

EU-TYPE EXAMINATION CERTIFICATE

Issued by Liftinstituut B.V.
identification number Notified Body 0400,
commissioned by Decree no. 2016-0000038870

Certificate no. : NL17-400-1002-263-01 Revision no.: -

Description of the product : Brake as Ascending Car Overspeed protection (ACOP) to prevent uncontrolled upward movement of the car and as Unintended Car Movement Protection (UCMP) means

Trademark, type : Suzhou Mona Drive, EMK7K-2x425 Nm to be used on MCK100 machine, EMK9K-2x975 Nm to be used on MCK200 machine, EMK12K-2x2150 Nm to be used on MCK300 & MCK500 machine.

Name and address of the manufacturer : Suzhou Mona Drive Equipment Co.,Ltd.
No.66 Changfengdang Road, Lili Town, Wujiang District, Suzhou City, 215200 P.R. China.

Name and address of the certificate holder : Suzhou Mona Drive Equipment Co.,Ltd.
No.66 Changfengdang Road, Lili Town, Wujiang District, Suzhou City, 215200 P.R. China.

Certificate issued on the following requirements : Lifts Directive 2014/33/EU

Certificate based on the following standard : Parts of: EN 81-20:2014, EN 81-50:2014,
EN 81-1:1998+A3:2009

Test laboratory : SISE, No.6, Chuangye Road, near Shunchengji Industrial park, Qinghu Dahe Road, New Longhua District, Shenzhen, P.R. China

Date and number of the laboratory report : 2016AF0768, 16-07-2016
2017AF0951, 31-08-2017
2017AF0458, 16-05-2017
2016AF0707, 06-07-2016
2016AF1298, 30-11-2016
2017AF0758, 19-07-2017

Date of EU-type examination : August – November 2017


Additional document with this certificate : Report belonging to the EU-type examination certificate no.: NL17-400-1002-263-01

Additional remarks : See chapter 2 and 5 of the report belonging to this EU- type examination certificate.

Conclusion : The safety component meets the requirements of the Lifts Directive 2014/33/EU taking into account any additional remarks mentioned above.

Amsterdam

Date : 17-11-2017
Valid until : 17-11-2022


ing. P.J. Peeters
Manager
Certification decision by

Report EU-type examination

Report belonging to EU-type examination certificate no.	: NL17-400-1002-263-01
Date of issue of original certificate	: November 17, 2017
Concerns	: Safety component
No. and date of revision	: -
Requirements	: Lifts Directive 2014/33/EU Standards: EN81-20:2014, EN81-50:2014 EN 81-1:1998+A3:2009
Project no.	: P171018

1. General specifications

Name and address manufacturer	: Suzhou Mona Drive Equipment Co.,Ltd. No.66 Changfengdang Road, Lili Town, Wujiang District, Suzhou City, 215200 P.R. China.
Description of safety component	: Brake as Ascending Car Overspeed protection (ACOP) to prevent uncontrolled upward movement of the car and as Unintended Car Movement Protection (UCMP) means
Type	: EMK7K-2x425 Nm to be used on MCK100 machine. EMK9K-2x975 Nm to be used on MCK200 machine. EMK12K-2x2150 Nm to be used on MCK300 and MCK500 machine.
Laboratory	: SISE, No.6, Chuangye Road, near Shunchengji Industrial park, Qinghu Dahe Road, New Longhua District, Shenzhen, P.R. China
Data of examination	: August - November 2017
Examination performed by	: W.Visser

2. Description safety component

The Suzhou Mona Drive EMK7K-2x425 Nm, EMK9K-2x975 Nm and EMK12K-2x2150 Nm are brakes that consist of two independent electro-mechanical block brakes which fulfils the requirements for lift brakes according to clause 5.9.2.2.2 of

EN81-20:2014, mounted to a MCK100, MCK200, MCK300 or MCK500 gearless machine.

The brake parts act on the traction sheave (e.g. on the brake drum that is bolted to the traction sheave directly by bolts), connected to the drive shaft by key and keyway. In that case the connections are proven to have built in redundancy. The brakes are also used as holding brakes during normal operation of the lift. The brake material is glued to the brake shoes and the shoes are bolted to the base.

