

JOHN HICKENLOOPER
Governor

ELLEN GOLOMBEK
Executive Director

MAHESH ALBUQUERQUE
Division Director



DEPARTMENT OF LABOR AND EMPLOYMENT

DIVISION OF OIL AND PUBLIC SAFETY

Conveyance Program
633 17th Street, Suite 500
Denver, Colorado 80202-3610
Phone: 303-318-8500; Fax 303-318-8488
Web: www.colorado.gov/ops

April 28, 2016

MR SETH MCNAGHTEN
OTIS ELEVATOR
9770 E EASTER AVE STE 100
CENTENNIAL CO 80112

RE: Approval of Alternate Materials and Methods Request (AMMR) regarding the Gen II underslung system for the over-speed governor with an electronic speed reducing switch and reduced apron height

Dear Mr. McNaghten:

The Division of Oil and Public Safety – Conveyance Program (OPS) has reviewed the alternate methods and materials request (AMMR) regarding the electronic speed reducing switch and reduced car apron height on the Gen II underslung units, because these items are not addressed in the currently adopted edition (2013) of ASME A17.1. Following review of the AECO Certificate of Conformance for each item (attached), this AMMR request is approved contingent upon the following conditions:

- This AMMR approval letter must be included in the on-site documentation portion of the Maintenance Control Program (MCP) for each site where the Gen II underslung systems have been installed or will be installed.
- The procedures for testing and maintenance of the electronic speed reducing switch must be included in the MCP for each system installed.
- The MCP for these units will be viewable onsite per the OPS MCP Guidance and will remain onsite if and when Otis Elevator is no longer the service provider for the units.

For jurisdictions that have executed a Memorandum of Agreement (MOA) with the State, Otis Elevator must also receive a separate approval from these jurisdictions. A list of these jurisdictions can be found on OPS' web site www.colorado.gov/ops/conveyances under the *Helpful Resources* link.

If you agree with the conditions included in this approval letter, indicate by completing the signature portion below and returning the letter to OPS. This approval will become effective upon receipt, by OPS, of your written acceptance of all the above conditions.

Approval of Alternate Materials and Methods Request
Otis Elevator, speed reducing switch and reduced car apron height
April 28, 2016
Page 2 of 2

Please contact me if you have any questions.



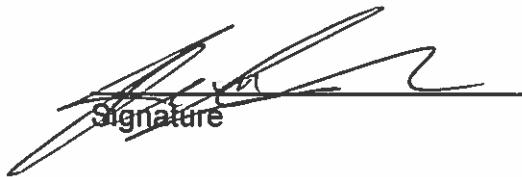
Greg Johnson
Conveyance Program Manager

cc: Paul Hentz, Otis Elevator
Mahesh Albuquerque, Division Director
David Harris, Conveyance Program Technical Specialist

Enclosures: AECO Certificates of Conformance

I hereby agree with all of the conditions in the above. I understand that any modification to these conditions may be made only with the written consent of the OPS.

Otis Elevator


Signature

John M. Iller
Printed Name

4/28/16
Date

General Manager
Title

CERTIFICATE OF CONFORMANCE

Acting under ASME A17.7.1/CSA B44.7.1 issued by Liftinstituut B.V.
Identification number ANSI AECO #0842
(AECO = Accredited Elevator/Escalator Certification Organization)
Certification system 3 according to ISO Guide 67: 2004

Certificate no. : NA 12-0842-1004-010-03 Revision no.: 4

Description of the product : Overspeed Governor with Electronic Speed Reducing Switch

Type : ORSF (Overspeed Reducing Switch Function) for GeN2 at 150, 200, 350

Model no. : -

Name and address of the manufacturer : Otis Elevator Company
5 Farm Springs
Farmington, CT 06032
United States of America

Name and address of the certificate holder : Otis Elevator Company
5 Farm Springs
Farmington, CT 06032
United States of America

Certificate issued on the basis of the following requirements : ASME A17.7-2007 / CSA B44.7-07
(I-3 Certification of Functions)

Test laboratory/location : Otis Facility, Bloomington, Indiana

Date and number of the laboratory report : None

Date of verification of conformance : July 2011 – September 2012, October 2014

Annexes with this certificate : Certificate of Conformance Report
no: NA12-0842-1004-010-03

Additional remarks : For GESRs, SPs and other information see supporting report.

Conclusion : The Function meets the requirements of the ASME A17.7-2007 / CSA B44.7-07, taking into account any additional remarks mentioned above.


