

Report of EC type-examination

Report belonging to EC type-examination certificate no. :	NL.04-400-1002-051-01
Date of issue of original certificate	: November 23, 2004
No. and date of revision of certificate	: Revision no. 6.0, October 20, 2009
No. and date of revision of report	: Revision no. 6.0, October 20, 2009
Concerns	: Double disk brakes to be applied as part of an ascending car overspeed protection means for electric lifts, manufactured according the standard EN 81-1.
Revision 6.0 concerns	: New friction material and O-ring for both brakes and modified number of springs in brake FCRD90 only. Complete change of layout due to changed test method for the brake types FCRD 90 and FCRD112.
Requirements	: Lifts Directive 95/16/EC Standard: EN 81-1
Project no.	: P090025-06

1. General specifications

Manufacturer	: Moteurs Leroy Somer
Address	: Boulevard Marcellin Leroy 16005 Angouleme Cedex
Country	: France
Description of lift component	: Double disk brakes
Type	: Type and nominal torque per single brake at a maximum speed of 1000 rotations/minute. FCRD90 type 60 Nm FCRD90 type 70 Nm (Schindler reference torque 65 Nm) FCRD90 type 80 Nm FCRD90 type 90 Nm (Schindler reference torque 80-88 Nm) FCRD112 type 110 Nm FCRD112 type 125 Nm (Schindler reference torque 105 Nm) FCRD112 type 140 Nm FCRD112 type 155 Nm FCRD112 type 170 Nm FCRD112 type 185 Nm (Schindler reference torque 150 Nm) FCRD112 type 200 Nm FCRD112 type 220 Nm (Schindler reference torque 180 Nm)
Laboratory	: Schindler Factory Ebikon (Lucerne) – Switzerland MLS, usine de Rabion, Angoulême – France
Date / data of examination	: July 15 th , 2003 April 26 th , 2004 and July 9 th , 2004 Nov. 30 th and Dec. 1 st , 2004 April 26 th and 27 th , 2006 October 21 th , 2008 (France) September 17 and 18, 2009
Examination performed by	: H.B. Kaptein A. van den Burg R.E. Kaspersma

2. Description of lift component

Description of the brakes

The specified disk brakes are intended to be used as holding brakes for the application in lift installations equipped with controlled drive systems.

The brakes each consist of two independent electro-mechanical disk brakes, that have to be mounted to the flange of a lift machine by three stud bolts M8.

One disk is clamped in between the lift machine flange and the anchor of the first brake. The other disk is clamped between the brake housing of the first brake and the anchor of the second brake.

The brake disks are manufactured of heat treated aluminium. At both sides, an asbestos-free brake lining is bonded to the disks. The connection of the disks with the main shaft of the machine is provided by splines.

The main differences between the types are the dimensions of the electro-magnets, the dimensions of the brake lining, the stiffness and the applied number of the pressure springs and the stud bolts, resulting in different outside dimensions of the housings. Both anchors are pushed towards the brake disks by means of guided compression springs. The different amount of springs, mainly defining the brake torque, cannot be adjusted in the field.

The brakes are delivered fully adjusted from the factory. Although the air gap of the brakes can be adjusted as well in the factory as also on site, no adjustments are assumed to be required on site. The wear of the brake lining has such a low degree that re-adjustment of the air gap during life time is not needed. This means that maintenance on the brake is also not needed.

The opening of each brake is monitored by switches that have to be connected to the controller or frequency converter of the lift. If one of the brakes fails to open, the lift shall be stopped. The contacts (micro-switches) are insulated and installed on the outside at the bottom of the brake housings.

More details concerning the dimensions of the compounding parts and mechanical data of these parts can be found in the tables on the next pages.

Technical details and limits of use

Type indication	FCRD 90	FCRD 90	FCRD 90	FCRD 90
Nominal braking torque [Nm]	2 x 60	2 x 70	2 x 80	2 x 90
Maximum theoretic torque [Nm]	2x 101	2 x 117	2 x 132	2 x 148
Average theoretic torque [Nm]	2 x 84	2 x 96	2 x 108	2 x 121
Minimum theoretic torque [Nm]	2 x 69	2 x 78	2 x 87	2 x 95
Maximum allowed speed RPM	1000	1000	1000	1000
Brake lining diameters outside / inside [mm]	ø152 x ø132	ø152 x ø132	ø152 x ø132	ø152 x ø132
Brake lining material	Bremskerl 9013	Bremskerl 9013	Bremskerl 9013	Bremskerl 9013
Indication of pressure springs	RST010 RC011 (654181)	RST010 RC011 (654181)	RST010 RC011 (654181)	RST010 RC011 (654181)
Number of pressure springs	5	6	7	8
Installation diameter of the pressure springs [mm]	ø 136	ø 136	ø 136	ø 136
Overall dimensions [mm]	ø 204 x 151.5	ø 204 x 151.5	ø 204 x 151.5	ø 204 x 151.5

