



Bbl and NEN 6075:
Impact of the new regulations
on fire dampers



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► Introduction

As of **1 July 2021**, new, stricter requirements will apply in the Netherlands with regard to **the prevention of smoke spread** (WRD). For new buildings, in addition to the fire compartmentation requirements (WBDBO), maximum smoke leakages - Ra or R200 - will also be set for compartment boundaries. To meet the WRD requirements, each component must be tested for smoke leakage according to the methods specified in the Dutch **NEN 6075:2020** standard.

This also applies to the ventilation system and its components: where an air duct passes through fire and/or smoke compartment boundary, dampers meeting the new requirements must be provided.

The addenda to the Building Decree 2012 (BB 2012) have been published. They include the new reference tables that determine what fire and smoke resistance requirements are to be met in relation to the building's usage function, and this for existing construction, for refurbishments and for new construction..

This document indicates which fire dampers should be used to meet the WBDBO and WRD requirements.

► Bbl - the new fire safety regulations

The aim of fire safety regulations in the Netherlands is to ensure safe escape and to prevent casualties (injuries and deaths). They must also prevent the fire from spreading to another property or building.

We have known for some time that smoke is far more dangerous than the fire itself: it spreads much faster than the fire - and faster than we think - and it is the greatest threat to those present. The new fire safety regulations take this into account by dividing the building into smoke compartments (called sub-fire compartments or SBC).

In the past the determination of smoke resistance was based on fire resistance (smoke resistance being equal to 1.5 times the flame integrity E). It did not provide sufficient protection against the spread of smoke. Components can meet the flame integrity requirement and still allow very significant amounts of cold smoke to pass through. The pressure build-up during a fire in a room causes a rapid spread of smoke through cracks, seams and other openings. Solutions with intumescent materials generally react too slowly and allow large amounts of smoke to escape from the affected compartment.

With the application of the new NEN 6075 rules, in accordance with the new fire safety regulations (Bbl), all components in the separation must be able to demonstrate that they react quickly, prevent cold smoke spreading and meet the requirements for smoke leakage at higher pressures.

► NEN 6075 - Determination of resistance to smoke transmission

In the new fire safety regulations, according to the Bbl, the WRD smoke requirement for a building component (wall, ceiling) is expressed in terms Ra and R200, where Ra refers to the total leakage losses of that building compartment boundary at 20°C, expressed in m³ per hour. R200 refers to the total leakage losses of the building compartment boundary at 200°C, i.e. a more stringent requirement than Ra. The WRD requirement Ra or R200 of a building compartment boundary is determined as the sum of all leakages Sa or S200 of each individual component within that compartment boundary (door, shutter, seams, fire damper, etc.).

The components are tested for leakages according to the provisions of NEN 6075:2020. For the ventilation system, NEN 6075 refers to the European test standards EN 1366-1 for the ductwork and EN 1366-2 for the fire dampers. The tests are carried out under fire conditions and, for fire dampers, the leakages across the closed damper blade is measured at a pressure difference of 300Pa. An essential factor is that the damper blade must react and close quickly on detection of (cold) smoke. In other words, the fire **dampers must be smoke-controlled**.

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Most fire dampers are Sa and S200 compliant, and with a **spring return actuator** they can be closed remotely immediately upon detection of smoke. Fire dampers of the butterfly damper type cannot be equipped with cold smoke control functionality.

► Translation of the WRD requirements for ventilation

The control tables from the Bbl are explained at the end of this document.

As indicated, the purpose of the WRD smoke requirements is to ensure safe escape and to prevent the spread of smoke in the building. The (protected) sub-fire compartments intended for this purpose must meet the Ra or R200 requirements. The Ra requirement applies mainly in non-sleeping buildings. The higher R200 requirement applies in sleeping buildings or where less self-reliant persons are present.

General rules for WBDBO and WRD compartments:

For fire compartments (BC):

- when a penetration passes through a fire compartment, a basic WBDBO requirement of 60 minutes applies. An extra protected escape route (EBVR) is located, by definition, in another fire compartment and so the same requirement applies, coupled with a R200 WRD requirement.

For sub-fire compartments (SBC):

- an Ra requirement applies, unless it concerns a separation with a BSBC or an EBVR. In that case, a WRD requirement R200 and a fire resistance requirement apply.

