Risk Consulting

EN 12845: European sprinkler standard
A big step forward

EFSN-London
Karim KARZAZI

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EN 12845: European sprinkler standard

A big step forward

1. Current status of the standard and next steps
2. Structure of document more user friendly
3. Main changes
4. Key challenges and open topics before the publication

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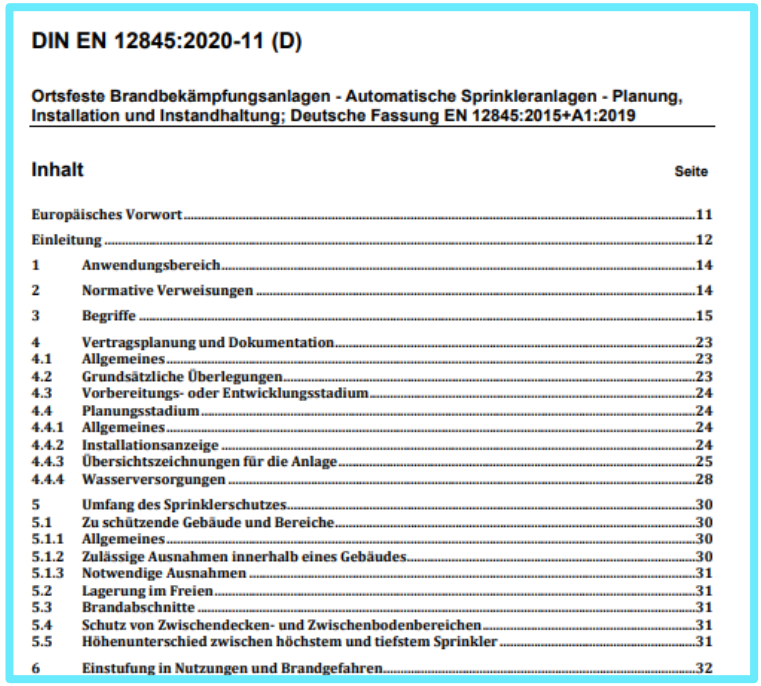
EN 12 845

Current status of the standard and next steps

Current status of EN 12845 Rev 1 + A1

- First published in 2004 : benchmark of other European standards and CEA 4001
- Amendment A1 & 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



DIN EN 12845:2020-11 (D)

Ortsfeste Brandbekämpfungsanlagen - Automatische Sprinkleranlagen - Planung, Installation und Instandhaltung; Deutsche Fassung EN 12845:2015+A1:2019

Inhalt Seite

This standard replaces all the existing sprinkler installation standards in 26 European countries + CEN member / affiliated countries (UK, Norway, Switzerland, Iceland, Turkey). In each country, the standard has the same numbering ref.

DIN EN 12845 in GERMANY

BS EN 12845 in UK

NF EN 12845 in FRANCE

UNE EN 12845 in SPAIN

The current status of EN 12845 (2015 + A1 :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** (to a certain extend)
- **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- **Some design for special hazards outdated**
- **ESFR , CMSA & Extended Coverage does not includes latest development**
- **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…

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."

Next evolutions of EN 12845

At May 2022

EN 12845 (:2015 + A1 : 2019)

EN 12845-1

Core of the existing standard applicable for all the other parts and design using CMDA sprinklers

- Draft ready for enquiry
- Translation(D, FR) done
- Enquiry in Dec 2021 : aprouved with comments
- Lots of comments received (4008 comments ->600 pages)
- Review comments in 2022
- Probable Second enquiry in 2023(?) due to large number of comments

EN 12845-2

Dedicated design for **ESFR** and **CMSA**

To be applied in conjunction with EN 12845-1

- draft ready
- Should be approved by WG5 in June 2022
- 1st Enquiry expected in Q3-2022
- Review comments in 2022-2023
- Formal vote in 2023(?) Before publication

EN 12845-3

Earthquake protection will replace CEN/TS 17551

To be applied in conjunction with EN 12845-1

- Limited revision of current TS (clarifications, inconsistencies and other limited changes)
- Enquiry to start in July 2022
- Publication expected end of 2022

EN 17 451

Pump sets standard

for use in sprinkler systems conforming to EN 12845

- Draft for 2nd Enquiry expected in 2022
- Review comments in 2022-2023
- Publication expected end of 2022 (2023?)