Issued in Amsterdam

Date of issue : October 31, 2014

Valid thru : October 31, 2017



Ing. A.J. van Ommen
Manager Business Unit
Certification



Certification decision by



Certificate of Conformance Report

Report supporting to Certificate of Conformance no. : NA 12-0842-1004-010-03
Date of issue of original certificate : February 10th, 2012
No. and date of revision of certificate : 4, October 31st, 2014
No. and date of revision of report : 4, October 31st, 2014
Applies to : Function
Revision 4 concerns : Addition of type numbers
Requirements : A17.7-2007/CSA B44.7-07
A17.1-2007/CSA B44-07
A17.1-2010/CSA B44-10
Project no. : P140363-01

1. General Specifications

Name and address certificate owner : Otis Elevator Company
5 Farm Springs
Farmington, CT 06032
United States of America
Function description : Overspeed Governor with Electronic Speed Reducing Switch
Type : ORSF (Overspeed Reducing Switch Function) for GeN2 at 150, 200, 350
Laboratory : None
Data of examination : July 2011 - September 2012
Examination performed by : R.E. Kaspersma, MEng

2. Component Description

The Overspeed Governor with Electronic Speed Reducing Switch is used on the GeN2 at 150, 200 or 350 by Otis and is mounted on the top of car if an overspeed occurs the governor is tripped and activates the safety. The governor is equipped only with a tripping switch and is used for up to 1.75 m/s or 350 fpm. Additionally, a speed monitoring system is used to detect overspeed of the elevator before the governor trips. The system detects the overspeed of the elevator by means of an encoder signal from the motor. A manual reset is necessary when the system is tripped.

011/024

3. Examinations and Tests

The tripping speeds for the overspeed governor are specified in the elevator code, ASME A17.1-2010/CSA B44-10, Section 2.18.2.1 and Table 2.18.2.1. The governor overspeed trip points for elevator speeds 0.75 m/s (150 ft/min) and lower allow the governor overspeed switch to open at the same trip speed as the governor. Section 2.18.4.2.1 requires that at speeds of 0.87 m/s (175 ft/min) to 2.5 m/s (500 ft/min) the governor overspeed switch is required to open at 90% of the governor overspeed trip point. Also requirement 2.18.4.2.3 requires for elevators with static control, that the car speed-governor overspeed switch shall open in the down direction of the elevator at not more than 90% of the governor overspeed trip point.

Section 2.18.4.2.5 of the elevator code allows the governor overspeed switch to open at the same trip speed as the governor subject to:

- (a) A speed-reducing switch of the manually reset type is provided on the governor
- (b) Subsequent to the first stop of the car after the opening of the speed-reducing switch, the car shall remain inoperative until the switch is manually reset.

The electronic speed reducing switch is not located on the governor but is an electronic system integrated in the controller.

The electronic speed reducing switch uses the following components that already exist within the elevator system:

- a. The machine encoder for velocity measurements, part# A_A633J
- b. The GECB(Global Elevator Control Board) processor board and software, board # A_A26800AML, s/w part # AAA30969
- c. The FPGA(Field Programmable Gate Array) on the I/O board and firmware, board part # A_A26800ANY, FPGA part # A_A816AF
- d. Manual resetting function on the I/O board

To verify an equivalent safety level, the A17.7-2007/CSA B44.7-07 appendix I-3 has to be followed. Otis has provided a Code Compliance Documentation (CCD), a risk assessment, a Maintenance Control Program (MCP), approval criteria and test results.

The following Global Essential Safety Requirement (GESR) is considered:
3.4.9 Changes of Speed or Acceleration

Based on the A17.7-2007/CSA B44.7-07 Code, a risk assessment in compliance with ISO 14798 was performed.

Based on the risk assessment the following steps have been taken to mitigate the risks involved:

- The governor tripping point is not dependent on the position of the sheave of the governor. At reaching the tripping speed the governor will trip and activate the contact without delay.
- A separate encoder signal is used to detect the overspeed (C channel)
- The signal is verified to the standard channels (A and B channel) used for the speed regulation of the elevator.
- Because the system is relying on motor speed instead of car speed a traction monitoring system is implemented to avoid failures caused by traction loss. The system monitors during normal run the time between consecutive landings, if the time is too long the elevator will be put out of service
- When the system is tripped the system needs to be reset manually. A power failure will not reset the system automatically.

4. Results

After the examination of the CCD, the risk assessment, test reports etc., the technical documentation was found in accordance with the requirements.

5. Conditions

On the certificate of conformance the following conditions apply and shall be verified on-site:

- The Unique Procedure Guide Document A_A21310AM_UP dated June 2012 or later located in the MCP shall describe the Overspeed Reducing Switch Test Verification Procedure.
- The function shall only be used with the OTIS Car Mounted Governor
- The following type numbers of the components will ensure the functions mentioned below:
 - o IOBD – AFA26800ANY1, 2 or 3 or AGA26800ANY1, 2 or 3
 - o FPGA – ADA816AF1 on IOBD
 - o Processor – AEA26800AML4 or 11 (mounted on IOBD)
 - o Control System Software:
 - AAA31256BAH
 - AAA31256BSJ
 - AAA31256BAJ
 - AAA31256BAK
 - AAA31256BSK

6. Conclusions

Based upon the results of the conformance examination Liftinstituut B.V. issues a Certificate of Conformance.

