

BMW 320 E21 CUP für rFactor

PREFACE

Welcome to the BMW 320 E21 CUP for rFactor.

The BMW 320 E21 in his origin version was developed and constructed by cooky for the running-simulation GTL.

I was responsible for the physics in the GTL version and could convert the MOD to rFactor with permission of cooky, DucFreak and all painters.

However, this conversion is no 1:1 transfer. Many things were changed, for example graphics and performance, artificial intelligence and tire physics,

The BMW was tested by more than 6 people for many weeks during the trial period. 2.9 GB of telemetry data were collected 3.960 km covered as well as 1 graphic card wore out.

I am believe devoutly the effort has been worthwhile. I hope, you will be satisfied with the BMW and you will spend a lot of interesting hours with it.

But now enough of the prefaces! We want on the race course.



BMW 320 E21 CUP für rFactor

1. INSTALLATION

The installation starts by call of the BMW320_E21_CUP_RC1.EXE.

After accepting the usual license and declaring the installation list, the BMW 320 E21 CUP will be installed on your computer.

It concerns the *high-res-version* with 2048x2048 of vehicle textures. Whether it is necessary, a 1024x1024 version for less efficient graphic cards or computers will be created.

You can get it here:

<http://www.trf.johnnysanders.de/orion2/viewtopic.php?t=1720>

Here is a screenshot of the installation.



2. VEHICLE SELECTION/UPGRADE

The selection and the purchase of a vehicle occur in usual manner via the main menu. In order to make the upgrade parts to your car, you must have bought the concerning vehicle before.

Here is a view of the upgrade parts:

2.1 STEERING



Here you can choose the multiplier for the *Force Feed Back* in stages. Standard 1.5 is multiplier. 2 and 2.5 are for the increase of the effects.

2.2 SHIFTER STYLE



Default setting is *Sequential* and should not be changed. The setting *Gated Shifter* is only for the genuine race drivers among us. You can enjoy a realistic H-shifting in the BMW with the corresponding hardware. All corresponding aids for a switching operation are deactivated then.

2.3 SHIFTLIGHT FOR THE E21

In the middle of the seventies an optical switching-request was very rare.

There exists the possibility in the BMW 320 E21 to install a so called *shiftlight* into the cockpit.



The Shiftlight will light up shortly before Attaining rotation speed limit and remind you of the switching operation.