2

Structure of document more user friendly

Structure of future EN 12845-1

A structure and order of chapters more in line with typical project schedule

- § 1-3: Scope, references and definitions
- § 4-9: Risk assessment and classification of hazards (non-storage, storage, special features influencing hazard class…)
- §10-12 : hydraulic and Design criteria
- §13-18 components, and installations rules
- § 19-21 Alarms and monitoring
- § 22-24 Pumps and water supply
- § 25-27 Commissioning and maintenance
- Annexes

Annexes

A : list of goods

B: model maintenance report

C: independent certification body

D: Pre-calculated systems

E: measure to improve reliability

F: system not fully operational (impairment)

G: testing of sprinklers

H: Distilled spirits in wood barrel

I: Measurement of wall thickness

J: special protection concepts (picking, racks, record storages, mini-load)

Structure of future EN 12845-2

A dedicated standard for storage applications, using large K factors (ESFR and CMSA)

- § 1-4: Scope, references , definitions and general : the definitions are the ones specific for ESFR and CMSA
- § 5 : installation requirements : especially rules for spacing and obstructions
- § 6 : hydraulic and Design criteria : for ESFR and CMSA

Unless specified in EN 12845-2, all other requirements given in EN 12845-1 shall be followed.

Work in Progress

Main changes

- **Classification of goods and activities**
- **Design approach**
- **Water supply**
- **More options on technology**
- **More options for storage protection**

Revision 2 of EN 12 845 : main changes

Classification of goods and activities :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 (FH1)**
  - **Fire Hazard 2 (FH2)**
  - **Fire Hazard 3 (FH3)**
  - **Fire Hazard 4 (FH4)**
  - **Fire Hazard 5 (FH5)**

- **Table 6: non-manufacturing activities**
- **Table 7: manufacturing activities**

With detailed classification within a given occupancy :

e.g: food & beverage is currently 0H2 or OH3 but without distinction of hazard zone within the plant. Retail: differences according to height of shelves and goods.

Revision 2 of EN 12 845 : main changes

Classification of goods and activities :non-manufacturing (extract from table 6)

Retail	**Department stores, shopping malls, supermarkets, and retail areas.**	Storage height up to 1,7 m for goods no more than HHS3. Storage height up to 1,5 m for HHS4 goods. Storage height up to 1,2 m for HHS5 goods.	FH2.
		Storage height up to 2,2 m for goods no more than HHS3. Storage height up to 1,9 m for HHS4 goods. Storage height up to 1,6 m for HHS5 goods.	FH3.
		Storage height up to 2,6 m for goods no more than HHS3. Storage height up to 2,3 m for HHS4 goods. Storage height up to 2,0 m for HHS5 goods.	FH4.
		Goods higher than values mentioned above shall be treated based on the storage hazard present.	HHS
		Particular attention shall be paid to possible hazardous goods such as aerosol containers, rubber product and flammable liquid.	See clause 11

Note: limitation of block storage as described in table 2 doesn't apply to sales areas (no limitation to 50m²)

revision 2 of EN 12 845 : main changes

Classification of goods and activities :manufacturing (extract from table 7)

Paper	Book-binding factories, cardboard factories, paper factories (e.g. pulp and paper making), waste paper processing, and printing works (paper).	General	FH3
		Paper making machine area including wet and dry areas, hoods, obstructed areas and sub ceiling.	FH2
		Coating and printing using water-based liquids.	FH3
		Washing, bleaching and chemical treatment.	FH2
		Processes with hot surfaces and combustibles liquids and calanders with hydraulic oil. Heat transfer fluid room(oil systems), coating and printing using solvents, processes involving > 1000 litres of flammable and combustible hydraulic fluids. Process generating dust.	FH5

➔ Hazard classification linked to the process within a given activity

revision 2 of EN 12 845 : main changes:

Design approach :manufacturing & non-manufacturing design

- **Design density and area of operation linked to height of building**

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

Note a: For building exceeding 18m, special design is required. Consult authorities.
Note b: For dry pipe installation and pre-action type C installation, add 25% for the area of operation.

