

RISK ENGINEERING GUIDELINE

FIREFIGHTING WATER SUPPLY

HDI Risk Consulting

Property

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In special cases additional firefighting water must be provided by the operating company.

The municipal firefighting water supply is a basic protection for the community. This supply is not always sufficient for industrial fire risks.



General.

Despite modern fire extinguishing technology and fire extinguishing agents, water is and remains the vital extinguishing agent for firefighting. However, when the press reports on largescale fire incidents, problems with the water supply for firefighting are often mentioned.

Today, the public supply of water for firefighting is often provided through the drinking water supply network. Due to the population's decreasing demand for drinking water and in terms of hygienic aspects, water supply companies increasingly install pipes with a diameter suited to today's generally reduced drinking water demand. Consequently, the firefighting water supply in many places can no longer be provided by the public (drinking water) supply network alone.

1 Base protection and asset protection.

Depending on the field of application, firefighting water supply can be subdivided into base protection and asset protection in some countries. The term base protection is understood to mean the supply of firefighting water in a firefighting district of a particular size of builtup area, based on overall fire risk.

The required quantity of firefighting water is calculated taking into account the types of construction and the risk of the fire spreading.

Asset protection is the property-specific firefighting water supply over and above the baseline protection, for properties with a special fire risk. For this calculation a risk analysis is required, the results of which are translated into measures for ensuring a supply of firefighting water by the occupier of the property, the water supply company, the relevant fire department and the risk carrier (insurer).



Country	Abbreviation	Designation / remarks
AUS	AS 2118	Automatic fire sprinkler systems (Water supplies section) ABCB Reference Document
AUT	-ÖBFV-RL VB-01 -TRVB 137/03	"Die Löschwasserversorgung (Fire water supply)", Regulations issued by the Austrian Federal Fire Fighters' Association "Löschwasserbedarf (Fire water demand)" Technical regulations for preventive fire protection (in connection with ÖBFV-RL VB-05)
BEL	Annexe 6 - Bijlage 6	Law on Fire Safety Annexe 6 - Bijlage 6 Primary, secondary and tertiary water supply is described
BRA	Instrução Técnica 022/2010	„Sistema de hidrante e de mangotinhos para combate a incêndio“, Technical regulations of Sao Paulo fire service (applies only to the area of the city of Sao Paulo, no other national regulations are in force); Fire water supply in BRA is mostly from tanks
CAN	-Regional building codes -Guide to Recommended Practices	Fire Underwriters Survey (FSU)
CHE	Richtlinien für die Ausführung der Löschwasserversorgung u. d. Subventionen der GVZ	GVZ Gebäudeversicherung Kanton Zürich (Richtlinie des Versicherers)
CZE	ČSN 730873	Požární bezpečnost staveb – Zásobování požární vodou
DNK		No national standards, requirements of municipal councils
ESP	-Real Decreto 2267/2004 -(CTE): DB SI -UNE 23500 -Cepreven RT2 ABA	Reglamento de Seguridad Contra Incendios en Establecimientos Industriales Seguridad en caso de incendio, Código Técnico de la Edificación (CTE) Sistemas de Abastecimiento de Agua Contra Incendios Abastecimiento de Agua Contra Incendios
FRA	-Circulaire 1951/1957/1967 -AP SAD, NFPA, FM	Requirements of Fire Department: at least 980 l/min for 3 hours City of Paris: 2,000 up to 10,000 l/min, depending on risk can also be used
GBR	Water UK and LGA 2002	National guidance document on the provision of water for fire fighting
GER	-DVGW W405 -MIndBauRL -VdS 2034	Deutscher Verein des Gas- und Wasserfaches (German Association of gas and water specialists), Arbeitsblatt (worksheet) W405 Prototype industrial construction regulations GDV publication "Non-public fire departments" See also the HDI Risk Engineering Guideline "Fire water supply" in German!
GRC	Technical Chamber of Greece (1996)	At least 30 minutes at a level 750 to 7,200 l/min, depending on the risk category
ITA	-UNI 10779 -UNI EN 12849	Standards for Fire Fighting Water Supplies & Nets (Hydrants and Hose Connections; to be added eventual Fire Extinguishing Systems needs) Sprinkler demand of course (also NFPA can be used)
JPN	-Article No.2 -FDMA Bulletin No.7	Fire Service Act Fire & Disaster Management Agency (FDMA)
LUX	DVGW W405	no national guideline, but in dependence on German DVGW W405; at least 48 m ³ /h
NLD	KIWA Mededeling 50 (outdated)	Requirements of local fire department; at least 60 m ³
NZL	SNZ PAS 4509	New Zealand Fire Service Firefighting Water Supply Code of Practice
POL	Dz.U. 2009 nr 124 poz. 1030	Rozporządzenie Ministra Spraw Wewnętrznych i Administracji z dnia 24 lipca 2009 r. w sprawie przeciwpożarowego zaopatrzenia w wodę oraz dróg pożarowych
SVK	STN 92 0400	Požiarňa bezpečnosť stavieb : zásobovanie vodou na hasenie požiarov
SWE	VAV P83	Svenskt Vatten: Allmänna vattenledningsnät; Anvisningar för utformning, förnyelse och beräkning. (Guideline of Swedish Water & Wastewater Association)
USA	-NFPA 13 -NFPA 14 -NFPA 22 -NFPA 24 -NFPA 1141 -NFPA 1142 -ISO Needed Fire Flow Method	Standard for the installation of sprinkler systems Standard for the installation of standpipe and hose systems Standard for water tanks for private fire protection Standard for the installation of private fire service mains and their appurtenances Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas Standard on water supplies for suburban and rural fire fighting Guide for determination of needed fire flow Insurance Services Office (ISO), Jersey City
Europe	CFPA No. 18	"Fire Protection on chemical manufacturing sites (Fire Water Supply)", CFP Europe