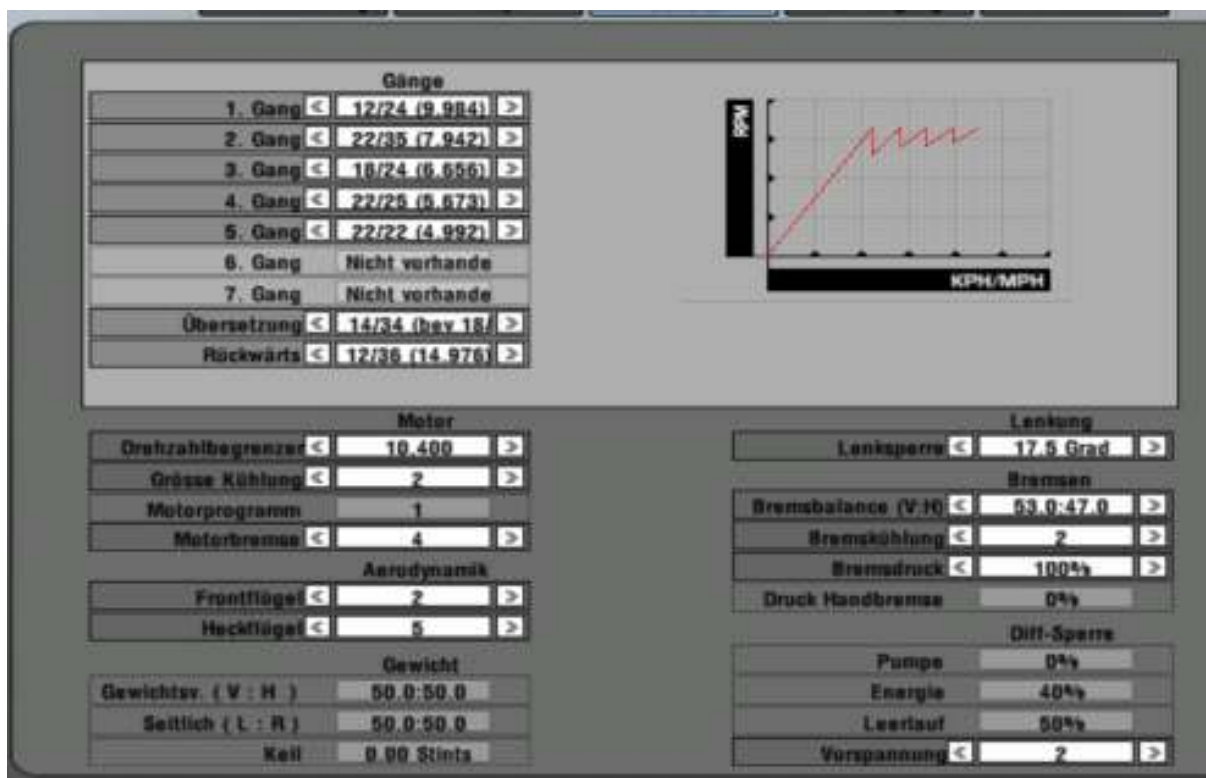


3. ATTITUDES IN THE GARAGE

I spent many hours with finding a practice-oriented setting option in the set-up menu. After the first tests and online-races I passed to restricting the SET-UP radically.

In my opinion too much precious time is spent in finding a set-up for a fast qualifying round. Not everybody has the time and the knowledge to begin a set-up search of several days before a planned race.

Who still does not leave the fingers of the set-up, for that one here comes a short overview of the most important set possibilities



REV limiter

The standard REV limit is near 10.400 U/min. The setting range ranges from 10.200 U/min to 10.500 U/min.

More than 10.400 U/min go on the durability of the engine and lead inevitably to an engine failure.

Radiator size

If you notice while driving, that the oil temperature is beyond the normal range of more than 103 degrees, you have to enlarge the radiator duct size.

Greater cooling = higher air resistance = slower BMW

Front/tail wing

The attitudes of the front- and tail wing influence the road performance of the BMW.

Modifications in the wing attitudes often make changes in the gear ratio and in the braking force distribution necessary.

With increasing wing attitude the down force increases itself in the respective vehicle area, the curve rates increase. However, at the same time the air resistance also rises and slows down the vehicle on the straight lines.

Control range front	1 = min. downforce	3 = of max. downforce
Control range rear	1 = min. downforce	7 = of max. downforce

Brake balance

With the aid of the brake balance you can control the brake force between the front and back wheels.

If for example the front wheels jam the braking/one steering into the curve formerly as the rear-wheel brake, you must adjust the distribution in the direction of back wheels.

If e.g., the front wheels block while gentle braking and yielding to the curve earlier than the back wheel, you must shift the distribution in the direction of back wheels.

A nervous tail can be minimized with the aid of the balance, too, because you don't have any possibility to move the differential.

The attitude of the brake balance, however, is linked to the following points: brake duct size/pressure point, as well as the used hardware/steering wheel/pedal.

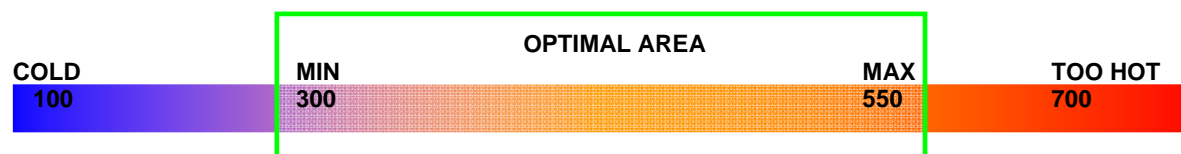
Control range	front	rear	to	front	rear
	50%	50%		60%	40%

Brake duct size/pressure

Sense of the brake duct size is to hold the temperature of the brake possibly always in the optimum area.

