01%	0,95%
Mean Deceleration [m/s²]	3,98	3,60	3,69	3,99
Reference Value [m/s ²]	3,98	3,99	3,99	3,99
Compared to Reference [%]	100,0%	90,3%	92,5%	100,0%
Compared to Segment [%]	106,1%	95,8%	98,2%	-

BRAKING DISTANCE [M]

BRAKING PERFORMANCE COMPARED TO REFERENCE [%]


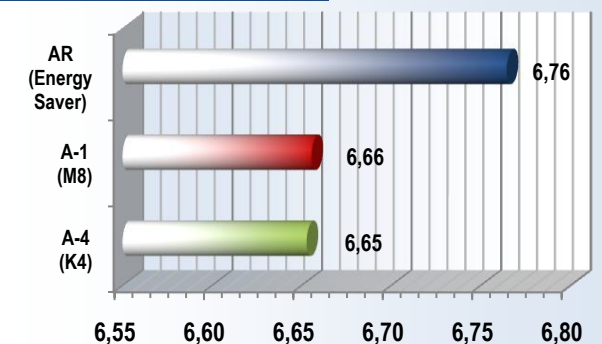
DATASHEET: FUEL CONSUMPTION
FUEL CONSUMPTION TEST

Customer:	Zhongce	Test location:	Highway roads (A9, A92) near Munich (D)
Order-No.:	76243920	Tire size:	195/65 R15 91H
Route Profile:	~ 95% with various share of constant speed (80, 100, 120 km/h), rest mixed traffic	Average speed:	~ 94 km/h
Test Vehicles:	VW Golf Mk VI 1.4 TSI (identical cars, 90 kW)	Tire inflation [bar]:	FA: 2.0 RA: 2.0

Further test information: The test was carried out at nighttime to avoid influences of traffic with other cars; the test cars were driving in convoy but with a distance of ~ 300 - 400 m to avoid influences from slipstream; the speed was kept constantly by electronic cruise control of the vehicles, the exact speed was measured by GPS based V-Box systems in the vehicle. The test was carried out in three loops, each loop consisting of three runs (each run ~105 km); each run was driven by the same driver on the same vehicle with the same tire; for each next run, the drivers were changed between the cars; for the next loop, the tires were changed between the vehicles. After all three loops, each tire/driver/vehicle combination had covered the same total distance.

The fuel consumption was measured by determining the exact amounts at fueling (at start of a loop) and draining of the tank (at the end of a loop) and controlled with the on board computer of the cars. The measurement error at determination of the amounts of fuel and the resulting calculation of the average fuel consumption can be regarded as <0.5%.

TIRE	AR (Energy Saver)	A-1 (M8)	A-4 (K4)
Ø Fuel consumption [l /100 km] Loop 1:	6,789	6,563	6,653
Ø Fuel consumption [l /100 km] Loop 2:	6,730	6,658	6,743
Ø Fuel consumption [l /100 km] Loop 3:	6,774	6,745	6,562
Ø Fuel consumption [l /100 km] Total:	6,76	6,66	6,65
Fuel consumption compared to Michelin [%]:	100,0%	98,4%	98,3%
Ø Fuel range [km/l] Loop 1:	14,73	15,24	15,03
Ø Fuel range [km/l] Loop 2:	14,86	15,02	14,83
Ø Fuel range [km/l] Loop 3:	14,76	14,82	15,24
Ø Fuel range [km/l] Total:	14,8	15,0	15,0
Mileage/liter compared to Michelin [%]:	100,0%	101,6%	101,7%

AVERAGE FUEL CONSUMPTION [L/100KM]

MILEAGE COMPARED TO MICHELIN [%]
