



Sprinkler standard EN 12845 – CEA 4001 update

OSLO – March 11

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VERSION 2 - 2020

Sprinkler standard EN 12845 – CEA 4001 update

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CEA 4001 key technical evolutions

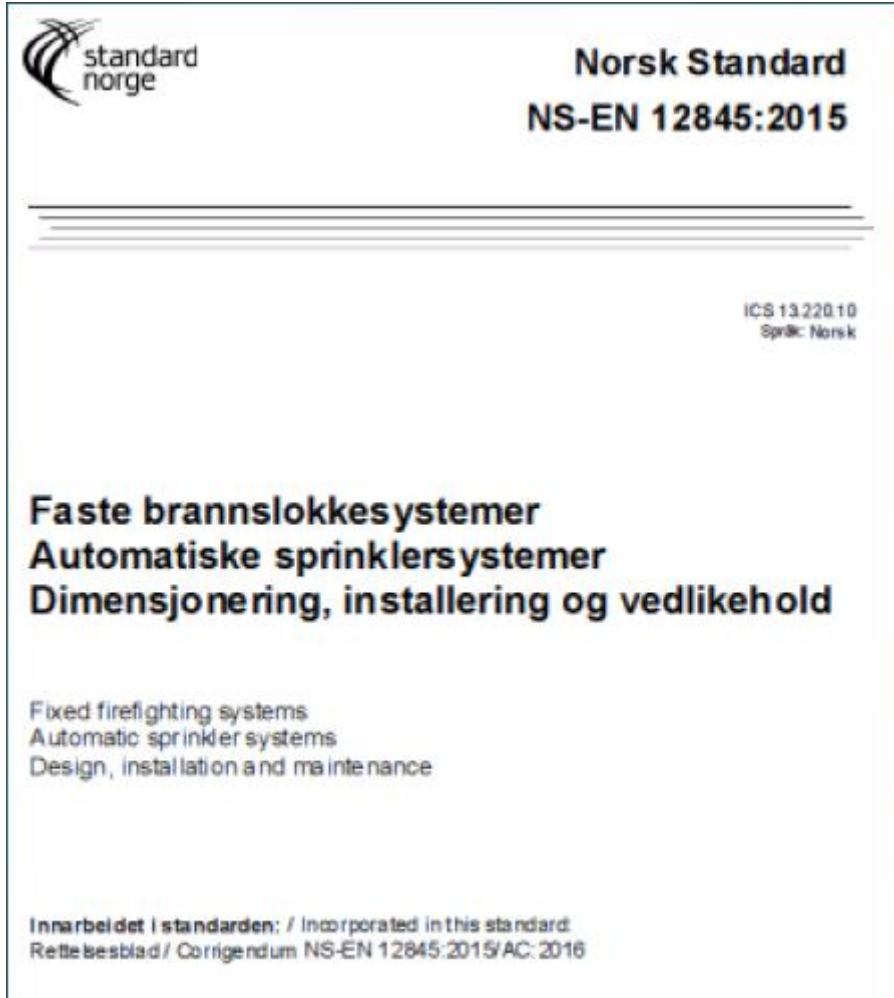


EN 12 845 current status



The current status of EN 12845

- **First published in 2004 : benchmark of other European standards**
- **Initially published with an annex ZA (CPD)-sprinkler kit**
- **Amendment A1 and Amendment A2 published in 2009**
- **Revision 1 : 2015 (current edition)**
 - **Most of bugs of the initial version corrected**
 - **Comprehensive standard that covers 80% of cases**
- **+ Amendment A1 : December 2019**



The current status of EN 12845 (2015 + A1)

edition December 2019

Advantages and room for improvement



- **One single document from design to installation rules, maintenance and water supply**
- **Covers most of classical cases**
- **Includes design for ESFR as standalone annex**
- **Includes design for CMSA as standalone annex**
- **Address the clearance issue for storage**
- **Use of large K factors**
- **Allows alternative solutions that can be taken from test results or other standards (Annex L and § 4.4.2 k)**



- **Classification of goods that does not sufficiently take into account plastic**
- **Design for non storage application : not specific to building configuration**
- **General organisation of standard that does not follow the logical steps of a sprinkler project**
- **Some design for special hazards outdated**
- **Many annexes**

The current status of EN 12845 (2015 + A1)

Amendment A1 : **edition December 2019**

21 Periodic system inspection

The sprinkler system shall be periodically inspected **by a qualified person** at least once a year (see Annex Q). The inspection report shall assess whether the system is in accordance with this standard, with regard but not limited to maintenance, operation and adequacy for the risk involved. A list of deviations shall be issued for action.