Type indication	FCRD 112	FCRD 112	FCRD 112	FCRD 112
Nominal braking torque [Nm]	2 x 110	2 x 125	2 x 140	2 x 155
Maximum theoretic torque [Nm]	2x 165	2 x 184	2 x 204	2 x 224
Average theoretic torque [Nm]	2 x 137	2 x 153	2 x 169	2 x 185
Minimum theoretic torque [Nm]	2 x 109	2 x 121	2 x 132	2 x 144
Maximum allowed speed RPM	1000	1000	1000	1000
Brake lining diameters outside / inside [mm]	ø180 x ø150	ø180 x ø150	ø180 x ø150	ø180 x ø150
Brake lining material	Bremskerl 9013	Bremskerl 9013	Bremskerl 9013	Bremskerl 9013
Indication of pressure springs	RST012 RC004 (674036)	RST012 RC004 (674036)	RST012 RC004 (674036)	RST012 RC004 (674036)
Number of pressure springs	7	8	9	10
Installation diameter of the pressure springs [mm]	ø 174	ø 174	ø 174	ø 174
Overall dimensions [mm]	ø 235 x 163.5	ø 235 x 163.5	ø 235 x 163.5	ø 235 x 163.5

Type indication	FCRD 112	FCRD 112	FCRD 112	FCRD 112
Nominal braking torque [Nm]	2 x 170	2 x 185	2 x 200	2 x 220
Maximum theoretic torque [Nm]	2x 243	2 x 263	2 x 283	2 x 302
Average theoretic torque [Nm]	2 x 200	2 x 216	2 x 232	2 x 248
Minimum theoretic torque [Nm]	2 x 155	2 x 167	2 x 179	2 x 191
Maximum allowed speed RPM	1000	1000	1000	1000
Brake lining diameters outside / inside [mm]	ø180 x ø150	ø180 x ø150	ø180 x ø150	ø180 x ø150
Brake lining material	Bremskerl 9013	Bremskerl 9013	Bremskerl 9013	Bremskerl 9013
Indication of pressure springs	RST012 RC004 (674036)	RST012 RC004 (674036)	RST012 RC004 (674036)	RST012 RC004 (674036)
Number of pressure springs	11	12	13	14
Installation diameter of the pressure springs [mm]	ø 174	ø 174	ø 174	ø 174
Overall dimensions [mm]	ø 235 x 163.5	ø 235 x 163.5	ø 235 x 163.5	ø 235 x 163.5

Principal drawings of the brakes are shown in the annexes of this report.

3. Examinations and tests

The brakes, are initially examined and tested in full accommodated lifts both as a lift brake as well as part of the ascending car overspeed protection means. This means that the tests were performed for the purpose of being applied in certain defined lifts. After the latest modifications of the brakes, it is decided to change the method of testing.

The brakes are now tested on a test bench that consisted of an electro motor with additional inertias coupled to a lift machine to which the two brakes are mounted. Only the brake types FCRD90 for 90 Nm and the FCRD112 for 220 Nm are actually tested in order to prove that the brakes are capable to neutralise the maximum specified amount of energy of 46881 J for FCRD90 and 108566 J for FCRD112.

The other types that have lower torques are assumed to function properly on theoretical grounds as only the amount of springs is reduced in these models.

4. Results

Within the framework of the certification activities, the following items were checked and found in order:

- The models of the tested brakes
- Relevant layout drawings and cross section drawings of the concerning brakes
- Brake lining material specifications
- The results of the strength calculations
- The test results

The full capacity brake tests passed without remarks and did not lead to permanent deformations notable brake lining wear or loss of stability.

After the final examinations the brakes and the technical file were found in accordance with the requirements.

5. Conditions

The EC type-examination certificate is only valid for products which are in conformity with the same specifications as the type certified product. Products deviating of these specifications need additional examination by Liftinstituut in order to determine whether a new EC type-examination certificate is necessary. Additional examination shall be requested by the certificate holder.