ACOP

The Ascending Car Overspeed Protection shall be actuated by a governor overspeed contact or an equivalent EU-type tested device which was no part of this investigation.

UCMP

The brake can be used as braking element for Unintended Car Movement Protections according Art. 5.6.7 of EN 81-20:2014.

The brake torque for each type is pre-determined in the factory by application of a fixed amount of guided compression springs. The torque is indicated on a label attached to the brake. This setting is sufficient until the air gap between magnetic core and brake lining exceeds 0,60 mm. Each brake part is separately provided with a monitoring contact. The controller of the lift in which these brakes are used, must check the signals from each brake contact according to Art. 5.6.7.9 of EN 81-20:2014. If a failure is detected, the lift must be put out of service permanently.

The brake delay times T_{10} and/or T_{90} as indicated in this report shall be used to check by means of calculation that the stopping distance of the car fulfils the requirements. T_{10} means the time from activation until the moment that 10% of the nominal brake torque has been reached and T_{90} means the time from activation until the moment that 90% of the nominal brake torque has been reached.

A value of brake delay time between T_{10} and T_{90} can be interpolated if needed.

The defined and calculated nominal torque per brake is the minimum guaranteed torque under the conditions which the manufacturer prescribes during the lifetime of the brake.

Brake Coil Connections

A brake connection box is mounted on top of the machine. It has a 110VDC input from a rectifier inside the lift control panel. Main contactors are on the DC side.

BRAKE DATA

Manufacturer	Suzhou Mona Drive Equipment Co.,Ltd.		
Type	EMK7K	EMK9K	EMK12K
Number of friction surfaces	2	2	2
Number of brake springs	2 x 10	2 x 4	2 x 8
Brake drum diameter [mm]	398	525	667
Air gap between brake drum and brake shoe [mm]	0,2-0,5	0,2-0,5	0,2-0,5
Max allowed tripping speed	278 rpm	308 rpm	257 rpm
Nominal torque	2 x 425 Nm	2 x 975 Nm	2 x 2150 Nm
Exciting / holding voltage [VDC]	110 / 110	110 / 110	110 / 110
T-10 (maximum value measured)	39 msec	53 msec	42 msec
T-90 (maximum value measured)	100 msec	147 msec	74 msec

TRACTION MACHINE APPLICATION DATA

Machine type Suzhou Mona Drive	MCK100	MCK200	MCK300	MCK500
Q=Nominal capacity range [kg]	320-630	320-1150	630-1600	630-2000
P=Car mass range [kg]	400-1100	400-1600	750-2280	750-2400
Rated torque [Nm]	340	780	1110	1660
Roping factor	2:1	2:1	2:1	2:1
Traction sheave diameter [mm]	320	400 / 450	400 / 480	480
Max. rpm traction sheave /speed lift	209 rpm / 1,75 m/s	239 rpm / 2,5 m/s	199 rpm / 2,5 m/s	199 rpm / 2,5 m/s
Max. tripping rpm/speed ACOP	278 rpm / 2,33 m/s	308 rpm / 3,225 m/s	257 rpm / 3,225 m/s	257 rpm / 3,225 m/s
Bolted connection traction sheave -brake disc	8 x M12	8 x M12	6 x M16	6 x M16
Max. allowed lift inertia ACOP [kgm ²]	40	40	40	40

3. Examinations and tests

The examination covered a check whether compliance with the Lifts Directive 2014/33/EU is met, based on the harmonized product standards EN81-20:2014 and EN81-50:2014. The examination included:

- Examination of the technical file (See annex 2):
- Check of performed calculations according to EN81-20 and EN81-50.
- Examination of the representative model in order to establish conformity with the technical file.
- Inspections and tests to check compliance with the essential requirements of the EN 81-50 Art. 5.7 and 5.8 at Shenzhen Institute of Special Equipment Inspection and Test (SISE). All results are described in the following SISE Test Reports:

	EMK7K	EMK9K	EMK12K
ACOP	2016AF0768	2017AF0458	2016AF1298
UCMP	2017AF0951	2016AF0707	2017AF0758

Liftinstituut recognizes the tests and the results by this ISO 17025 accredited laboratory.