**No more
third party
requirement**



But informative annex Q

When performing periodic inspection, it is **recommended** that the system inspections are undertaken **by an independent body**, e.g. not the system owner, building occupier, system installer (or competing installer) or service and maintenance provider (or competing service and maintenance provider). The **qualified person** is a designated individual, **suitably trained, competent through knowledge and practical experience** and with the necessary instruction to enable the tests and examinations to be carried out."



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EN 12 845 EN 12 845
Key technical evolutions

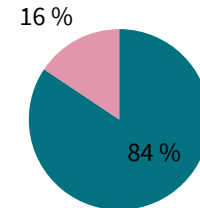
Work in progress : revision 2 of EN 12 845 (**status at March 2020**)

New structure of the document: 28 chapters divided into 6 sections

- ▶ SECTION 1: Scope, references and definitions
- ▶ SECTION 2: Risk assessment
- ▶ SECTION 3 : Design criteria
- ▶ SECTION 4 : Installation
- ▶ SECTION 5: Water Supply:
- ▶ SECTION 6: Commissioning and maintenance

Status EN 12 845 rev 2- March 2020

■ reviewed ■ to be reviewed



- Plan to submit the first draft October 2020 (to TC 191)
- Enquiry beginning 2021
- Review of comments 2021-2022
- Formal vote and publication in 2022

Work in progress : revision 2 of EN 12 845 : non storage application

•currently (9 options)

- Light Hazard (LH)
- Ordinary Hazard (OH 1,2,3,4)
- High Hazard Process (HHP 1,2,3,4)



•Future (5 options)

- Fire Hazard 1
- Fire Hazard 2
- Fire Hazard 3
- Fire Hazard 4
- Fire Hazard 5

With detailed classification within a given occupancy :
e.g: food & beverage is currently OH2 or OH3 but without distinction of hazard zone within the plant

Work in progress : revision 2 of EN 12 845 : non storage application

Activity sector	Occupancy Description	Comment	Fire Hazard
Food and beverages	Abattoirs, meat factories	Areas where non combustible liquids are processed in metal vessels	FH2
	Bakeries	Refrigerated areas or conditioning rooms made of sandwich panels	FH3/FH4 see Table T7a
	Biscuit factories Breweries Chocolate factories Confectionery Dairies factories		
	Animal feed factories	Use of plastic logistic aids (baskets, trays, boxes, pallets)	FH3
	Slaughter houses	Areas where combustible solids (dry food, tobacco) are processed	FH3
	Sea food		
	Butchery	Ammonia Rooms	FH3
	Corn mills	Mixing, blending, boiling of combustible liquids (aromas, solvents)	FH4
	Dehydrated vegetable and soup factories	Blow moulding container production process with plastic and/or PET.	FH3
	Sugar factories	Processes involving vegetable oils (fryer, vegetable grease). Processes using flammable liquids Heat transfer oil systems	FH4
	Alcohol distilleries		
Tobacco processing	Process generating dust accumulation	FH5	
Beverage bottling plants (incl. blow moulding)			
Snack Food			

Work in progress : revision 2 of EN 12 845 : non storage application - design section

•Design density and area of operation linked to height of building

Hazard class	≤9m		>9 ≤13,5 m		>13,5 ≤18 m		>18 Note 1	
	Density (mm/min)	Area of operation (m2) Note 2	Density (mm/min)	Area of operation (m2) Note 2	Density (mm/min)	Area of operation (m2) Note 2	Density (mm/min)	Area of operation (m2)
FH1	5	72	5	160	10	160	Special design	Special design
FH2	5	216	10	160	10	160	Special design	Special design
FH3	7,5	260	10	260	10	260	Special design	Special design
FH4	10	260	12,5	260	12,5	260	Special design	Special design
FH5	12,5	260	12,5	330	17,5	300	Special design	Special design

Note 1: Special design : for building exceeding 18m, special design is required. Consult authorities.