Table 1: Regulations regarding fire water supply in different countries (this list does not claim to be complete!)

2 Necessary fire water supply.

2.1 Base protection

The base fire water supply is either regulated by law in some countries or standards and/or specifications have been issued by the fire protection agency in charge. Table 1 provides an overview of the regulations in force in some selected countries.

2.2 Determination of asset protection in industrial and trade locations

There is no generally applicable procedure for determining the asset protection fire water demand because many factors influence this calculation. These include:

- fire compartment size,
- operational and structural fire loads,
- alarms/fire department intervention time,
- fire department personnel and equipment,
- presence of fire protection systems.

Under favourable conditions, the base protection may be sufficient. If unfavourable factors such as very large fire compartments, high fire loads and long fire brigade intervention times prevail, the fire water demand can be substantially higher. However, it is essential to ensure that the fire brigade can handle and spread the additional fire water in the fire in the first place. If the fire brigade is not able to do so or if there are any doubts regarding this question, it makes more sense (and is often less expensive) to install automatic fire protection systems inside the buildings which fight a fire as early as in its development phase, making the use of large water quantities unnecessary.

Tables 2 and 5 provide an orientation for estimating the necessary asset protection. Depending on the fire load in each building type/use, fire water classes with a minimum fire water demand can be defined (table 2). These values have been derived from decades of experience in general firefighting and from experience with losses and partly match the well-known regulations relating to fire water supply, but partly go beyond these values (specific asset protection). Most trade sectors and branches of industry and/or uses can be assigned one fire water class in view

General object-related fire water requirements (guideline values)

Type of building, use	Occupancy	Area fire load equals approx. [kWh/m ²]	Fire water class	Approximate fire water demand during 3 h [m ³ /h]/ = [l/min]
Residential buildings/open development	Summer houses, small free-standing buildings, residential buildings ≤ 3 storeys	< 15	1	24-48/400-800
Residential and business buildings/closed development (core areas, mixed areas)	Business or trade buildings with 2 storeys max. and similar risks	15-30	2	96/1600
Trade companies (trade areas)	Large trade buildings, small industrial buildings with 3 storeys max. and similar risks	30-75	3	144/2400
Industrial companies Medium fire loads	Business and trade buildings with >3 storeys, industrial or storage buildings without excessively large fire compartments (up to 2,500 m ²) or similar	75-150	4	192/3200
Industrial companies High fire loads	Industrial and storage buildings with high fire loads and/or excessively large fire compartments (up to 4,000 m ²) or similar	150-300	5	240/4000
Industrial companies Very high fire loads	Industrial and storage buildings with very high fire loads and/or excessively large fire compartments (more than 4,000 m ²) or similar	>300	6	≥= 288/ ≥ = 4800
Trade and industrial companies with an automatic fire protection system	Automatic full-area fire protection system is available and recognized according to national or international standards	-	2	96/1600

