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Title:

The Fire Resistance Performance Of Timber Or Mineral Composite Based Insulated Doorsets and Uninsulated Steel Based Doorsets When Fitted With NHN 350, NHN 400, NHN 420, NHN 400 BC or NHN 836 Surface Mounted Door Closers or an NHN 1035 Concealed Door Closer

WF Assessment Report No:

338443 (Issue 3)

Prepared for:

Kenwa Co. Ltd.

12th Floor, Tower West,
Umeda Skybuilding 1-30
Oyodonaka 1-chome, Kita-ku,
OSAKA 531-0076
JAPAN

Date: 24th March 2014

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Executive Summary

Objective

This report presents an appraisal of the fire resistance performance of single-acting timber doorsets when fitted with NHN 350, NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers or an NHN 1035 concealed door closer, if tested in accordance with BS EN 1634-1.

Report Sponsor

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Summary of Conclusions

Should the recommendations given in this report be followed, it can be concluded that the NHN 350, NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers may be fitted to timber or mineral composite based doorsets, required to provide up to 120 minutes integrity and insulation which have been previously tested in accordance with BS EN 1634-1 at a Notified laboratory (or assessed by Exova Warringtonfire).

NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers may be fitted to previously tested by a Notified laboratory (or assessed by Exova Warringtonfire) uninsulated steel based doorsets to provide 240 minutes integrity performance if tested in accordance with BS EN 1634-1.

NHN 1035 concealed door closers may be fitted to previously tested by a Notified laboratory (or assessed by Exova Warringtonfire) insulated doorsets, to provide 60 minutes integrity and insulation performance if tested in accordance with BS EN 1634-1.

Valid until

1st April 2019

Introduction

This report presents an appraisal of the fire resistance performance of single-acting doorsets when fitted with NHN 350, NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers or an NHN 1035 concealed door closer.

The proposed timber or mineral composite based doorsets are required to provide a fire resistance performance of up to 60 or 120 minutes integrity and insulation with respect to BS EN 1634-1, when including one of the specified closers.

The proposed steel based doorsets are required to provide a fire resistance performance of 240 minutes integrity with respect to BS EN 1634-1: 2000, when including one of the specified closers.

FTSG

The data referred to in the supporting data section has been considered for the purpose of this appraisal which has been prepared in accordance with the Fire Test Study Group Resolution No. 82: 2001.

Assumptions

It is assumed that the door closers will be fitted to an insulated doorset (timber or mineral composite) which has been previously shown to be capable of providing the required fire resistance performance when tested in accordance with BS EN 1634-1 in the proposed configuration i.e. single-leaf or double-leaf.

It is assumed that where the NHN 400, NHN 420, NHN 400 BC or NHN 836 door closers are permitted to be used on an uninsulated doorset (steel based), the doorset will have been previously shown to be capable of providing the required fire resistance performance when tested in accordance with BS EN 1634-1 in the proposed configuration i.e. single-leaf or double-leaf.

Additionally, where the doorset is required to provide 60 minutes integrity performance in conjunction with an NHN 1035 concealed closer, the door leaf shall include sub-facings comprising a minimum of 3 mm thick non-combustible board.

Clearance gaps

Door leaf to frame clearance gaps can have a significant effect on the overall fire performance of a doorset. It is therefore assumed that the leaf to leaf and leaf to frame clearance gaps will not exceed those measured for the relevant fire tested doorset. In addition, it is assumed that the door leaves will be in the closed position.

Proposals

It is proposed that NHN 350, NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers may be fitted to timber or mineral composite based doorsets, required to provide up to 120 minutes integrity and insulation which have been previously tested in accordance with BS EN 1634-1 at a Notified laboratory (or assessed by Exova Warringtonfire).

It is also proposed that NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers may be fitted to previously tested by a Notified laboratory (or assessed by Exova Warringtonfire) uninsulated steel based doorsets to provide 240 minutes integrity performance if tested in accordance with BS EN 1634-1.

It is further proposed that NHN 1035 concealed door closers may be fitted to previously tested by a Notified laboratory (or assessed by Exova Warringtonfire) insulated doorsets, to provide 60 minutes integrity and insulation performance if tested in accordance with BS EN 1634-1.