Note 2: For dry pipe installation and pre-action type C installation, add 25% for the area of operation.

Work in progress : revision 2 of EN 12 845 :

Storage application

- currently (4 classes)
- High Hazard Storage (HHS 1,2,3,4)

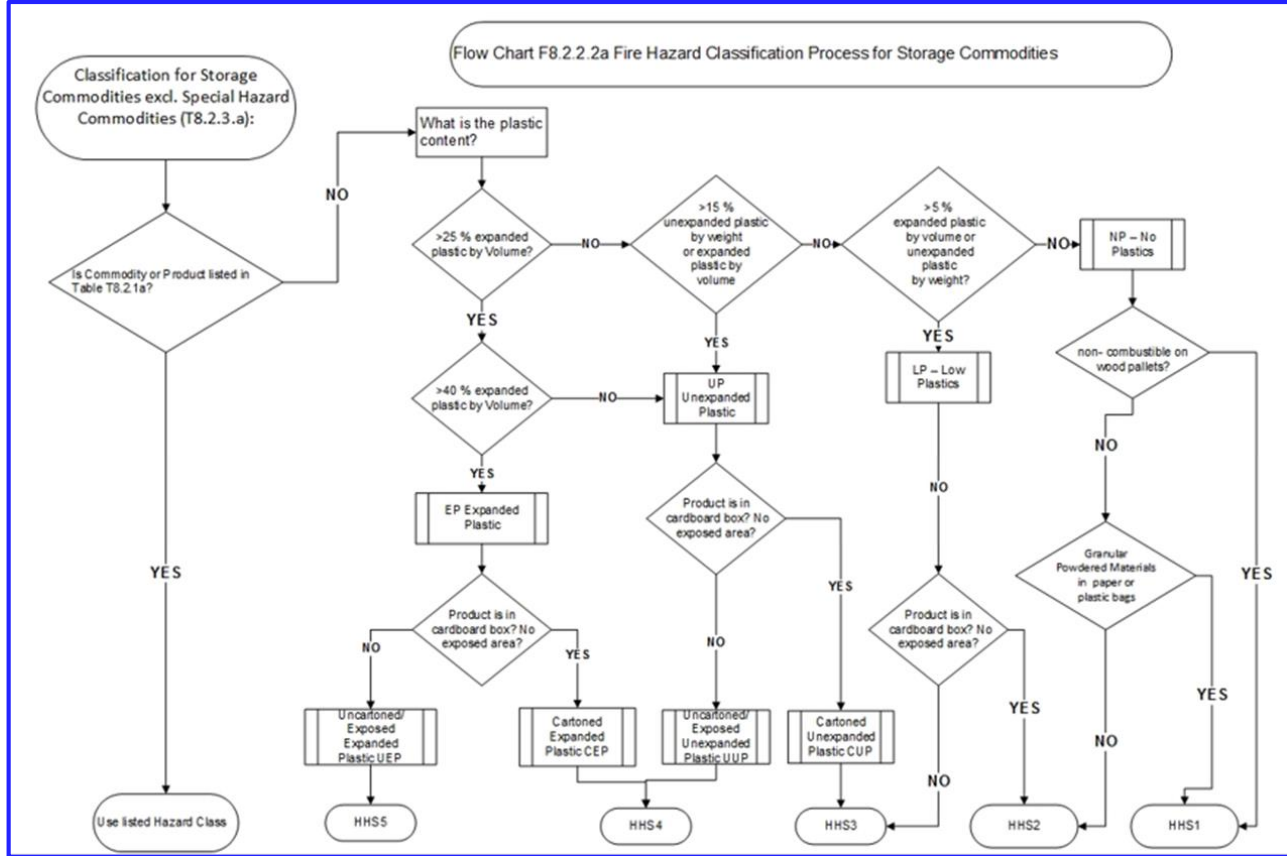


•Future (5 classes)