For protected sub-fire compartments (BSCB):

- Here a WBDBO requirement of 30 minutes between BSBCs (60 minutes if leading to another BC) applies. The WRD requirement depends on the degree of self-sufficiency of the persons in the room:
 - For residential facilities with care, healthcare facilities with bed areas, cellular functions, in short rooms in which sleeping or less self-reliant persons (mZR) are present, a WRD requirement of R200 applies.
 - For other BSBCs, a WRD requirement of Ra applies
 - For separation with an escape route outside the sub-compartment (BVR) or outside the fire compartment (EBVR), an R200 requirement (and a WBDBO requirement of 30 and 60 minutes respectively) applies.

Protected and extra-protected escape routes (BVR and EBVR):

- In the direction of escape, an Ra requirement generally applies. Only when the BVR passes into an EBVR (other fire compartment) does a WBDBO requirement of 60 minutes and an R200 requirement apply.

► Supplement with fire dampers

The fire resistance requirements WBDBO of 30 and 60 minutes are met by providing fire dampers with a fire resistance of EI30(S) and EI60(S).

To meet WRD requirements Ra or R200, fire dampers must not only be thermally controlled (exceeding 72°C by means of a thermal triggering device, **but also able to respond to (cold) smoke**).

The fire damper with spring return actuator is closed remotely when smoke is detected in the room. According to NEN 6075 the dampers can be activated by a smoke detector as meant in NEN 2555 or a smoke detector in a fire alarm system as meant in NEN 2535, with the smoke detector placed in the room or in the respective air duct.

This type of fire damper is generally connected to the building control system using bus technology. The

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communication for this can be provided integrated within the spring return actuator of the fire damper.



NEN 6075:2020 mentions two alternative methods for ventilation systems to comply with the WRD requirements. The first is that the ventilation system has only inlets and outlets in one SBC, i.e. there is no possibility of the smoke spreading through the same air duct over several SBCs.

The second method is mentioned in appendices C and E of the NEN 6075:2020 and implies that a mechanical extraction is guaranteed for at least 20 minutes after the fire alarm. This method assumes the following requirements:

- ✓ the smoke dispersion pathways must be mapped, AND
- ✓ a bypass must be provided and the recirculation switched off, AND
- ✓ the design of the system should take into account temperatures of up to 1000°C from the fire source, AND
- ✓ the design must take into account the flow rates for air exhaust and for smoke extraction, AND
- ✓ the air ducts must be insulated to meet the WBDBO requirements and to ensure extraction for at least 20 minutes

This method may not be used on heat recovery units, as there is always partial recirculation. When using such units, smoke-controlled fire dampers must always be installed on the partitions.

A recent practical case study (September 2020) commissioned by the Dutch Fire Service into smoke dispersion in a residential building shows that the pressure build-up during a fire is very high. From the study we can conclude that the mechanical exhaust of the smoke through ventilation ducts for 20 minutes is insufficient in most cases.

► Explanatory notes to the Bbl

With the Environmental and Planning Act, the government wants to simplify and unify rules for spatial development. The date of entry into force of the Environmental and Planning Act is planned for 1 July 2022, but at the time of writing it has not yet been finalised. The Decree on construction works and living environment (Bbl), the successor to the Building decree 2012 (BB2012), forms part of the Environmental and Planning Act and sets out the rules relating to the safety, sustainability and usability of buildings.

With the decision of 2 March 2021 (publication in the Staatsblad 2021-211), it has been decided to replace parts of the BB2012 with the new provisions from Bbl. As of 1 July 2021, new, stricter requirements will apply with regard to prevention of smoke spread (WRD) in buildings. The application and determination methods from the Bbl replace the provisions from the BB2012.

The Bbl contains the control tables with which is determined which requirements have to be met according to the different functions of the building. The method for determining the resistance to the passage of smoke between compartments is included in the NEN 6075:2020 standard.

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► Control tables: application for ventilation

The WBDBO and the WRD requirements are included in the Bbl in paragraph §4.2.8 (limiting the spread of fire) and paragraph §4.2.9 (further limiting the spread of fire and limiting the spread of smoke).