Furthermore the following conditions are applicable:

- The double disk brake is certified to be applied as part of an Ascending car overspeed protection means for lifts, like indicated in EN 81-1, chapter 9.10,

- in particular the requirements of the articles 9.10.1, 9.10.4.d), 9.10.5 and 9.10.10.a) must be fulfilled for the purpose of application.
- The maximum rotational speed of the brakes at the moment of detection of the speed monitoring device according the requirements of art. 9.10.10 of EN 81-1 shall not be higher than 1000 rotations/minute.
 - When these brakes are additionally used as the braking system for lifts, compliance of the lift design with the following requirements for lift brakes of EN 81-1, issue September 1998, shall be checked: 12.4.1.1, 12.4.2.1, 12.4.2.2, 12.4.2.3, 12.4.2.4.
 - On the brakes a data plate shall be fixed, indicating:
 - the name of the manufacturer,
 - the type examination sign (CE) and its references.
 - Installation instructions for the brake units shall be provided at delivery.

6. Conclusions

Within the specified braking capacities these brakes meet the requirements of the Lifts Directive 95/16/EC and the standard EN 81-1, issue 1998.

However it is explicitly pointed out that compliance with the EMC Directive was not assessed.

Based upon the results of the type-examination, Liftinstituut B.V. issues a revised EC type-examination certificate. The number of this EC type-examination certificate, being NL.04-400-1002-051-01 may be indicated on the type identification plate.

7. EC Declaration of conformity

Every set of brakes placed on the market by Moteurs Leroy Somer, type designations as stated on page 1 of this report, that is in complete conformity with the examined type must be provided with a CE marking according to Annex III of the Directive 95/16/EC, under consideration that conformity with the EMC Directive and eventually other applicable Directives is proven. Also every safety component must be accompanied by an EC Declaration of Conformity according to Annex II of the Directive in which the name, the address and the identification number of the Notified Body that carried out the EC-type examination (Liftinstituut) must be included as well as the number of the EC-type examination certificate.

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Annex 5. Overview of previous revisions of (EC)-type examination certificates and reports.

PREVIOUS EC-TYPE EXAMINATION CERTIFICATES

Rev.	Date	Summary of revision
0	23-11-2004	First issue of type-examination certificate
1.0	21-12-2004	New type-examination certificate because of update for new brake
2.0	17-10-2005	New type-examination certificate because of update for details
3.0	12-07-2006	New type-examination certificate because of new brake added
3.1	2-04-2007	New type-examination certificate because of update various data all brakes with exception of 2 x 180 Nm brake
3.2	2-11-2007	New EC-type examination certificate because of changing type examination into EC-type examination, as well various data of the 2 x 180 Nm brake updated
4.0	15-04-2008	New EC-type examination certificate because of implementation two new brakes 2x88 Nm (FCRD90) and 2x80 Nm (FCRD112)
5.0	27-10-2008	New EC-type examination certificate because of implementation two new brakes 2x200 Nm (FCRD112) and 2x280 Nm (FCRD132)
5.1	15-12-2008	New EC-type examination certificate because of corrections in tables on pages 4 and 5

PREVIOUS REPORTS, BELONGING TO THE EC-TYPE EXAMINATION CERTIFICATES

Rev.	Date	Summary of revision
0	23-11-2004	original report for brakes of 2 x 65 Nm, 2 x 80 Nm and 2 x 150 Nm
1.0	21-12-2004	- brake of 2 x 105 Nm added in report - some values for brake 2 x 150 Nm adapted
2.0	17-10-2005	- limits for adjustment of airgap changed - spline bush data implemented (table at page 3)
3.0	12-07-2006	- new brake added (2 x 180 Nm) - some concerning parts of text adapted - history introduced (Annex 3)
3.1	2-04-2007	- various data updated for all types of brakes, with exception for 2 x 180 Nm (pages 3 and 4) - specification air gap adjustment extended
3.2	2-11-2007	- Type examination changed into EC-type examination - various data of the 2 x 180 Nm updated (page 3)
4.0	15-04-2008	- Two new brake types implemented: 2 x 88 Nm (FCRD90) and 2 x 80 Nm (FCRD112). - Most data of all existing brakes updated, because of new performed calculations
5.0	27-10-2008	- Two new brake models added: 2x200 Nm and 2x280 Nm. - Table split up in 2 sections and data added. - Some existing data accommodated.
5.1	15-12-2008	- Corrections of torque values 44 Nm and 50 Nm in the tables on pages 4 and 5
5.2	04-05-2009	- missing limits of application implemented in the text. - Annex 4 implemented (table and belonging text)