- HHS 1 (low combustible)
- HHS 2 (limited amount of plastic)
- HHS 3 (cartoned unexpanded plastic)
- HHS 4 (exposed unexpanded plastic & expanded cartoned plastic)
- HHS 5 (expanded exposed plastic)

- **Consistent with large scale fire test configuration , ESFR and CMSA design**
- **To clearly identify differences between exposed plastic and cartoned plastic**

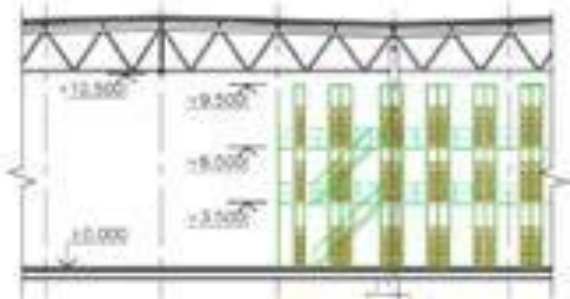
Work in progress : revision 2 of EN 12 845 : Classification for storage



Work in progress : revision 2 of EN 12 845 : storage application

Introduce numbers of storage configurations :

Bin box, Drive through, multilevel shelf storage... and many others



Work in progress : revision 2 of EN 12 845 :

Storage application - design section

- CMDA : similar approach as today but includes HHS1 → HHS5 and combination of numerous storage configurations
- Updated design for ESFR : standalone Chapter – **or separate sub standard (under discussion)**
- Updated design for CMSA : standalone chapter
- Updated design for special hazards (flammable liquids, hanging garments, rubber tyres...)

Storage configuration	Maximum permitted storage height (m)					Density (mm/min)	Area of operation (m ²) See note 1
	HHS1	HHS2	HHS3	HHS4	HHS5		
STC4.3	4,7	3,4	2,2	1,9	1,6	7,5	260
STC5.1	5,7	4,2	2,6	2,3	2,0	10,0	
STC5.2		5,0	3,2	2,8	2,3	12,5	
			3,7	3,2	2,7	15,0	
				3,6	3,0	17,5	
STC6	3	3	1,7	1,5	1,2	7,5	260
STC5.3	4,7	3,4	2,2	1,9	1,6	10,0	
STC9	5,7	4,2	2,6	2,3	2,0	12,5	
		5,0	3,2	2,8	2,3	15,0	
			3,7	3,2	2,7	17,5	

Note 1: For dry pipe installation and pre-action type C installation, add 25% for the area of

Work in progress : revision 2 of EN 12 845 :

Installation section

- **No revolution, but number of improvements and clarifications:**

- **Obstruction rules**
- **Components that are not part of EN 12259 -series**
- **Type of installations and related requirements (antifreeze, pre action...)**
- **Zoning**
- **Protection of concealed spaces**
- **Location of in-rack sprinklers**
- **Guidelines regarding interaction with smoke vents (acceptable smoke vents actuation according to sprinkler type)**
- **Type of pipe and thickness updated.**

Work in progress : revision 2 of EN 12 845 : Installation section

Pipe thickness : black steel / stainless steel and many other options

Nominal diameter	External diameter	Roll grooved or welded				Threaded pipes and cut grooved			
		EN 10216-1	EN 10255 (LS/L-series)	EN 10217-1	EN 10305-3	EN 10255 (M-series)	EN 10216-1	EN 10217-1	EN 10305-3
DN 20	26,9	2,6	-	2,6	3	-	3,2	3,2	3,5
DN 25	33,7	2,6	2,6	2,6	3	3,2	3,2	3,2	3,5
DN 32	42,4	2,6	2,6	2,6	3	3,2	3,2	3,2	3,5
DN 40	48,3	2,6	2,9	2,6	3	3,2	3,2	3,2	3,52
DN 50	60,3	2,6	2,9	2,6	3	3,6	3,6	3,6	4
DN 65	76,1	2,6	3,2	2,6	3,5	3,6	3,6	3,6	4
DN 80	88,9	2,9	3,2	3,2	3,5	4	4	4	4
DN 100	114,3	3,2	3,6	3,6	4	4,5	4,5	4,5	4,5
DN 125	139,7	3,6	4,5	4	4,5	5	5	5	5
DN 150	168,3 ^a	4	4,5	4,5	4,5	5	5	5	5
DN 200	219,1	4,5	-	4,5	-	-	6,3	6,3	-
DN 250	273	5	-	5	-	-	6,3	6,3	-
DN 300	323,9	5,6	-	5,6	-	-	7,1	7,1	-
DN 350	355,6	5,6	-	5,6	-	-	8	8	-
DN 400	406,4	6,3	-	6,3	-	-	8,8	8,8	-
DN 450	457	6,3	-	6,3	-	-	10	10	-
DN 500	508	6,3	-	6,3	-	-	11	11	-