An overheated brake is as hindering as an undercooled brake.

The graphic arts show the temperature area of the front brake and are given in Celsius.:



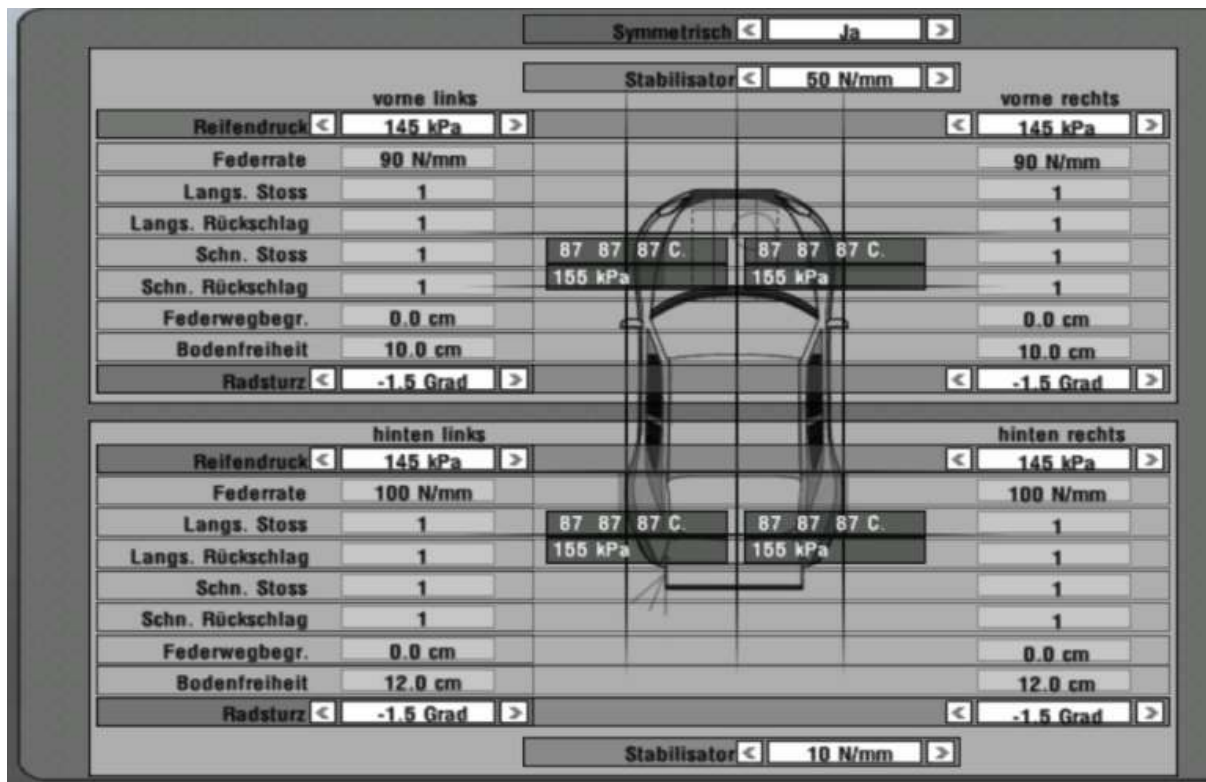
Try to hold the temperature of the brake within the optimal area of 300 and 500 C.

The brake duct size ranges from: **1**=minimum to **5**=maximum

If the brake reaches its optimal temperature, it is hard to dose the pedal, when you are in a race.

By reduction of the brake pressure you can weaken the braking power. But you give away, perhaps, the victory in the last curve by a too long braking distance.

SUSPENSION



I would like to go into the parameters *anti-roll bar front/rear*, because they are very important for the road performance.

Driving fastly with the BMW means a compromise between

- controlled and not excessive drift with the rear
- yield without a lot understeer
- optimal brake balance

The anti-roll bar have an enormous stake in the first two points.

If you put on the stabilizer behind "without", you will get more grip on the back wheel axis. The BMW then is more aggressive on the rear.

This means for the front area, that you can turn in more precise. The chance of turners while yielding to the curve rises.