- Tests to verify the required monitoring according to Art. 5.6.7.3 of EN 81-20.
- The machine was placed on a test stand with a coupling to an intermediate shaft with a torque meter. (See annex 1d). On the other side of this intermediate shaft is an electric driving motor with overrated power to the shaft. The torque is stored as a function of time with a digital oscilloscope.
- The torque meter was calibrated in advance by an ISO 17025 accredited laboratory.
- The test stand is provided with additional flywheels that can be coupled to the setup but the inertia of the test stand on its own ($> 40 \text{ kgm}^2$) was found to be more than the maximum inertia for the application range defined for the ACOP for these traction machines.
- The electromotor is run with high torque at the highest speed anticipated before deceleration occurs (tripping rpm's of the brake). These maximum tripping rpm's are calculated based on the maximum tripping speed of the applied overspeed governor, which overspeed tripping contact activates the brake as ACOP. After constant speed is reached, the brake holding voltage is cut and the brake set is applied until the machine has come to a full stop, while the electromotor continues giving the unbalance torque calculated from the maximum allowed unbalance for the applicable machine. This test is done 10 times in clockwise direction and 10 times in counter clock wise direction with the complete brake.
- The results of the torque measurement has been recorded and studied. From these results the dynamic torque and the reaction times T_{10} and T_{90} have been established. Also the functioning of the monitoring contacts has been tested. Immediately after each test the temperature of the brake housing and brake discs was checked.
- The test has been performed with brake contactors on the DC side. DC values for each brake are mentioned in chapter 2 of this report. The power to the brake shall always be interrupted on DC side to ensure the specified delay times.

4. Results

4.1. Calculations

Calculations of the maximum torque of the machine/system and brake torque were checked and found in order.

Brake clutch surface pressure calculations and brake spring calculations were checked and found in order.

The strength calculations of connecting bolts between the brake disc and traction sheave were checked and found in order.

Calculations of acceleration, retardation and stopping distances were checked and found in order.

4.2. Measurements

The tests on the test bench showed that the measured torque of the brake was significantly higher than the calculated torque by the manufacturer and that the brake is capable of absorbing sufficient kinetic energy.

After the final examination the product and the technical file were found in accordance with the requirements.

5. Conditions

On the EU-type examination certificate the following conditions apply:

- The application of this certificate is limited to the brakes mentioned in chapter 2 used as brake set for lift applications. Each brake set consists of two independent electro-mechanical block brakes and fulfil the requirements for lift brakes according article 5.9.2.2.2 of EN 81-20:2014.
- Lifts to be built according EN 81-20 shall fulfil Art. 5.9.2.2.2.7 allowing that it is possible to test each brake set independently from outside of the well.
- This brake set can be used as braking element for an Ascending Car Overspeed Protection and as braking element for an Unintended Car Movement Protection according EN 81-20:2014.
- For Ascending Car Overspeed Protection the tripping speed of governor contact shall be according Art. 5.6.6 of EN 81-20:2014.
- Any controller shall take the lift out of service when a fault in the correct lifting and dropping of the brake parts occurs.
- The Suzhou Mona Drive document "Installation and Maintenance manual" must be provided with every brake/machine, in order to make the correct installation and maintenance.
- The installer of the lift needs to define the final complete UCMP solution taking into account the key-parameters of the MCK100 machine with EMK7K brake, MCK200 machine with EMK9K brake or the MCK300 and MCK500 machine with EMK12K brake as UCMP stopping means.
An additional calculation shall be done to check whether the deceleration and stopping distance of the car is within the limits as required by EN 81-20:2014.
- In case of no releveling and no pre-door opening condition, there is no need of any additional safety devices for unintended car movement protection, but only where this brake is mounted on a gearless machine. The controller of the lift must check the signal from the brake monitoring contacts. If a failure is detected, the lift must be put out of service. Its release or the reset of the lift shall require the intervention of a competent person.
- The brake must be interrupted at the DC side of the brake connection to ensure the specified delay times T_{10} and T_{90} .
- The components are according the descriptions of chapter 2 in this report.