Basic Test Evidence

The test referenced WARRES No. 143145 included two fully insulated, single-acting, single-leaf, timber doorsets

The door leaf of Doorset A was retained via a concealed door closer, referenced NHN 1035 for the purposes of this assessment. The door leaf of Doorset B was retained via a surface mounted overhead door closer which is stated to be identical to that referenced NHN 420.

The leaves were orientated such that Doorset A opened towards the heating conditions of the test, and Doorset B opened away from the heating conditions. Each leaf was rendered unlatched for the duration of the test.

The test referenced WF No. 174172 included a fully insulated, single-acting, double-leaf, timber doorset.

The left hand door leaf was retained via a surface mounted door closer referenced '836 BC'. The right hand leaf was retained via a surface mounted overhead door closer, referenced 'NHN 350' for the purposes of this assessment. Both closers were mounted on the exposed face of the doorset in parallel arm configuration.

The doorset was orientated such that its leaves opened away from the heating conditions of the test. The doorset was unlatched for the purposes of the test.

The test referenced WF No. 166580 included two uninsulated, single-acting, single-leaf, steel based doorsets.

Doorset B included a surface mounted overhead door closer which is stated to be identical to that referenced NHN 400 mounted on its exposed side and an additional closer body of the same specification mounted to its non-exposed side.

The doorset was orientated such that the door leaf opened away from the heating conditions.

Assessed Performance

General

It is proposed that previously fire tested by a Notified laboratory (or assessed by Exova Warringtonfire) timber or mineral composite based insulated doorsets may be fitted with an NHN 350, NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closer or a '1035' concealed door closer in order to provide up to 120 minutes or 60 minutes respectively, without detracting from the performance of the doorset.

It is further proposed that previously fire tested by a Notified laboratory (or assessed by Exova Warringtonfire) steel based uninsulated doorsets may be fitted with an NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closer in order to provide up to 240 minutes integrity, without detracting from the performance of the doorset.

400/420 Surface Mounted Door Closers

The only difference between these two models is the ability of the latter to be power adjusted via a spring, thus requiring a closer body of slightly increased dimensions (236 mm compared to 206 mm). As both models have been proven under fire test conditions, albeit on different door types, this is not expected to have any significant effect on the performance and as such it is considered acceptable to justify the use of one model in a particular application using the test evidence of the other.

400/420 Surface Mounted Door Closers – Timber/Mineral Composite doors

The performance of Doorset B during the test referenced WARRES No. 143145 is cited to display the ability of the proposed door closer to remain in place for a period of 35 minutes as detailed within the observations to the test report.

The test included insulated (timber based) door leaves and upon examination of the test reports it can be seen that there were no modes of integrity failure, which were either attributable to or co-incident with the performance or presence of the door closer, for the full test duration.

A surface mounted door closer is usually required to restrain a timber door leaf up until the time at which the intumescent seals react. After a test period of 10 -15 minutes the intumescent seals would be expected to have reacted and as such the restraint offered via the closer is deemed to be superfluous to requirements. The above referenced test therefore provides direct evidence on the ability of the proposed closers to be capable of restraining the door leaves for the required test period.

The door closer remained in place for a test period of 35 minutes, the intumescent seals had sufficiently reacted by this time to retain the door leaf for the remainder of the test duration.

The tested '420' closer comprised the same basic body design as those proposed and was installed in a parallel arm (Application/Figure 66) configuration. This is considered to represent the most onerous condition in terms of the ability of the closer to remain in place and provide restraint to the door leaf under standard fire test conditions.

The proposals require that the closers are to be used in a parallel arm (Application/Figure 66), projecting arm (Application/Figure 1) or transom mounted (Application/Figure 61) configuration. For the reasons detailed within the previous paragraph the proposals are deemed acceptable.

The arm utilised for the test was selected as being the more onerous specification in terms of profile and can therefore be assumed to provide positive information relating to the expected performance of alternative arms.