Table 2: General total fire water demand (basic and object protection, guideline values) from a loss prevention point of view and derived from general experience with losses

of their typical fire load (across the entire area, table 5) which is to be taken as a guideline value. If the actual fire hazards/fire loads deviate from those typical in the branch in question, a lower or higher fire water class must be applied.

2.3 Fire department, special extinguishing agents

Besides an adequate quantity of water, it is naturally of major significance that the fire department that responds in the event of a fire has the personnel and the technical capacity to apply the water quantities purposefully onto the fire source or to protect the neighbourhood!

Even though water is the principal extinguishing agent, in certain cases special extinguishing agents such as foam, carbon dioxide or extinguishing powder may be required. This is the case if the combustible materials cannot be extinguished, or cannot be solely extinguished, due to special combustion behaviour or other properties. In agreement with the fire department, the required special extin-

guishing agents then usually need to be held at the company for the fire department to use.

3 Firefighting water withdrawal equipment.

3.1 Firefighting water supply locations

The following options are basically available for the supply of firefighting water:

- public or company water lines (with hydrants),
- firefighting water wells,
- firefighting water ponds, pools, tanks or cisterns,
- open bodies of water (rivers, harbour basins),
- others (sedimentation basins, cooling water reservoirs etc.).

Basically, all firefighting water points within a radius of 300 m (access distance) from the property, that can deliver their rated output for two to three hours, can be taken into consideration. As these distances may be too great for





the fire department's initial response, it is recommended to provide a supply point within 80 to 150 meters of the property. For a quick response the firefighting water points should have a hose couplings, that can be used by the local fire department.

3.2 Capacities of water lines and hydrants

The capacities of water lines and hydrants are depending on:

- diameter,
- pressure and distance from waterworks,
- kind of line system (ring system or ramification system/ dead ends),
- age of the line (deposits can reduce the diameter).

Water line	Approximate capacity of a ring system* at a pressure of			
	3 bar		5 bar	
80 mm	600 l/min	36 m ³ /h	1.000 l/min	60 m ³ /h
100 mm	1.000 l/min	60 m ³ /h	1.600 l/min	96 m ³ /h
125 mm	1.500 l/min	90 m ³ /h	2.500 l/min	150 m ³ /h
150 mm	2.100 l/min	126 m ³ /h	3.600 l/min	216 m ³ /h
200 mm	3.800 l/min	228 m ³ /h	6.300 l/min	378 m ³ /h
250 mm	5.900 l/min	354 m ³ /h	9.800 l/min	588 m ³ /h
300 mm	8.500 l/min	510 m ³ /h	14.000 l/min	840 m ³ /h

Table 3: Capacities of water lines (guideline values)

* In a ring system water can flow from two sides to the point of use (hydrant). In a ramification system (dead ends) only from one side, so the water supply is reduced down to 60% of the values of this table.

The usable water volumes mentioned in table 3 are only available in dependence on the number of hydrants. For technical data of several kinds of hydrants see table 4.

Kind of hydrant (mm diameter of pillar)	Approximate capacity*	
Underground hydrant 80 mm	800 l/min	48 m ³ /h
Pillar hydrant 80 mm	1.000 - 1.200 l/min	60 – 72 m ³ /h
Pillar hydrant 100 mm	1.300 - 1.500 l/min	78 – 90 m ³ /h
Pillar hydrant 150 mm	1.800 - 2.250 l/min	108 – 135 m ³ /h

Table 4: Capacities of hydrants (guideline values)

*In order to reach the mentioned values, there must be a water line with adequate diameter and pressure. Under fortunate conditions the values can be significantly higher. These values are conservative.