Revision 2 of EN 12 845 : main changes

Classification of goods and activities :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**

Revision 2 of EN 12 845 : main changes

Classification of goods and activities :storage application- Classification of goods

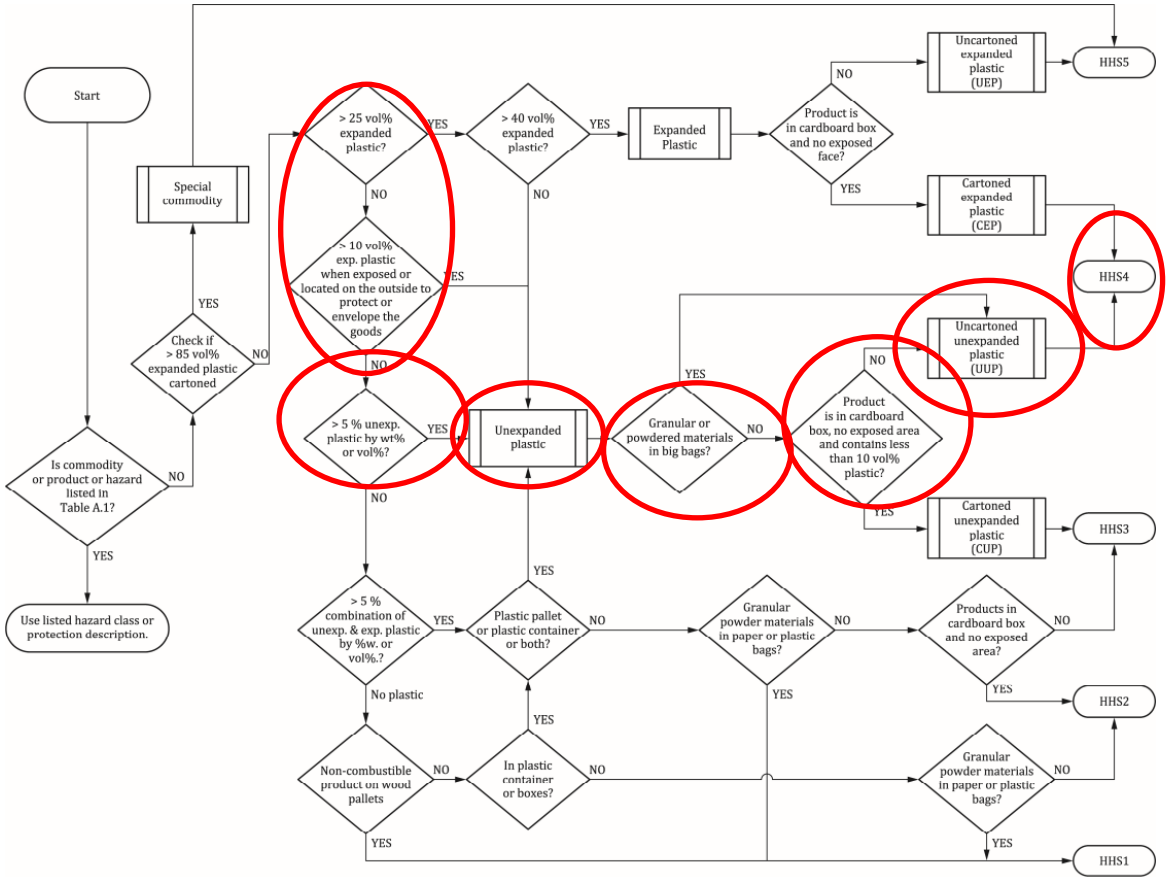
Table A.1 — HHS Category by goods

Product	HHS-Category	Notes and additional requirements
Acrylics	4	-
Acrylonitrile-butadiene-styrene (ABS)	4	-
Adhesives with solvent container less than 0,5 l	4	For larger containers, refer to flammable liquids.
Adhesives without solvent	1	-
Aerosols in cans or bottles with propellant gas with either combustible content or a combustible propellant gas	See 11.2.	
Aluminium foil laminate paper	2	-
Asphalt paper in horizontal rolls	2	-
Asphalt paper in vertical rolls	3	-
Automobile bumpers	4	-
Batteries without electrolyte (plastic casing)	4	-
Batteries, dry cell	2	Excluding lithium batteries.
Batteries, wet-cell; filled with non-ignitable electrolyte	3	-
Beeswax or paraffin wax in block	5	-
Beverage: Beer and wine (20 % or less alcohol) in metal, glass or ceramic containers in plastic crates	4	-
Beverage: Beer and wine (20 % or less alcohol) in metal, glass or ceramic containers in cartons or in wood crates	1	-
Beverage: Beer and wine (20 % or less alcohol) in plastic containers larger than 200 l	2	-
Beverage: Beer and wine (20 % or less alcohol) in plastic containers larger than 200 l	3	-
Beverage: Beer and wine (20 % or less alcohol) stored in wooden barrels	2	-
Beverage: Cardboard drink boxes filled with	2	Plastic-coated, wax-coated