350 and 836 Surface Mounted Door Closers – timber based doors

The performance of the doorset during the test referenced WF No. 174172/B is cited to display the ability of both surface mounted door closer model to remain in place for a period of between 10 and 25 minutes as detailed within the observations to the test report.

Upon close examination of the test report it can be seen that there were no modes of integrity failure, which were either attributable to or co-incident with the performance or presence of the door closers for the full test duration of 60 minutes.

As discussed previously, beyond a test period of 10-15 minutes the intumescent seals would be expected to have reacted and as such the restraint offered via the closers would be no longer needed. The above referenced test therefore provides direct evidence on the ability of the proposed closers to be capable of restraining the door leaves for the required test period.

The proposals require that the closers are to be used in a parallel arm (Application/Figure 66), projecting arm (Application/Figure 1) or transom mounted (Application/Figure 61) configuration. As both closers were tested in the parallel arm configuration, discussed previously as the most onerous of the three proposed arm/installation configurations, the proposals are deemed acceptable.

400/420 Surface Mounted Door Closers – Steel based doors

The performance of Doorset B during the test referenced WF No. 166580 is cited to display the ability of the '400' door closer to hold the door leaf in the closed position until such time as the expansion of the steel door caused it to jam within its frame.

The test included an uninsulated steel based door leaf and upon examination of the test report it can be seen that there were no modes of integrity failure, which were either attributable to or co-incident with the performance or presence of the door closer for the full test duration of 240 minutes.

The tested '400' closer was installed in a parallel arm (Application/Figure 66) configuration. This is considered to represent the most onerous condition in terms of the ability of the closer to remain in place and provide restraint to the door leaf under standard fire test conditions.

The proposals require that the '400/420' closers to be used in a parallel arm (Application/Figure 66), projecting arm (Application/Figure 1) or transom mounted (Application/Figure 61) configuration. For the reasons detailed within the previous section the proposals are deemed acceptable.

The tested '400' closer was fitted with a steel arm set and soffit plate. Where the closer is used in other configurations the associated arms and fixing plates should also be of steel.

836 Surface Mounted Door Closer – Steel based doors

The '836' model surface mounted closer does not have its own direct test evidence for use in conjunction with steel based doorsets, however it does share the same construction and components as the previously discussed '400/420' models. It is therefore reasonable to consider that, as both models have been proven under fire test conditions, albeit on different door types, this is not expected to have any significant effect on the performance and as such, in this instance, it is considered acceptable to justify the use of one model in a particular application using the test evidence of the other.

The '836' model also contains the same quantity and type of hydraulic fluid as the tested unit so does not provide any additional concern with regard to the potential for ignition of the fluid should it be fitted on the non-exposed face of a steel based doorset.

The proposals again require that the '836' closer may be used in a parallel arm (Application/Figure 66), projecting arm (Application/Figure 1) or transom mounted (Application/Figure 61) configuration. For the reasons detailed previously the proposals are deemed acceptable.

The tested closer was fitted with a steel arm set and soffit plate. This appraisal requires that in all fitting configurations the associated arms and fixing plates should also be of steel for the '836' model.

Steel covers

The tested active closer assemblies did not include a cover. As the inclusion of a cover would be expected to afford some increased levels of protection to the closer body, this would be expected to have a positive effect on its ability to remain in place and restrain the door leaf. The use of steel covers is therefore considered acceptable.

1035 Concealed Door Closer

Doorset A tested under the reference WARRES No. 143145 included a '1035' concealed door closer which included a body and track protected via 2 mm thick Lorient mono-ammonium phosphate material (Interdens).

The tested assembly restrained the doorset for the required period and did not incur any modes of integrity failure for the test duration of 66 minutes. This therefore provides direct test evidence relating to the ability of the proposed '1035' closer to contribute towards a fire performance of 60 minutes.

400 BC

This closer is identical to that subjected to test but includes a back-check function. Since this function does not alter the ability of the closer to hold the door leaf in the closed position it is considered acceptable to include this option.

Proposed Doorsets

As stated in this report, the doorset, in the required configuration, will be previously tested by a Notified laboratory (or assessed by Exova Warringtonfire) and its performance is therefore not in doubt.