3.3 Regular testing and maintenance of hydrants

Public hydrants should be maintained and tested regularly, for example by the municipality, by the water supply company or by the fire department, depending on the country. Company hydrants must be regularly maintained and tested by the company. The following tests should occur in a cycle of about one year:

Above-ground and underground hydrants:

- accessibility,
- signage,
- fouling, corrosion on visible parts,
- correct seating and easy opening of the cover and of the road cap, winter-proofing (underground hydrant only).

Hydrant Signage To find obscured covers of underground hydrants (snow, parked vehicles)		
Germany (DIN 4066) and several European countries		H = hydrant 200 = diameter of water line in mm (to derive capacity)
Position/coordinates: 0,2 = 0.2 meter distance left of the sign	Position/coordinates: 1,8 = 1.8 meter distance in front of the sign	
United Kingdom Ireland		H = hydrant 75 = diameter of water line in mm (old: inch) (1 inch = 25 mm)
	Position/coordinates: 3.2 = 3.2 meters distance in front of the sign (old: feet)	1 m = 3,3 feet)
Other countries	"HYDRANT"	different layouts occur

- Integrity of the claws (underground hydrant only)
- Ease of access to the main shut-off (spindle)
- Output test (water supply)
- Flushing, seal, draining

4 Report on the firefighting water situation.

For the firefighting water supply for a given property, all the firefighting water supply points mentioned above within a radius of 300 m which are usable by the fire department, can be included. But the actual accessibility (access distance) to the source point must be used (e. g. a hydrant that is located at a distance of only 200 m, but is behind a heavily used railway line, cannot be included).

The calculation of the firefighting water situation locally consists of the following:

- In-house locating around the property,
- documentation from the water supply company and/or the city,
- information from the fire department and
- a survey of company members.

There may also be information in fire department property plans if these exist.

It may subsequently be necessary to obtain additional or missing information from the relevant water company or the fire department. See model letters to the city/municipality and water supply company in Annex 1.

5 References.

Local standards should be complied with.

Internationally recognised standards (see also table 1):

NFPA 1	Fire Code
NFPA 22	Standard for water tanks for private fire protection
NFPA 24	Standard for the installation of private fire service mains and their appurtenances
NFPA 1141	Standard fore fire protection infrastructure for land development in wildland, rural and suburban areas
NFPA 1142	Standard on water supplies for suburban and rural fire fighting
Australian standard AS 2118	Automatic fire sprinkler systems

Specific standards (Best practice):

DIN EN 13501	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
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Annex 1 Sample letter to the city/municipality and water works

to obtain information about the supply of firefighting water through the public water supply.

To the
city/municipality....
-regulatory agency/water company-
1 High Street
12345 Anytown

Re: Availability of firefighting water for the property situated at 2 High Street in 12345 Anytown

Dear Sirs,

To assist with a fire protection risk analysis by our fire insurer, we would like to request information regarding the existing firefighting water situation. We are particularly interested in

- what nominal diameter (DN) and what (static) pressure the public water supply lines in a radius of about 300 m from the above property have.
- how many and what type of hydrants (underground/above-ground, nominal widths) are available to the fire department within a radius of about 300 m (with a location sketch, please).
- whether further firefighting water supply options exist within a radius of about 300 m, either on public land or on private neighbouring areas, such as wells, tanks, swimming pools, ponds, watercourses, harbour basins, etc., which are usable year-round by the fire department, and what are their capacities (l/min or m³) for what time periods (with location sketch, if possible).
- what maximum total firefighting water flow rate (l/min) can be drawn from the public supply and from other firefighting water sources by the fire department in the event of a fire (is a pressure increase in the network in the event of fire required and/or possible?).
- whether the above total water flow is a theoretically calculated one, or a measured value, which was determined e.g. in the course of a fire department exercise.
- whether, and to what extent, the firefighting water supply might be compromised, under particular circumstances, (seasonal variations, heavy users etc.).
- at what intervals and by whom the existing firefighting water supply points, particularly the hydrants, are checked for proper operation and for completeness (e.g. hydrant signs), and who is assigned to correct any deficiencies.