The Certificate of Conformance 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 Certificate of Conformance is necessary. Additional examination shall be requested by the certificate owner.

The Certificate of Conformance is issued based on the requirements that are valid at the date of issue. Liftinstituut reserves all rights regarding the validity of the certificate with respect to changes in the requirements or changes in the state of the art of the product.

7. Marking

Every governor system placed on the market by Otis, type CMG for GeN2 at 150 or 200 or 350 that is in complete conformity with the examined type must be labelled marked or tagged with following data:

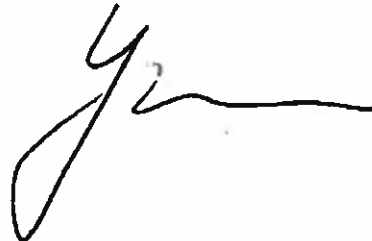
- (a) the name or trademark of the manufacturer, or AECO Certificate of Conformance identification by which the organization that manufactured the device can be identified;
- (b) the AECO mark, name, or identifying symbol which can be found on our website www.liftinstituut.com
- (c) the AECO Certificate of Conformance identification NA 12-0842-1004-010-03;
- (d) statement of compliance with ASME A17.7/CSA B44.7;
- (e) a distinctive type, model, or style letter or number, and any conditions of validity of the certificate and any particulars necessary to identify the type of Component or Function certified, as determined by the AECO.

Prepared by:



R.E. Kaspersma
Senior Specialist
Liftinstituut B.V.

Certification decision by:



Annexes
Annex 1 : Overview of previous revisions of certificate(s) and report(s)
REVISIONS OF CERTIFICATE

Rev.:	Date	Summary of revision
-	February 10 th , 2012	Original Issue
1	June 21 st , 2012	Editorial changes
2	September 28 th , 2012	Implementation of 350 fpm application
3	January 16 th , 2014	Addition of type numbers and software numbers
4	October 31 st , 2014	Addition of type numbers

REVISIONS OF REPORT, BELONGING TO THE CERTIFICATE

Rev.:	Date	Summary of revision
-	February 10 th , 2012	Original Issue
1	June 21 st , 2012	Editorial changes
2	September 28 th , 2012	Implementation of 350 fpm application
3	January 16 th , 2014	Addition of type numbers and software numbers
4	October 31 st , 2014	Addition of type numbers

CERTIFICATE OF CONFORMANCE

Acting under ASME A17.7.1/CSA B44.7.1 Issued by Liftinstituut B.V.
Identification number ANSI AECO #0842
(AECO = Accredited Elevator/Escalator Certification Organization)
Certification system 3 according to ISO Guide 67: 2004

Certificate no. : NA 11-0842-1004-010-02 Revision no.: 3

Description of the product : Reduced car apron height for the Otis GeN2-S

Type : Otis GeN2-S

Model no. : -

Name and address of the manufacturer : Otis Elevator Company
5 Farm Springs
Farmington, CT 06032
United States of America

Name and address of the certificate holder : Otis Elevator Company
5 Farm Springs
Farmington, CT 06032
United States of America

Certificate issued on the basis of the following requirements : ASME A17.7-2007 / CSA B44.7-07
I-3 Certification of Components

Test laboratory/location : None

Date and number of the laboratory report : None

Date of verification of conformance : July 2011 – October 2011, January 2012

Annexes with this certificate : Certificate of Conformance Report
no: NA 11-0842-1004-010-02 Revision 3

Additional remarks : For GESRs, SPs and other information see supporting report.

Conclusion : The Component meets the requirements of the ASME A17.7-2007 / CSA B44.7-07, taking into account any additional remarks mentioned above.

Issued in Amsterdam

Date of issue : November 14, 2014

Valid thru : November 14, 2017



Ing. A.J. van Ommen
Manager Business Unit
Certification



Certification decision by

Certificate of Conformance Report

Report supporting to Certificate of Conformance no. : NA 11-0842-1004-010-02
Date of issue of original certificate : October 12th, 2011
No. and date of revision of certificate : 3, November 14th, 2014
No. and date of revision of report : 3, November 14th, 2014
Applies to : Component
Revision 3 concerns : Textual change
Requirements : A17.7-2007/CSA B44.7-07
A17.1-2007/CSA B44-07
A17.1-2010/CSA B44-10
A17.1-2013/CSA B44-13
Project no. : P140170-04

1. General Specifications

Name and address certificate owner : Otis Elevator Company
5 Farm Springs
Farmington, CT 06032
United States of America
Component description : Reduced car apron for Otis GeN2-S
Type : Otis Otis GeN2-S
Laboratory : None
Ratings : -
Data of examination : July 2011 – October 2011, January 2012
Examination performed by : R.E. Kaspersma MEng

2. Component Description

The Otis GeN2-S is a machine-room-less elevator. The elevator has a rated load up to 1600 kg (3500lbs); with a rated speed up to 1.00 m/s (200 fpm). The maximum travel height is 46 m (150').