6. Conclusions

Based upon the results of the EU-type examination and the Test reports of SISE, Liftinstituut B.V. issues an EU-type examination certificate.

The EU-type examination certificate is only valid for products which are in conformity with the same specifications as the type certified product. The certificate is issued based on the requirements that are valid at the date of issue. In case of changes of the product specifications, changes in the requirements or changes in the state of the art the certificate holder shall request Liftinstituut B.V. to reconsider the validity of the certificate.

7. CE marking and EU Declaration of conformity

Every safety component that is placed on the market in complete conformity with the examined type must be provided with a CE marking according to article 18 of the Lifts directive 2014/33/EU under consideration that conformity with eventually other applicable Directives is proven.

Also every safety component must be accompanied by an EU declaration of conformity according to annex II of the Directive in which the name, address and Notified Body identification number of Liftinstituut B.V. must be included as well as the number of the EU-type examination certificate.

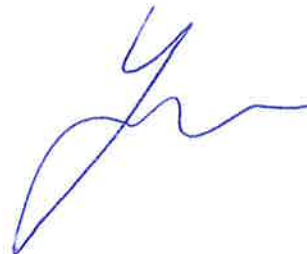
An EU type-certified safety component shall be random checked e.g. according to annex IX of the Lifts directive 2014/33/EU before these safety components may be CE-marked and may be placed on the market. For further information see regulation 2.0.1 'Regulations for product certification' on www.liftinstituut.com.

Prepared by:



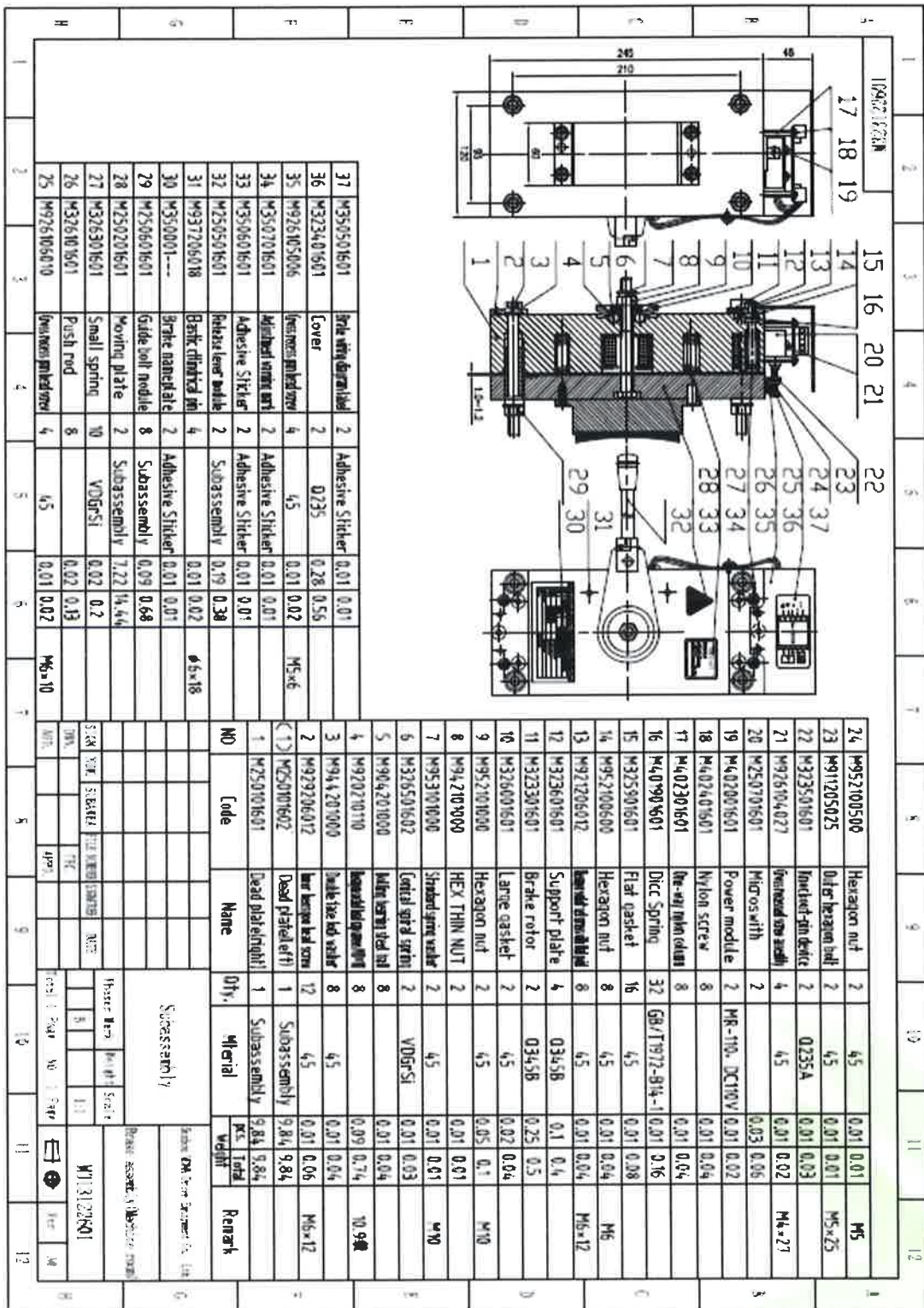
W.Visser
Product Specialist Certification
Liftinstituut B.V.