- **Either you have directly the category in annex A1 (alphabetic list)**
  - **consider wood pallets**
  - **If plastic pallets ➔ +1 category (e.g. HHS2➔HHS3)**
- **Or apply the methodology according to plastic contains if good is not listed in annex A1**

Revision 2 of EN 12 845 : main changes

Classification of goods and activities :storage application- Classification of goods



Television screens in cardboard boxes:

- **contains 30% of plastic in weight**
- **and 15% in volume of expanded polystyrene**

➔ HHS4

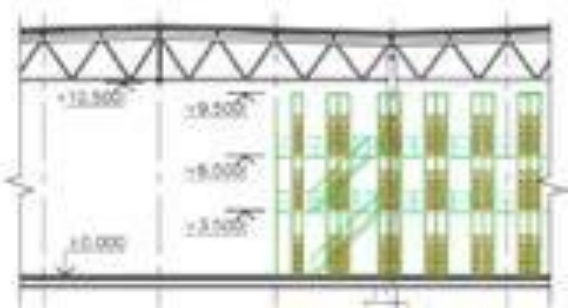
Revision 2 of EN 12 845 : main changes

Classification of goods and activities :storage application- Type of storages

Desig-nation	Storage configuration
STC1	Solid pile
	Palletized storage
STC2	Shelves storage
	Back-to-back shelf storage
	Bin box
	Picking racks
STC3	Portable racks
STC4	Open frame racks
STC4.1	Open frame single row rack
STC4.2	Open frame double row rack
STC4.3	Open Frame Multiple Row Rack with transverse flues parallel to loading direction and longitudinal flues perpendicular to loading direction
STC5	Racks with solid shelving
STC5.1	Single Row Rack with solid shelving
STC5.2	Double Row rack with solid shelving
STC5.3	Multiple Row Rack with transverse flues parallel to loading direction and longitudinal flues perpendicular to loading direction with solid shelving

+ Introduce numbers of storage configurations : more options

Mini load (STC 10), Drive through (STC 6), multilevel shelf storage (STC 7)… and others



Revision 2 of EN 12 845 : main changes

Design approach: storage application- design criteria (table 10)