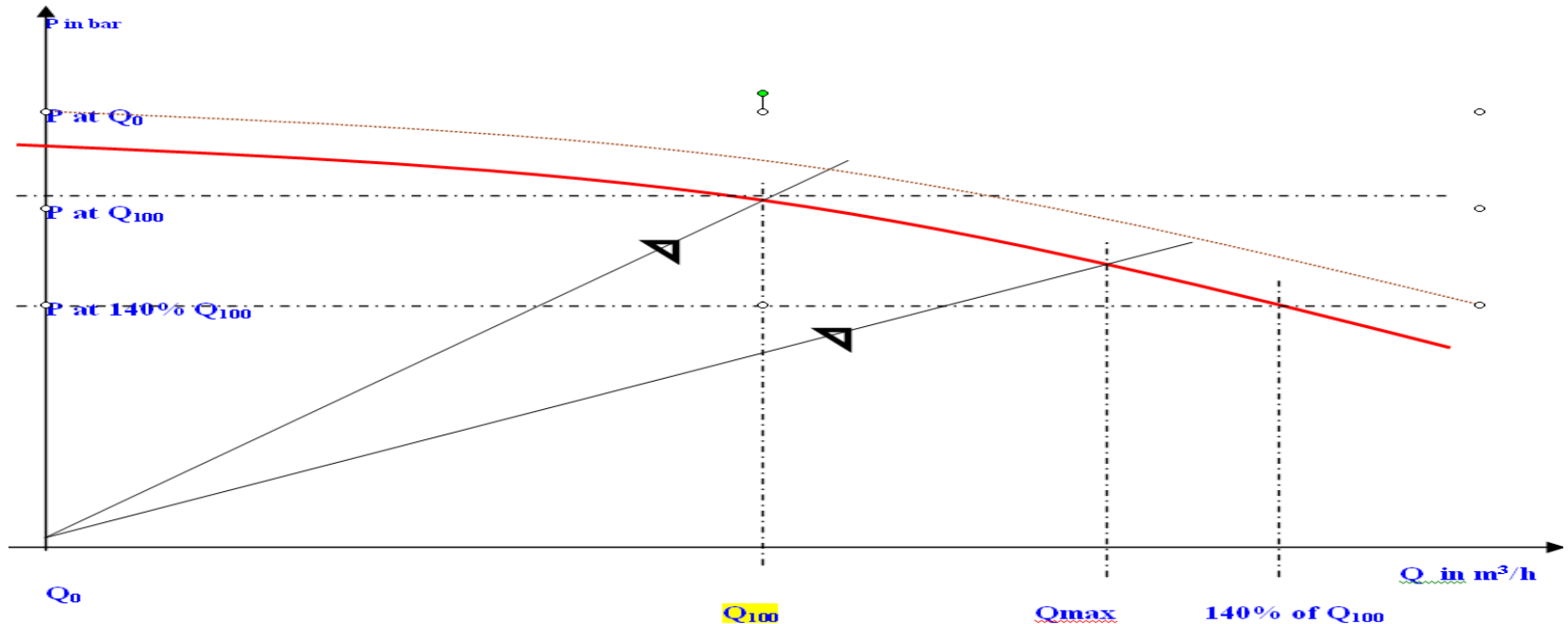
^a 165,1 for EN 10255.