To enable the use of the door closers on a range of doorsets, it is necessary to address the available information on the proposed doorset. As this appraisal is intended to be used on a general basis and not restricted to any particular manufacturer of fire resisting doorsets, the following points are given to enable the closers to be used safely:

a) Timber or mineral composite based doorsets shall carry valid certification or the doorset, including the door frame and associated ironmongery should have achieved up to 120 minutes integrity, when tested by a Notified laboratory (or assessed by Exova Warringtonfire) to BS EN 1634-1.

b) Steel based doorsets shall carry valid certification or the doorset, including the door frame and associated ironmongery should have achieved up to 240 minutes integrity, when tested by a Notified laboratory (or assessed by Exova Warringtonfire) to BS EN 1634-1.

c) If the proposed doorset is to be used in double-leaf configuration the test or assessment evidence should be applicable to double-leaf configurations.

d) Where the doorset is required to provide 60 minutes integrity performance in conjunction with a 1035 concealed closer, the door leaf shall include sub-facings comprising a minimum of 3 mm thick non-combustible board.

e) The critical aspects of the doorset construction are given earlier in this report and shall be replicated on the proposed doorset

Conclusions

Timber or mineral composite based doorsets that have previously been successfully fire tested by a Notified laboratory (or assessed by Exova Warringtonfire) which have achieved 120 minutes integrity and insulation as discussed in this report, may be fitted with NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers, without detracting from the overall performance of the doorset.

Steel based doorsets that have previously been successfully fire tested by a Notified laboratory (or assessed by Exova Warringtonfire) which have achieved up to 240 minutes integrity as discussed in this report, may be fitted with NHN 400, NHN 420, NHN 400 BC or NHN 836 surface mounted door closers without detracting from the overall performance of the doorset.

The fitting of the door closers onto alternative doorsets, subject to compliance with the conditions stated in this report, is therefore considered to be acceptable.

Validity

This assessment is issued on the basis of test data and information available at the time of issue. If contradictory evidence becomes available to Exova Warringtonfire the assessment will be unconditionally withdrawn and Kenwa Co. Ltd. will be notified in writing. Similarly the assessment is invalidated if the assessed construction is subsequently tested because actual test data is deemed to take precedence over an expressed opinion. The assessment is valid initially for a period of five years, after which time it is recommended that it be returned for re-appraisal.

The appraisal is only valid provided that no other modifications are made to the tested construction other than those described in this report.

Summary of Primary Supporting Data

WARRES No. 143145

Test report relating to the performance of two fully insulated, single-acting, single-leaf, timber doorsets incorporating a surface mounted and concealed overhead door closers, when subjected to a test in accordance with BS EN 1634-1: 2000 to determine its fire resistance performance.

The doorsets had overall dimensions of 2080 mm high by 1010 mm wide and incorporated door leaves of overall dimensions 2040 mm high by 926 mm and by 52 mm thick. The leaves comprised softwood stiles and rails, a flaxboard core, with non-combustible board sub facings, hardwood lippings to the vertical edges and MDF outer facings.

Door leaf A was retained via a concealed door closer referenced '1035' and Door leaf B was retained via a surface mounted overhead door closer referenced '420' for the purposes of this assessment.

The leaves were orientated such that Doorset A opened towards the heating conditions of the test, and Doorset B opened away from the heating conditions. Each leaf was rendered unlatched for the duration of the test.

The specimen satisfied the test requirements for the following periods:

		Doorset A	Doorset B
Integrity	Sustained Flames	66 minutes*	66 minutes*
	Gap Gauge	66 minutes*	66 minutes*
	Cotton Pad	66 minutes*	66 minutes*
Insulation		66 minutes*	66 minutes*

* The test duration.

Test date : 11th November 2004

Test sponsor : Permission from the sponsor has been provided for this test report to be utilised for the purposes of this appraisal

WF No. 166580

Test report relating to the performance of two specimens of uninsulated, single-acting, single-leaf doorset incorporating various items of building hardware, including a surface mounted closer referenced '400' for the purposes of this assessment, when subjected to a test in accordance with BS EN 1634-1: 2000 to determine their fire resistance performance.