- CMDA : similar approach as today but includes HHS1 ➔ HHS5
- ➔ HHS1 & 2 : no change
- ➔ HHS 3 similar to HHS3 but slightly more severe if >3,5m
- ➔ HHS 5 same as previous HHS4
- ➔ HHS 4 between previous HHS and previous HHS4

Table 10 —Design criteria for HHS with roof or ceiling protection only

Storage configuration (see Table 3)	Max. allowed storage height in m					Density in mm/min	Area of operation in m² [a]
	HHS1	HHS2	HHS3	HHS4	HHS5		
STC1 Solid pile palletized storage	5,3	4,1	2,9	2,3	1,6	7,5	260
	6,5	5,0	3,5	2,8	2,0	10,0	
	7,6	5,9	3,7	3,2	2,3	12,5	
	7,6	6,7	4,1	3,7	2,7	15,0	
	7,6	7,5	4,7	4,1	3,0	17,5	
	-	-	5,2	4,5	3,3	20,0	300
	-	-	5,7	4,9	3,6	22,5	
	-	-	6,3	5,3	3,8	25,0	
	-	-	6,7	5,7	4,1	27,5	
	-	-	-	6,	4,4	30,0	

NEW

Table 4 — Design criteria for HHS with roof or ceiling protection only

Storage Configuration	Maximum permitted storage height m				Design density mm/min	Area of operation (wet or pre-action system (see NOTE) m²
	Category I	Category II	Category III	Category IV		
ST1 Free standing or block stacking	5,3	4,1	2,9	1,6	7,5	260
	6,5	5,0	3,5	2,0	10,0	
	7,6	5,9	4,1	2,3	12,5	
		6,7	4,7	2,7	15,0	
		7,5	5,2	3,0	17,5	
			5,7	3,3	20,0	300
			6,3	3,6	22,5	
			6,7	3,8	25,0	
			7,2	4,1	27,5	
				4,4	30,0	

current

Revision 2 of EN 12 845 : main changes

Design approach: storage application- design criteria (table 10)

- CMDA : similar approach as today but includes HHS1 ➔ HHS5 and combination of numerous storage configurations
- Updated design for ESFR : separate standard (EN 12845-2)
- Updated design for CMSA : separate standard (EN 12845-2)
- 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 operation.

Revision 2 of EN 12 845 : main changes

Design approach: Installation criteria

- **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: more option on technology with press fitting, concrete casting, CPVC, plastic pipes….**

Revision 2 of EN 12 845 : main changes

Design approach: Installation criteria – example of pipe thickness more detailed

Table 41 — Minimum wall thickness for steel pipes

Nominal diameter	External diameter	Roll grooved or welded in mm				Threaded pipes and cut grooved in mm			
		EN 10216-1	EN 10255 (L2/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	2,9	3,5	4	4	4	4
DN 100	114,3	3,2	3,6	3,2	4	4,5	4,5	4,5	4,5
DN 125	139,7	3,6	4,5	3,6	4,5	5	5	5	5
DN 150	168,3 [a]	4	4,5	4	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.

Table 42 — Minimum wall thickness for roll grooved, welded or press-fitted stainless steel pipes