Certification decision by:



Annexes

Annex 1a : Outline drawing of EMK7K 2x450 Nm brake



Annex 1b : Outline drawing of EMK9K 2x975 Nm brake

100100052M		100100052M		100100052M		100100052M		100100052M		100100052M		100100052M		100100052M		100100052M		100100052M		100100052M			
Part no.	Description	QTY	Unit	Part no.	Description	QTY	Unit	Part no.	Description	QTY	Unit	Part no.	Description	QTY	Unit	Part no.	Description	QTY	Unit	Part no.	Description		
17	Knockout-pin	2		18	Knockout-pin	2		19	Knockout-pin	2		20	Knockout-pin	2		21	Knockout-pin	2		22	Knockout-pin	2	
18	Knockout-pin	2		19	Knockout-pin	2		20	Knockout-pin	2		21	Knockout-pin	2		22	Knockout-pin	2		23	Knockout-pin	2	
19	Knockout-pin	2		20	Knockout-pin	2		21	Knockout-pin	2		22	Knockout-pin	2		23	Knockout-pin	2		24	Knockout-pin	2	
20	Knockout-pin	2		21	Knockout-pin	2		22	Knockout-pin	2		23	Knockout-pin	2		24	Knockout-pin	2		25	Knockout-pin	2	
21	Knockout-pin	2		22	Knockout-pin	2		23	Knockout-pin	2		24	Knockout-pin	2		25	Knockout-pin	2		26	Knockout-pin	2	
22	Knockout-pin	2		23	Knockout-pin	2		24	Knockout-pin	2		25	Knockout-pin	2		26	Knockout-pin	2		27	Knockout-pin	2	
23	Knockout-pin	2		24	Knockout-pin	2		25	Knockout-pin	2		26	Knockout-pin	2		27	Knockout-pin	2		28	Knockout-pin	2	
24	Knockout-pin	2		25	Knockout-pin	2		26	Knockout-pin	2		27	Knockout-pin	2		28	Knockout-pin	2		29	Knockout-pin	2	
25	Knockout-pin	2		26	Knockout-pin	2		27	Knockout-pin	2		28	Knockout-pin	2		29	Knockout-pin	2		30	Knockout-pin	2	
26	Knockout-pin	2		27	Knockout-pin	2		28	Knockout-pin	2		29	Knockout-pin	2		30	Knockout-pin	2		31	Knockout-pin	2	
27	Knockout-pin	2		28	Knockout-pin	2		29	Knockout-pin	2		30	Knockout-pin	2		31	Knockout-pin	2		32	Knockout-pin	2	
28	Knockout-pin	2		29	Knockout-pin	2		30	Knockout-pin	2		31	Knockout-pin	2		32	Knockout-pin	2		33	Knockout-pin	2	
29	Knockout-pin	2		30	Knockout-pin	2		31	Knockout-pin	2		32	Knockout-pin	2		33	Knockout-pin	2		34	Knockout-pin	2	
30	Knockout-pin	2		31	Knockout-pin	2		32	Knockout-pin	2		33	Knockout-pin	2		34	Knockout-pin	2		35	Knockout-pin	2	
31	Knockout-pin	2		32	Knockout-pin	2		33	Knockout-pin	2		34	Knockout-pin	2		35	Knockout-pin	2		36	Knockout-pin	2	
32	Knockout-pin	2		33	Knockout-pin	2		34	Knockout-pin	2		35	Knockout-pin	2		36	Knockout-pin	2		37	Knockout-pin	2	
33	Knockout-pin	2		34	Knockout-pin	2		35	Knockout-pin	2		36	Knockout-pin	2		37	Knockout-pin	2		38	Knockout-pin	2	
34	Knockout-pin	2		35	Knockout-pin	2		36	Knockout-pin	2		37	Knockout-pin	2		38	Knockout-pin	2		39	Knockout-pin	2	
35	Knockout-pin	2		36	Knockout-pin	2		37	Knockout-pin	2		38	Knockout-pin	2		39	Knockout-pin	2		40	Knockout-pin	2	
36	Knockout-pin	2		37	Knockout-pin	2		38	Knockout-pin	2		39	Knockout-pin	2		40	Knockout-pin	2		41	Knockout-pin	2	
37	Knockout-pin	2		38	Knockout-pin	2		39	Knockout-pin	2		40	Knockout-pin	2		41	Knockout-pin	2		42	Knockout-pin	2	
38	Knockout-pin	2		39	Knockout-pin	2		40	Knockout-pin	2		41	Knockout-pin	2		42	Knockout-pin	2					
39	Knockout-pin	2		40	Knockout-pin	2		41	Knockout-pin	2		42	Knockout-pin	2									
40	Knockout-pin	2		41	Knockout-pin	2		42	Knockout-pin	2													
41	Knockout-pin	2		42	Knockout-pin	2																	
42	Knockout-pin	2																					