For the purpose of the test the specimens were referenced Doorset A and Doorset B.

Doorset B had overall dimensions of 2092 mm high by 990 mm wide and incorporated a door leaf of overall nominal dimensions 2051 mm high by 924 mm wide by 45 mm thick. The doorset briefly comprised a profiled mild steel door frame and a door leaf formed from 1.2 mm thick mild steel skins, head and base channels and a core of paper honeycomb. The door leaf was mounted within the frame on three steel butt hinges. The doorset was provided with two sets of latch, locksets and handles and a surface mounted overhead door closer, referenced '400' for the purposes of this assessment, fitted to the exposed face of the doorset. An additional closer body referenced '400' for the purposes of this assessment was mounted on the unexposed face of the door leaf.

The doorsets were installed such that the leaf of Doorset A opened towards, and the leaf of Doorset B opened away from heating conditions of the test.

Doorset B satisfied the test requirements for the following periods:

		Doorset B
Integrity	Sustained Flames	62 minutes
	Gap Gauge	240 minutes*
	Cotton Pad	50 minutes*
Insulation		4 minutes

* The test duration. The test was discontinued after a period of 240 minutes.

Test date : 20th April 2005

Test sponsor : Permission from the sponsor has been provided for this test report to be utilised for the purposes of this appraisal

WF No. 174172/B Test report relating to the performance of a single specimen of fully insulated, single-acting, double-leaf, timber doorset incorporating various items of building hardware, including surface mounted closers (referenced 350 and 836 BC for the purposes of this assessment), when subjected to a test in accordance with BS EN 1634-1: 2000 to determine its fire resistance performance.

The doorset was of overall dimensions 2080 mm high by 1957 mm wide. Each door leaf had overall dimensions of 2038 mm high by 942 mm wide by 52 mm thick comprising softwood stiles and rails, a flaxboard core, non conbustible board sub facings and chipboard outer facings with hardwood lippings on the vertical edges. The meeting edge of the doorset was rebated. The doorset was hung within a hardwood frame on six zinc plated steel hinges, and was mounted such that it opened away from the heating conditions of the test. The doorset was unlatched for the duration of the test.

For the purposes of the test when viewed for the unexposed side the left-hand leaf was referenced Door Leaf A and the right-hand leaf was referenced Door Leaf B. The exposed face of Door Leaf A was fitted with a Panic Latch Assembly device and closer referenced '836 BC', Door Leaf A also had a mortice latch. The exposed face of Door Leaf B included a Panic Bolt Assembly and closer referenced '350' (for the purposes of this assessment).

The doorset satisfied the test requirements for the following periods:

		Doorset B
Integrity	Sustained Flames	55 minutes
	Gap Gauge	60 minutes*
	Cotton Pad	54 minutes
Insulation		54 minutes

* The test duration. The test was discontinued after a period of 60 minutes.

Test date : 4th July 2008

Test sponsor : Permission from the sponsor has been provided for this test report to be utilised for the purposes of this appraisal

Declaration by Kenwa Co. Ltd.

We the undersigned confirm that we have read and complied with the obligations placed on us by the UK Fire Test Study Group Resolution No. 82: 2001.

We confirm that the component or element of structure, which is the subject of this assessment, has not to our knowledge been subjected to a fire test to the Standard against which the assessment is being made.

We agree to withdraw this assessment from circulation should the component or element of structure be the subject of a fire test to the Standard against which this assessment is being made.

We are not aware of any information that could adversely affect the conclusions of this assessment.

If we subsequently become aware of any such information we agree to cease using the assessment and ask Exova Warringtonfire to withdraw the assessment.

Signed: Yamada

For and on behalf of:

Kenwa Co., Ltd.

10th Apr. 2014

Signatories

Responsible Officer

D. Hankinson* - Principal Certification Engineer

Approved

D. Forshaw* - Principal Certification Engineer

* For and on behalf of Exova Warringtonfire.

Report Issued: 24th March 2014

Issue 2: Inclusion of additional devices and changes to references (7th April 2014)

Issue 3: Minor correction (8th April 2014)

The assessment report is not valid unless it incorporates the declaration duly signed by the applicant.