Nominal diameter for stainless steel mm	Minimum wall thickness mm
25	2,0
32	
40	
50	2,9
65	
80	
90	
100	3,2
125	
150	
200	
250	



Work in progress : revision 2 of EN 12 845 : Water supply section

Water tank volume based on Q_{100} and not on Q_{max} anymore → **smaller volume of tanks**



Work in progress : revision 2 of EN 12 845 :

Water supply section

• Suction pipe diameter → increase of maximum velocity → **smaller diameter aligned with other standards** → From 1,8 m/s to 4m/s

• guidelines for selecting type of water supply according to category of risk and number of sprinklers



Category of risk & Number of sprinkler supplied by the same water supply ⁽²⁾	Acceptable water supply		
	Single water Supply	Single superior water supply	Duplicate water Supply
FH1	X	X	X
FH2 less than 1000 spk	X	X	X
FH2 more than 1000 spk		X	X
FH3-FH5 less than 500 spk	X	X	X
FH3-FH5 more than 500 spk		X	X
HHS less than 500 spk	X	X	X
HHS from 500 to 5000 spk		X	X
HHS more than 5000spk			X

• specifications for hydrants and hose demand : 90 m³/h in FH1 and 2 and 120M³/h for other cases

Work in progress : revision 2 of EN 12 845 : User control program (chapter 28)

- a) Program of test activities (T)
- b) Program of maintenance activities (M)
- c) Program of Inspection, including organizational and structural topics (I)

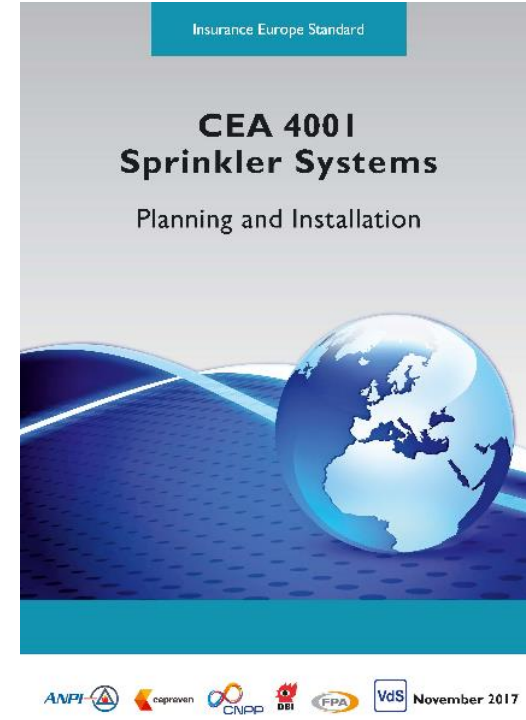
Description	Weekly	Monthly	Quarterly	Half-yearly	Yearly	Three-yearly	Ten-yearly
Water levels	I. 28.3.1.3			T. 28.3.4.1			
Water motor alarm	T. 28.3.1.4				M. 28.3.5.4		
Automatic pump starting	T. 28.3.1.5						
Diesel engine driven pump running	T. 28.3.1.6						
Heating tracing	T. 28.3.1.7						
Batteries		T. 28.3.2.1			M. 28.3.5.5		
Water storage tank		I. 28.3.2.2				M. 28.3.6.1	M. 28.3.7.1