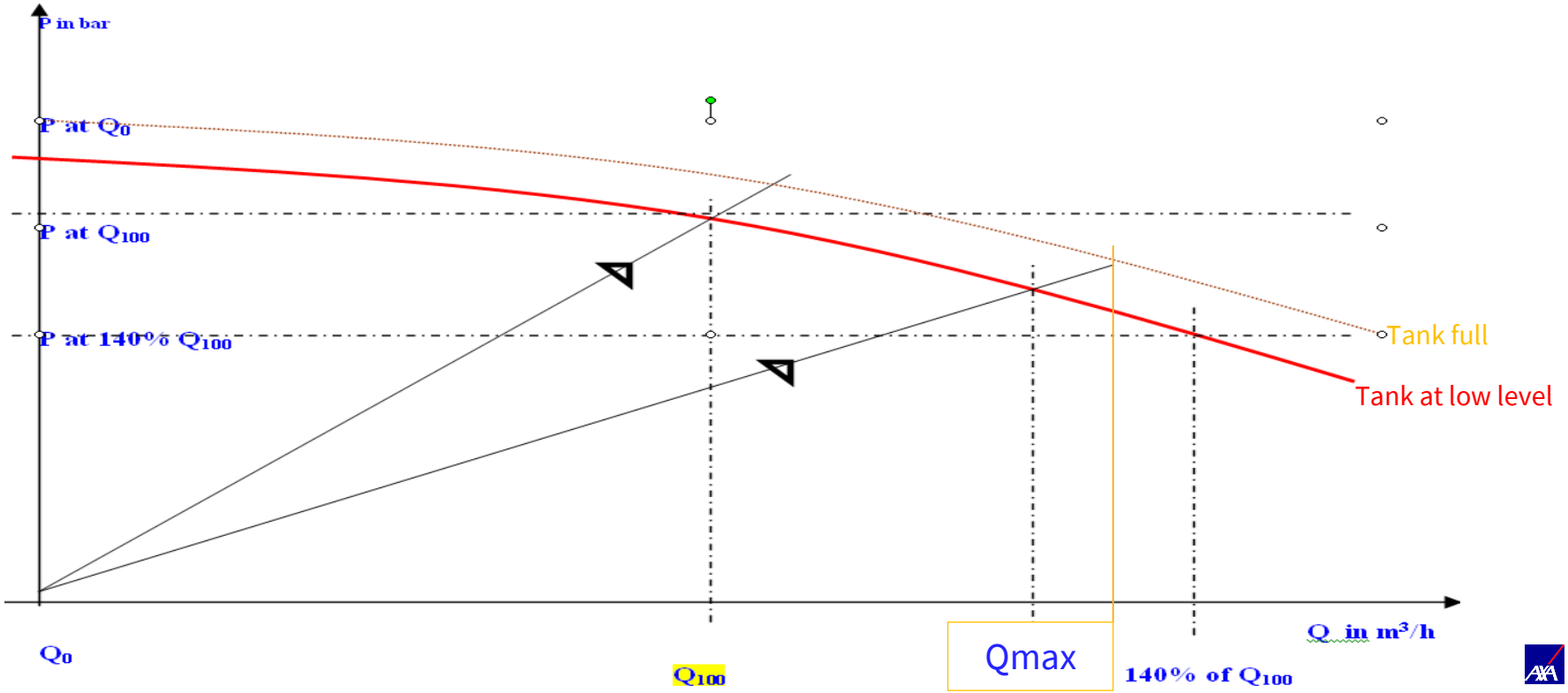
Roll-grooved or welded connections [a]		Press-fitting connection	
Nominal diameter	Minimum wall thickness	Corresponding diameter applicable for press-fitting pipe	Minimum wall thickness
DN	mm	mm	mm
20	2,0	22,0	1,2
25		28,0	1,2
32		35,0	1,5
40		42,0	1,5
50		54,0	1,5
65	2,9	64,0	2,0
80		76,1	2,0
90		88,9	2,0
100		108,0	2,0
125	3,2	Not applicable.	
150			
200			
250	4,0		

[a] Thinner wall thicknesses shall be accepted by authorities based on test and/or technical documentation.