UPSHOT

The BWM asks for a correct gear ratio, brake balance and depending on the driver for the correct setting of the stabilizers.

And with the traits of the 3 different tire models I wish a lot of fun with the limited setup.

4. TIRE

The BMW 320 worked with different tire brands in the middle of the seventies German championship. The sponsor' stickers and/or the tire legend tell the corresponding manufacturer.

The tire brand with its different character and performance and its performance had got a high priority.

The tires are from:

1. GOODYEAR
2. DUNLOP
3. PIRELLI

The tires differ in grip, wear, warming, absorbability as well as other parametres.

The following graphic arts optically show the character of the tires. You can get precise information at the end of the documentation.

	LITTLE		HIGHER
GRIP	GOODYEAR	DUNLOP	PIRELLI
WEAR	GOODYEAR	DUNLOP	PIRELLI
HEATING	GOODYEAR	DUNLOP	PIRELLI

While testing we found out, that there is no favourite of tires. Rather the choice of the tyres depended on the predilections and the driving style of the driver.

IMPORTANT:

The tyre type is not selectable. It is firmly bound to a vehicle.

5. THANKS TO AND CREDITS

I would like thank all, who helped me to realize the

BMW 320 E21 CUP for rFactor

Cooky	3D-Models and textures
Ducfreak	soundfiles
c.k.73	video, pictures, installation program
Jolo	meshfiles
Nile	cam-files
Toffi	for the preparation of the BMW-corner and filehosting at http://wwwracingfactor.de

BETA-TESTER

c.k.73	Dreamteam
Jolo	NIL51!N
TOFFI	Almost Eddy
SpaceKid	Udo

PAINTER

Cooky	CY-33
Meinicke	Schnuf
Niklas	PrinzTT
Odi	

dmatzies 2007

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ATTACHMENTS

TALENTFILES

Fahrer	Starts	Poles	Wins	Championships	Aggression	Reputation/Ruf	Courtesy/ Höflichkeit	Composure Gelassenheit	Speed	Crash	Recovery	Complete Laps	Minimum Racing Skill
Karl Heinz Becker	18				70	50	70	80	80	10		307	80
Walter Brun	38	2			80	71	25	60	85	11		686	70
Hans Georg Bürger	12				70	50	50	60	85	10		307	60
Eddie Cheever	8				85	60	70	50	90	2		233	80
Bo Emanuelsson	30				75	50	40	60	70	5		380	75
Harald Ertl	6	4	4	1	100	90	100	50	95			372	85
Harald Grohs	22				85	70	65	71	75	9		448	80
Marcel Höttinger	15				75	85	70	75	70	3		278	70
Joachim Winkelhock	12				90	65	60	75	75	2		160	60
Striezel Kraus	35		1		85	70	75	80	80	5		399	75
Markus höttinger	15				75	85	70	75	70	3		278	70
Manfred Winkelhock	20	1	6		95	90	60	40	85	2		775	95
Jörg Obermoser	6				65	70	56	70	70	1		205	50
Roberto Ravaglia	20	1	2		80	60	70	65	85	5		312	95
Hans Ruesch	23		1		75	60	70	85	80	10		377	85
Hans Joachim Stuck	4	3	3		95	100	90	100	100			93	100
Marc Surer	7	1	1		90	50	40	60	95	1		250	95
Manfred Winkelhock	20	1	6		95	90	60	40	85	2		775	95
Jens Winther	15		1		80	60	75	75	75	7		290	85
Nils Gustav Wulik	30		1		100	1	1	1	95	13		380	50
Jim Busby	22				80	65	85	75	87	6		400	70
Johan Groehndahl	15	1			85	85	60	45	75	5		290	65
Bernard Beguin	25				95	75	30	47	75	8		320	75
Gilles Villeneuve	35	2	1		100	100	85	40	95	5		600	90
Gerhard Berger	25	1	1		100	30	30	45	50	15		420	60
Karl Oppitzhauser	20	2	2		95	100	100	85	100			300	90