For elevator application in with a reduced pit a car apron with a length of 915 mm (36") is used. According to clause 2.15.9.2 a of the A17.1-2007/CSA B44-07, A17.1-2010/CSA B44-10 and A17.1-2013/CSA B44-13 a minimum length of 1220 mm is

required. All other requirements of clause 2.15.9 are fulfilled. For hydraulic elevators also a smaller apron can be used.

3. Examinations and Tests

To prove an equal safety level the A17.7-2007/CSA B44.7-07 appendix I-3 has to be followed. Otis has provided a Code Compliance Documentation (CCD), a risk assessment, a Maintenance Control Program (MCP), approval criteria and test results.

The following Global Essential Safety Requirements (GESR's) are considered:

- 3.3.3 Alignment of LCU (Car) and Landing
- 3.3.4 Self-Evacuation from an LCU (Car)
- 3.1.2 Elevator Maintenance
- 3.2 Means shall be provided to prevent the risk of users, non-users, and elevator personnel falling into the hoistway
- 3.4.7 LCU (Car) Collision with Objects in or beyond Travel Path
- 3.4.6 Uncontrolled, Unintended Movement of an LCU (Car)

Based on the GESR's a risk assessment in compliance with ISO 14798 is made. Based on the risk assessment the following steps are taken to mitigate the risks involved:

- Door restrictor is provided (safety parameter 3.3.4.1), this ensures that the car doors cannot be opened more than 100 mm(4") from the inside unless the car is within the unlocking zone specified by the A17.1/B44 Code or local regulations.
- Unintended car movement protection and the emergency brake stops the car before the sill is more than 915 mm above or below the landing.

4. Results

After the examination of the CCD, the risk assessment, test reports etc., the technical documentation was found in accordance with the requirements.

5. Conditions

On the certificate of conformance the following conditions apply:

- The evacuation procedure for Otis Otis GeN2-S elevators shall be present with the elevator.
- A door restrictor shall be provided (safety parameter 3.3.4.1), this ensures that the car doors cannot be opened more than 100 mm (4") from the inside unless the car is within the unlocking zone specified by the A17.1/B44 Code or local regulations.
- Unintended car movement protection and the emergency brake stops the car before the sill is more than 915 mm above or below the landing.
- For checking the proper adjustment of the unintended car movement protection and detailed instruction shall be provided.

6. Conclusions

Based upon the results of the conformance examination Liftinstituut B.V. issues a Certificate of Conformance.

The Certificate of Conformance 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 Certificate of Conformance is necessary. Additional examination shall be requested by the certificate owner.

The Certificate of Conformance is issued based on the requirements that are valid at the date of issue. Liftinstituut reserves all rights regarding the validity of the certificate with respect to changes in the requirements or changes in the state of the art of the product.

7. Marking

Every component placed on the market by Otis, type reduced car apron for the Otis Otis GeN2-S that is in complete conformity with the examined type must be labelled marked or tagged with following data:

- (a) the name or trademark of the manufacturer, or AECO Certificate of Conformance identification by which the organization that manufactured the device can be identified;
- (b) the AECO mark, name, or identifying symbol which can be found on our website www.liftinstituut.com;
- (c) the AECO Certificate of Conformance identification NA 11-0842-1004-010-02;
- (d) statement of compliance with ASME A17.7/CSA B44.7;
- (e) a distinctive type, model, or style letter or number; and any conditions of validity of the certificate and any particulars necessary to identify the type of Elevator system; Sub-system; Component; Function *) certified, as determined by the AECO.

Prepared by:

Certification decision by:



R.E: Kaspersma
Productspecialist Certificatie
Liftinstituut B.V.

Annexes

Annex 1 : Overview of previous revisions of certificate(s) and report(s)

REVISIONS OF CERTIFICATE

Rev.:	Date	Summary of revision
-	October 12 th , 2011	Original issue
1.0	October 31 st , 2011	Textual changes
2	May 4 th , 2012	Textual changes
3	November 14 th , 2014	Textual changes

REVISIONS OF REPORT, BELONGING TO THE CERTIFICATE

Rev.:	Date	Summary of revision
-	October 12 th , 2011	Original issue
1.0	October 31 st , 2011	Textual changes
2	May 4 th , 2012	Textual changes
3	November 14 th , 2014	Textual changes