Revision 2 of EN 12 845 : main changes

Water supply: new reference point

Water tank volume based on Q100 and not on Qmax anymore ➔ smaller volume of tanks



Revision 2 of EN 12 845 : main changes

Design approach: Water supply

•Suction pipe diameter ➔ increase of maximum velocity ➔ smaller diameter : aligned with other standards ➔From 1,8 m/s to 4m/s in positive head (from 1,5 to 2,5m/s in suction lift condition)

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

	Acceptable water supply		
Category of risk & Number of sprinkler supplied by the same water supply (2)	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 where connected to the same water supply: 90 m3/h in FH1 and 2 and 120M3/h for other cases

Revision 2 of EN 12 845 : main changes

User program: A clear indication of actions and frequency

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. 27.4.1.3			T. 27.4.4.1			
Water motor alarm	T. 27.4.1.4				M. 27.4.5.4		
Automatic pump starting	T. 27.4.1.5						
Diesel engine driven pump running	T. 27.4.1.6						
Heating tracing	T. 27.4.1.7						
Batteries		T. 28.4.2.1			M. 27.4.5.5		
Water storage tank		I. 28.4.2.2				M. 27.4.6.1	M. 27.4.7.1

4

Key challenges and open topics before the publication

Revision 2 of EN 12 845 : Key challenges and open topics before the publication EN 12 845 -1

Classification of goods and activities

Table 7 — Manufacturing activities and their associated fire hazard class

Activity sector	Description	Specific details	Minimum fire hazard
Glass and ceramics	Glass factories	General. Consider molten glass spills – where does the spill go when containment breaks?	FH1
		Cable spreading/ distribution room or other places with a high amount of electrical cabling. Hydraulic operating equipment holding < 100 litres of ignitable liquids.	FH2
		Hydraulic operating equipment holding 100 to 1 000 litres of ignitable liquids	FH4
		Hydraulic operating equipment holding > 1 000 litres of ignitable liquids	FH5
Chemicals and pharmaceuticals	Chemical factories, cement works, photographic film factories, dye works, soap factories, photographic laboratories, resin, lamp black and	General	FH2
		Combustible small in-process storage or a typical laundry with hydraulic oil vessels or cranes holding less than 100 litres of ignitable liquids.	FH2
		Tanks and vessels requiring exposure protection, clean-rooms, sterilization	FH4

- We have some comments and debate on some threshold and categories but should not be a big deal

Revision 2 of EN 12 845 : Key challenges and open topics before the publication EN 12 845 -1

Design density and area of operation

Table 9 — Design criteria for FH1 - FH5

Hazard class	Ceiling height					
	≤9 m		>9 ≤13,5 m		>13,5 ≤18 m [a]	
	Density mm/min	Area of operation [b] m²	Density mm/min	Area of operation [b] m²	Density mm/min	Area of operation [b] m²
FH1	5	72	5	160	10	160
FH2	5	216	10	160	10	160
FH3	7,5	260	10	260	10	260
FH4	10	260	12,5	260	12,5	260
FH5	12,5	260	12,5	330	17,5	300

[a] For buildings exceeding 18 m in height a special design is required. The local authorities shall be consulted. Sprinkler systems are effective above 18 m but special design is required. See also EN 12845-2.

[b] For dry pipe installations and pre-action type C installations, add 25 % for the area of operation.

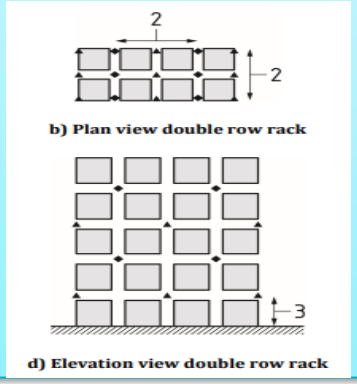


Table 2 — Determination of maximum block storage areas for each fire hazard category and storage configuration in non-storage areas

Storage configuration	Fire hazard	Maximum storage block area for goods ≤ HHS3 m²	Maximum storage block area for goods HHS4 and HHS5 m²	Minimum width of aisles of separating rows of storage m	Minimum separation clearance around storage block area m
STC1	≥ FH2	50	6	-	2,4
STC2	≥ FH2	50	6	2,4	2,4
STC3	≥ FH2	50	6	-	2,4
STC4	≥ FH2	50	6	1,2	2,4
STC5	≥ FH2	50	6	1,2	2,4

NOTE 1 Standard portable racks (post pallets) shall have an aisle of 2,4 m between the rows. The length is limited to four butted pallets.