BMW 320 E21 CUP *für rFactor*



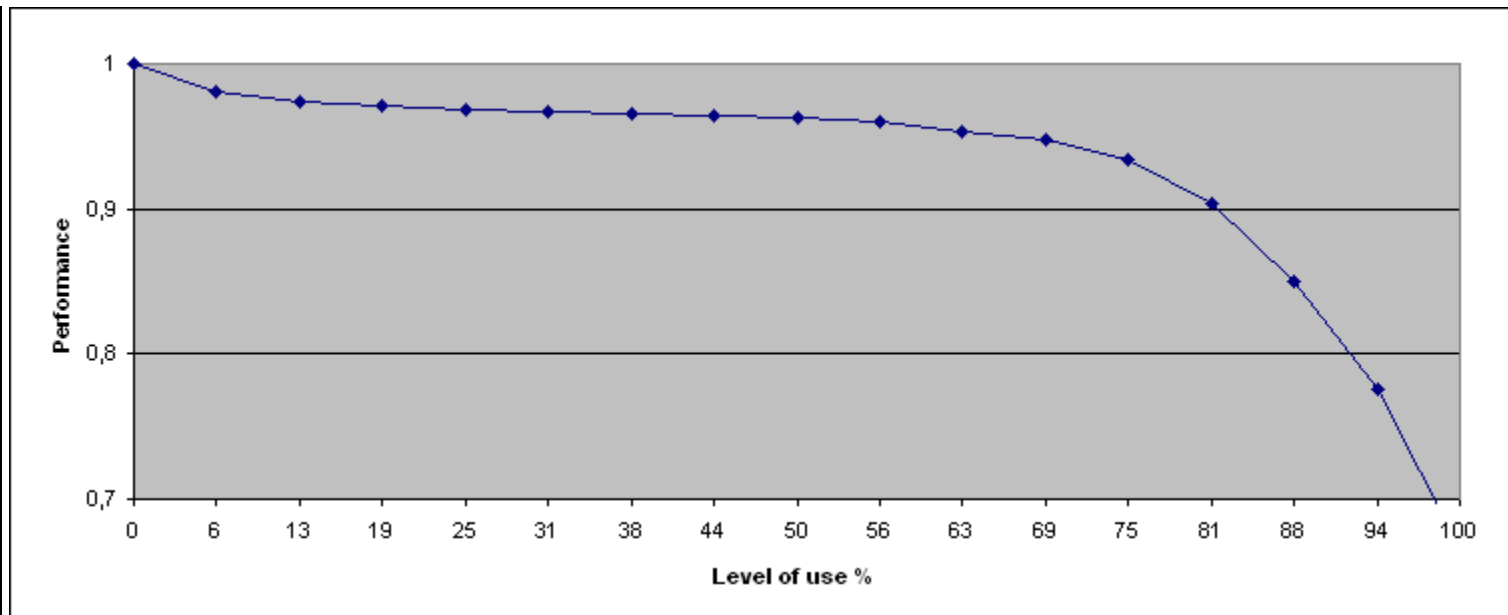
Christian Neumann	15				60	70	50	50	65	6		200	77
Tom Walkingshaw	5				75	66	55	54	75	3		60	65
Dirk Winter	12				85	70	67	40	50	4		130	58
Heinz Becker	13				50	70	50	65	20	6		40	40
Giovanni Morelli	5	1	1		80	80	70	65	85	2		101	75
Erwin Warislowich	16				77	65	58	60	75	4		320	60
Dieter Quester	20	1			85	75	80	80	80	5		380	75