Annex 1c : Outline drawing of EMK12K 2x2150 Nm brake

Pos.	Code	Part name	QTY	Material	Weight	Volume	Surface	Notes
25	M32301601	Pin/Shaft (pin)	2	Q235A	0.01 0.03			
26	M940100400	Gasket ϕ 4	4		0.01 0.02			
27	M926104027	Hex. nut M4x27	4		0.01 0.02			
28	M25010601	Klausenschiff	2		0.02 0.04			
29	M402001601	Yeast anchor	2	MR-110-DC110V	0.01 0.02			
30	M40201601	Yeast spring	8		0.01 0.04			
31	M401901601	Disc spring	32	GB/T1972-B14-1	0.01 0.16			
32	M325901601	Flat gasket	16	45	0.01 0.08			
33	M952100600	Hexagon nut M6	8		0.01 0.04			
34	M921206012	Hex. nut M6x12	8		0.01 0.04			
35	M323603601	Support plate	2	Q345B	0.24 0.48			
36	M323301601	Under-gasketing rotating body	2	Q345B	0.25 0.5			
37	M326001601	Disc gasket	2	45	0.02 0.04			
38	M952101000	Hexagon nut M10	2		0.01 0.01			
39	M942101000	Hexagon nut M10	2		0.01 0.01			
40	M326501602	Coil spring	2	VDGr-Si	0.01 0.03			
41	M94201000	Hex. nut M6	8		0.01 0.04			
42	M326401601	Hex. nut M6	16	VDGr-Si	0.06 0.96			
43	M326201601	Spring steel	8	Q235A	0.02 0.16			
44	M920210130	Hex. nut M10x20	8		0.09 0.74			Order 10.9
45	M944201000	Hex. nut M10	8		0.01 0.04			
46	M929206012	Hex. nut M6	12		0.01 0.06			
47	M250103601	Subassembly	1	Subassembly	19 19			
48	M250103601	Subassembly	1	Subassembly	19 19			
49	M250103601	Subassembly	1	Subassembly	19 19			
50	M250103601	Subassembly	1	Subassembly	19 19			
51	M250103601	Subassembly	1	Subassembly	19 19			
52	M250103601	Subassembly	1	Subassembly	19 19			
53	M250103601	Subassembly	1	Subassembly	19 19			
54	M250103601	Subassembly	1	Subassembly	19 19			
55	M250103601	Subassembly	1	Subassembly	19 19			
56	M250103601	Subassembly	1	Subassembly	19 19			
57	M250103601	Subassembly	1	Subassembly	19 19			
58	M250103601	Subassembly	1	Subassembly	19 19			
59	M250103601	Subassembly	1	Subassembly	19 19			
60	M250103601	Subassembly	1	Subassembly	19 19			
61	M250103601	Subassembly	1	Subassembly	19 19			
62	M250103601	Subassembly	1	Subassembly	19 19			
63	M250103601	Subassembly	1	Subassembly	19 19			
64	M250103601	Subassembly	1	Subassembly	19 19			
65	M250103601	Subassembly	1	Subassembly	19 19			
66	M250103601	Subassembly	1	Subassembly	19 19			
67	M250103601	Subassembly	1	Subassembly	19 19			
68	M250103601	Subassembly	1	Subassembly	19 19			
69	M250103601	Subassembly	1	Subassembly	19 19			