NOTE 2 See Table 10 for height.

8.3.2 Description of storage configurations STC 1 to STC 5

Table 3 — Overview of storage configurations

Desig-nation	Storage configuration	Description	Additional requirement
STC1	Solid pile	On-floor storage, without pallets or other material handling devices. Unit loads are placed on top of each other, leaving no horizontal spaces between unit loads.	Maximum storage block area shall be 150 m². When necessary to extend above 150 m² the area of operation shall be increased proportionally. Minimum clearance around storage block area shall be 2,4 m.
	Palletized storage	A storage arrangement that consists of product stored on pallets. Pallet loads are placed one on top of another with the bottom pallet located directly on the floor.	
STC2	Shelves storage	Storage on structures up to and including 1,2 m deep (measured aisle to aisle) and separated by aisles at least 800 mm wide.	-
	Back-to-back	Two solid or perforated shelves up to	-

We could have some comments and debate

- where the area of operation and design density differs from existing EN 12 845
- Where we have limitations in storage blocks, aisles…
- Introduction of face sprinklers for some special design (aerosols, flammable liquids)

Revision 2 of EN 12 845 : Key challenges and open topics before the publication EN 12 845 -1

- Use of extended coverage sprinklers

- We could have some comments and debate on scope of application and special design

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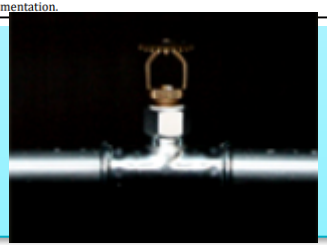
- Pipes, wall thickness, technology and limitation in scope

Table 42 — Minimum wall thickness for roll grooved, welded or press-fitted stainless steel pipes

Roll-grooved or welded connections [a]		Press-fitting connection	
Nominal diameter	Minimum wall thickness	Corresponding diameter applicable for press-fitting pipe	Minimum wall thickness
DN	mm	mm	mm
20	2,0	22,0	1,2
25		28,0	1,2
32		35,0	1,5
40		42,0	1,5
50		54,0	1,5
65	2,9	64,0	2,0
80		76,1	2,0
90		88,9	2,0
100		108,0	2,0
125	3,2	Not applicable.	
150			
200			
250	4,0		

[a] Thinner wall thicknesses shall be accepted by authorities based on test and/or technical documentation.



- We could have some comments and debate on scope of application and minimal wall thickness

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Design for ESFR installations

- "Traditionally" Designed based on 12 spk heads
- Alternate solution exists with 9, 10 or 15 spk head in simultaneous operation, but with other minimum pressure
- Rules for obstructions and compensatory measures are different if we refer to FM or NFPA or latest tests

- We could have some comments and debate
  - Maintain 12 spk as a basic for design or offer alternate solutions – associated constraints
  - Dedicated rules for obstructions associated to design or global

Revision 2 of EN 12 845 : Key challenges and open topics before the publication EN 12 845 -1 & EN 17451 (pump set)

- Water supply
- Safety margin for power consumption
- Pump controller :Fuses protection vs circuit breakers
- Type of pumps allowed in sprinkler installations

- Ongoing work regarding interaction between EN 12 845-1, EN 17451 but also 12 259-12 (pump)

Revision 2 of EN 12 845 : Key challenges and open topics before the publication conclusion

- EN 12 845-1 at review of comments stage and soon will be EN 12 845-2 and EN 17451
- WG5 and TG's members did their best to offer an updated European standard
- It is important that all sprinkler industry and sprinkler users + authorities give their opinion and submit proposals
- So that ➔ WG5 and its TG's will review the comments based on clear proposals and arguments

Thank You

Karim KARZAZI
Technical Centre Leader
AXA XL
Karim.karzazi@axaxl.com
Mobile: (+33) 6 78 88 24 69