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TIRE DESCRIPTION

BMW 320 E21 GOODYEAR

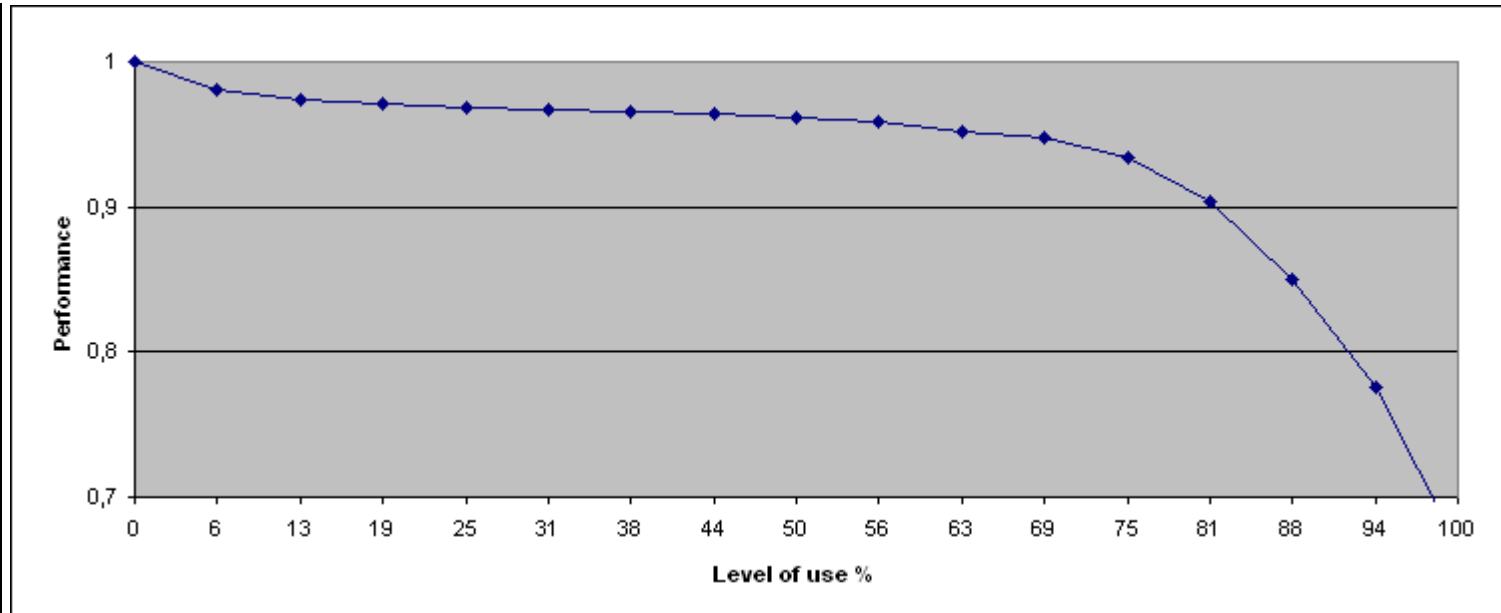
Level of use	Performance
0	1
6	0,981
13	0,9745
19	0,9715
25	0,969
31	0,967
38	0,9655
44	0,9645
50	0,9635
56	0,96
63	0,953
69	0,948
75	0,934
81	0,904
88	0,85
94	0,775
100	0,665



	Wear-Rate	AI_Wear-Rate	SpringBase	SpringkPa	Damper	Heating	Transfer (Heating)	Temperature	DryLatLong
Front	0.400e-6	0.700e-7	80000.0	1000.00	1400.0	7.40e-1, 8.30e-3	10.00e-3, 1.80e-3, 3.00e-4	85.0, 25.0	1.565
Rear	0.420e-6	0.700e-7	80000.0	1000.00	1400.0	7.80e-1, 9.00e-3	10.00e-3, 1.80e-3, 3.00e-4	85.0, 25.0	1.615

BMW 320 E21 DUNLOP

Level of use %	Performance
0	1
6	0,981
13	0,9745
19	0,9715
25	0,968
31	0,967
38	0,9655
44	0,9645
50	0,962
56	0,959
63	0,952
69	0,948
75	0,934
81	0,904
88	0,85
94	0,775
100	0,665