CEA 4001 current status

CEA 4001 status – current edition November 2017

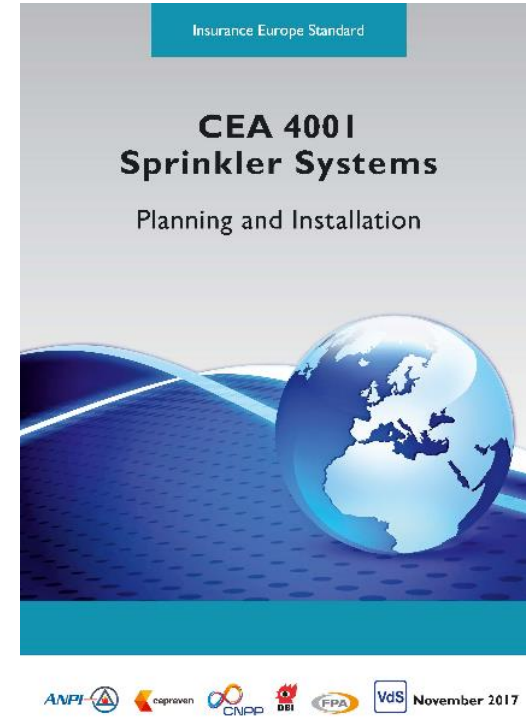
- Water duration requirement already based on Q100 (corresponding to the unfavourable hydraulic calculation), instead of Qmax → cost effective solution.
- Diameter of suction pipe already based on 4m/sec → smaller pipe diameter
- Choice of water supply : CEA provides guidance (annex N- informative) for the choice of water supply according to category of risk and number of sprinklers : avoid misinterpretation and differences between offers from various contractors.
- Addition of foam concentrate (annex P) : comprehensive clause for foam injection design
- Details about parameters for omission of sprinklers in concealed spaces
- Pre-action systems: details requirements for the 4 types of protection systems that are commonly used (EN 12845 mentions only 2 types)



CEA 4001 status – current edition November 2017

- Detailed requirement for antifreeze installations and extensions
- PIPEWORK : new redrafted chapter with comprehensive details:
 - Clear specifications for pipe thickness according to various application, connection and type of material
 - Specifications for stainless steel, plastic and copper pipes
 - Press fitting system
 - Requirement for welded pipes
 - Flexible pipes
 - Concrete casting of sprinkler pipework

→ Many improvements that will appear in 2022 in EN 12845 that are already in CEA 4001





CEA 4001 key technical evolutions

CEA 4001 status – Technical bulletin (in preparation)

→ Supplement CEA 4001 on specific topics

Recycling plants

Li-ION batteries : draft V2 ready for final review by EG4

Third party inspection

Cold rooms and freezers : first draft established. It lists the various acceptable options (dry, pre-action, dry pendent spk, antifreeze...) with details regarding design specificities.

automatic retrival storage system :

Corrosion

car parc (Automatic, electricar charging area....

extended coverage sprinklers

CEA 4001 status – Technical bulletin (in preparation)

Waste treatment plant

Building / activity	Activity	Type of protection	Maximum Ceiling/roof height in m	Risk classification or storage classification	Storage type / maximum permitted storage	Required sprinkler protection			Installation type	Comment
						Type of spk	Density in mm/min	Area of operation in m ² (See note 3)		
Indoor receiving area or Tipping floor	Waste is discharged directly from truck on the ground (balled or bulk storage)	sprinkler	9	Mixed material considered as HHS3 (see note 1). Storage is considered as ST1	5m for bulk storage and 4m for bale storage. Block storage area shall be limited to 300m ² and separated by physical barriers such as brick walls, concrete blocks, concrete walls	Spray sprinkler K160 quick or standard response - T° 68°C or 93°C	17,5	325	Dry unless no risk of frost	Waste is usually discharged directly from truck on the ground (balled or bulk storage) Flammable liquids wastes and hazardous wastes are not covered in this table. The height of wall or separation shall be designed to contain the heap of waste within 300m ² (see figure T2.1a and figure T2.1b). Where deluge system is applied, the size of the deluge zone should be at least equal to the zone limited by physical barriers.
		sprinkler	12				20	375	Dry unless no risk of frost	
		sprinkler	13,7				25	375	Dry unless no risk of frost	
	deluge	All	Spray nozzle K160			15	2 adjacent deluge zones to be calculated simultaneously	Deluge installation triggered by adequate and reliable fire alarm system (particular attention to be paid to dust, height of building, air movements and maintenance) see note 2		
		Ceiling sprinkler in combination with automatic monitors	all			Spray sprinkler K115 standard response T° 68°C or 93°C	10	325	Dry unless no risk of frost	Applicable ceiling protection in combination with monitor protection

Note 1: Where significant (above 30% - refer to Annex B2 of CEA 4001) amount of plastic is present, one of the following additional measure shall be taken:

- e.g. foam additive applied to ceiling protection).

- Increase design density by 25% without revising the area of operation.





Thank you



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