70	M250103601	Subassembly	1	Subassembly	19 19			
71	M250103601	Subassembly	1	Subassembly	19 19			
72	M250103601	Subassembly	1	Subassembly	19 19			
73	M250103601	Subassembly	1	Subassembly	19 19			
74	M250103601	Subassembly	1	Subassembly	19 19			
75	M250103601	Subassembly	1	Subassembly	19 19			
76	M250103601	Subassembly	1	Subassembly	19 19			
77	M250103601	Subassembly	1	Subassembly	19 19			
78	M250103601	Subassembly	1	Subassembly	19 19			
79	M250103601	Subassembly	1	Subassembly	19 19			
80	M250103601	Subassembly	1	Subassembly	19 19			
81	M250103601	Subassembly	1	Subassembly	19 19			
82	M250103601	Subassembly	1	Subassembly	19 19			
83	M250103601	Subassembly	1	Subassembly	19 19			
84	M250103601	Subassembly	1	Subassembly	19 19			
85	M250103601	Subassembly	1	Subassembly	19 19			
86	M250103601	Subassembly	1	Subassembly	19 19			
87	M250103601	Subassembly	1	Subassembly	19 19			
88	M250103601	Subassembly	1	Subassembly	19 19			
89	M250103601	Subassembly	1	Subassembly	19 19			
90	M250103601	Subassembly	1	Subassembly	19 19			
91	M250103601	Subassembly	1	Subassembly	19 19			
92	M250103601	Subassembly	1	Subassembly	19 19			
93	M250103601	Subassembly	1	Subassembly	19 19			
94	M250103601	Subassembly	1	Subassembly	19 19			
95	M250103601	Subassembly	1	Subassembly	19 19			
96	M250103601	Subassembly	1	Subassembly	19 19			
97	M250103601	Subassembly	1	Subassembly	19 19			
98	M250103601	Subassembly	1	Subassembly	19 19			
99	M250103601	Subassembly	1	Subassembly	19 19			
100	M250103601	Subassembly	1	Subassembly	19 19			

Annex 1d: Test stand with EMK12K-2x2150 Nm brake and MCK500 traction machine



Annex 2. : Documents of the Technical File which were subject of the examination

title	document number	date
Design calculations	Annex.1	15-11-2017
Technical drawings	Annex.2	15-11-2017
Risk Analysis	Annex.3	15-11-2017
Assessment drawings	Annex.4	15-11-2017
Product description	Annex.5	15-11-2017
ACOP test reports:	2016AF0768	16-07-2016
	2017AF0458	16-05-2017
	2016AF1298	30-11-2016
UCMP test reports:	2017AF0951	31-08-2017
	2016AF0707	06-07-2016
	2017AF0758	19-07-2017
Manual	Annex.10	15-11-2017

Annex 3. Reviewed deviations from the standards

EN xx-x par.	Requirement	Accepted design
x.x.x		

Annex 4. Revision overview
REVISIONS OF THE CERTIFICATE AND REPORT

Rev.:	Date	Summary of revision
-	17-11-2017	Original