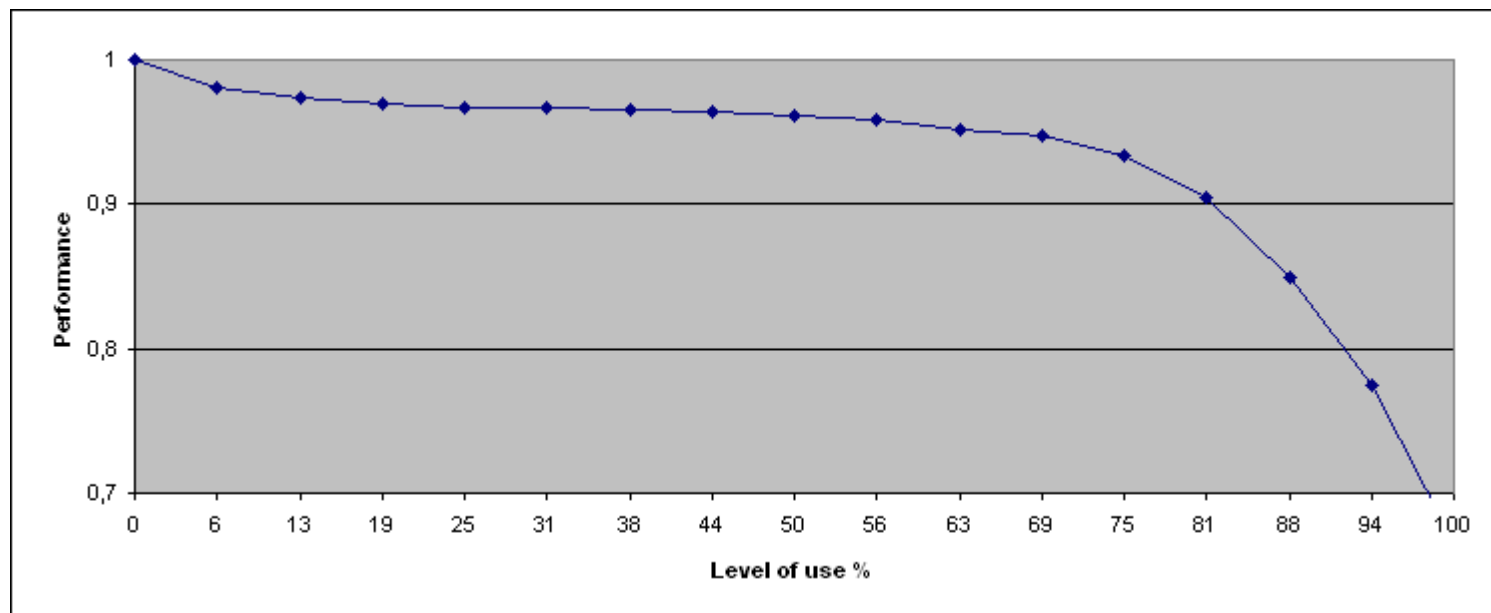


	Wear-Rate	AI_Wear-Rate	SpringBase	SpringkPa	Damper	Heating	Transfer (Heating)	Temperature	DryLatLong
Front	0.420e-6	0.700e-7	75000.0	1050.00	1300.0	7.40e-1, 8.30e-3	10.00e-3, 1.80e-3, 3.00e-4	85.0, 25.0	1.566
Rear	0.440e-6	0.700e-7	75000.0	1050.00	1300.0	7.80e-1, 9.00e-3	10.00e-3, 1.80e-3, 3.00e-4	85.0, 25.0	1.616

BMW 320 E21 CUP für rFactor

BMW 320 E21 PIRELLI

Level of use %	Performance
0	1
6	0,981
13	0,974
19	0,97
25	0,9675
31	0,967
38	0,9655
44	0,9645
50	0,961
56	0,958
63	0,951
69	0,948
75	0,934
81	0,904
88	0,85
94	0,775
100	0,665



	Wear-Rate	AI_Wear-Rate	SpringBase	SpringkPa	Damper	Heating	Transfer (Heating)	Temperature	DryLatLong
Front	0.430e-6	0.700e-7	76000.0	1030.00	1420.0	7.50e-1, 8.30e-3	10.00e-3, 1.80e-3, 3.00e-4	85.0, 25.0	1.567
Rear	0.450e-6	0.700e-7	74000.0	1100.00	1280.0	7.90e-1, 9.00e-3	10.00e-3, 1.80e-3, 3.00e-4	85.0, 25.0	1.617