The subdivision of a building into individual fire compartments (BC) and the associated WBDBO requirements remain unchanged from the BB2012, with the sole exception that a lift in a residential building will now be a separate fire compartment with a WBDBO requirement of 60 minutes.

The new provisions in the Bbl relate to the WRD requirements and the compartmentalisation within a BC. The Bbl defines the requirements in a control table based on the different use functions of the building. The table below gives a general overview of the requirements per type of compartmentalisation, taking into account the direction (from - to) of the requirement. Divisions between compartments may have multiple requirements: a room (SBC) may be on the boundary of a BC and thus must satisfy both the BC (WBDBO) and SBC (WRD) requirements in the direction of an adjacent room in another BC.

	From	To	WBDBO and/or WRD requirements	Requirements for the fire dampers
1	BC	BC	B60	EI60
2	SBC	SBC	Ra	E20 smoke controlled
3	SBC	BSBC in other SBC	E20 + R200	E20S smoke controlled
4	SBC	BVR	Ra	E20 smoke controlled
5	SBC	EBVR	B60 + R200	EI60S smoke controlled
6	BSBC	BSBC	B30 + R200	EI30S smoke controlled
7	BSBC-mZR	SBC	B30 + R200	EI30S smoke controlled
8	BSBC-mZR	VR	B30 + R200	EI30S smoke controlled
9	BSBC-mZR	BVR	B30 + R200	EI30S smoke controlled
10	BSBC-mZR	EBVR	B60 + R200	EI30S smoke controlled
11	BSBC other	SBC	B30 + Ra	EI30 smoke controlled
12	BSBC other	VR	B30 + Ra	EI30 smoke controlled
13	BSBC other	BVR	B30 + R200	EI30S smoke controlled
14	BSBC other	EBVR	B60 + R200	EI60S smoke controlled
15	BVR	BVR	Ra	E20 smoke controlled
16	BVR	EBVR	B60 + R200	EI60S smoke controlled
17	EBVR	BVR	Ra	E20 smoke controlled
18	EBVR	EBVR	Ra	E20 smoke controlled

1 - Between BCs, the basic fire resistance requirement is 60 minutes. A limited permanent fire load, an additional escape route, etc. can reduce the requirement to 30 minutes.

2 & 4 - Between SBCs (smoke compartments) only the Ra WRD requirement. This is also the case between an SBC

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and an enclosed space through which a protected escape route (BVR) passes.

3 & 5 - Between an SBC and a protected sub-fire compartment (BSBC) located in another SBC, a fire-resistance requirement of 20 minutes and a WRD requirement of R200 apply.

6 - A fire resistance requirement of 30 minutes and a WRD requirement of R200 apply between BSBCs.

7 to 10 - for BSCBs with bed areas and/or with less self-reliant persons, a fire-resistance requirement of 30 minutes and a WRD requirement of R200 apply.

11 to 14 - for the other BSCBs a fire resistance requirement of 30 minutes (60 minutes to an EBVR) and a WRD requirement of Ra applies, unless to a BVR or EBVR for which a WRD requirement of R200 applies.

15 to 18 - for the escape routes only an Ra requirement applies (no WBDBO requirement), unless it leads through a fire compartment (to EBVR) in which case a fire resistance requirement of 60 minutes and a WRD requirement of R200 applies.

A fire damper with EI60S classification (taking into account the fire resistance of the wall and the correct sealing of the damper) is also valid where an EI60, EI30S, E20 classification is required.

► Definitions

Fire compartment (brandcompartiment, BC): part of one or more builds intended as a maximum fire extension area.

Sub-fire compartment (subbrandcompartiment, SBC): part of a construction within or coinciding with the boundaries of a fire compartment, for the purpose of restricting the spread of smoke or further limiting the spread of fire.

Protected sub-fire compartment (beschermd subbrandcompartiment, BSBC): part of a construction within or coinciding with a sub-fire compartment that provides more protection against fire or smoke than a sub-fire compartment.

Escape route: route starting in the room for persons, leading only over floors, stairs or ramps and ending in a safe place, without the use of a lift.

Protected escape route (beschermd vluichtroute, BVR): part of an escape route outside a sub-fire compartment that only passes through a traffic area.

Extra protected escape route (extra beschermd vluichtroute, EBVR): part of a protected escape route outside of a fire compartment.