We would be extremely grateful to you for detailed information in response to the above questions, as it may contribute to a more positive risk rating by the insurer. Your information will be treated confidentially by us and will be used to assist us in obtaining an overview of the fire protective measures available in the event of fire for the company property.

Many thanks for your cooperation!

Best regards

Annex 2 Fire water classes

Use/occupancy	class
Office, administration	
Office/administration building with a low fire hazard	3
Office/administration building with a medium fire hazard	4
Office/administration building with a high fire hazard	5
Trade and stores	
Department stores, retail trade with selling and storage areas of > 2,000 m ²	6
Mail-order companies	6
Central purchasing companies for retail traders	6
Department stores, shopping centres, cooperative department stores and consumers' markets	6
Stores with a very low hazard	1
Stores with a low hazard	4
Stores with a medium hazard	5
Stores with a higher hazard	6
Stores with maximum hazard	6
Special stores	6
Cooling stores < 0°C	6
Raw materials exploitation, mining, oil, salt	
Ores - mining and processing	3
Ores - smelting (except for Fe)	4
Ores - direct reduction	3
Coking plant	4
Pig iron production	3
Steel production	3
Further processing	3
Hard coal - mining and processing	4
Hard coal - briquetting	5
Brown coal - mining and processing	4
Brown coal - briquetting	5
Salt	3
Natural oil, natural gas, drilling and conveying systems	6
Turf	6
Further processing of raw materials, ceramics, glass	
Minerals - mining and processing	1
Minerals - treatment	3
Minerals - processing of gravel and slag	1
Minerals - processing (gravel, tarred chippings, slag)	5
Minerals - production of cement, lime, gypsum etc. with a kiln	3
Minerals - production of cement, lime, gypsum etc. without a kiln	2
Minerals - production of cement, clay and gypsum products without a kiln	2
Fine ceramics	4
Fine ceramics including the use of foaming plastics	5
Fine ceramics, but without using wooden racks	3
Coarse ceramics	3
Coarse ceramics, but including the use of foaming plastics	4
Hollow glass - production and processing	3

Further processing of cooled-down hollow glass	4
Flat glass - production and processing	3
Further processing of cooled-down flat glass	1
Glass fibres - production and processing	3
Glass fibres - production and proc., but with use of foaming plastics	4
Further processing of cooled-down glass fibres	4
Further processing of cooled-down glass fibres, use of plastics	4
Abrasives, abrasive devices	5
Abrasives, abrasive devices if no easily flammable feedstock is used	4
Slags, rock wool	3
Metalworking and electric industry operations	
Foundry	3
Non-ferrous metals foundries > 1,000°C	3
Foundries < 1,000°	3
Light metal (pressure) foundry	3
Rough metalworking - forging, pressing, hammering operations, wires	3
Rough metalworking - with increased hazard due to electroplating, powder coating, painting, hardening	3
Forging, pressing and hammering operations with oil-hydraulic drives	3
Forging, pressing and hammering operations with oil-hydraulic drives and installations increasing the hazard	3
Other rough metalworking	3
Other rough metalworking with increased hazard due to electroplating, powder coating, painting, hardening shop	3
Other rough metalworking (refrigerators and furniture when using foamed plastics)	5
Electroplating, pickling	5
Hardening shop	4
Cold-rolling mills	3
Precision metalworking	4
Gold, silver and jewellery	3
Electric and electronic products, large-scale machinery	4
See above - small machinery, devices, apparatus, EDVA	5
Communication equipment, IT systems, home entertainment, cameras - Production and final assembly	5
Semiconductor production	6
Wafer production	4
Solar cells production	4
Electric and electronic components	4
Battery production	5
Cables and lines production	5
Vehicles - watercraft, made of metal for the most part	3
Watercraft made of plastics for the most part	5
Vehicles - Cars, lorries, rail vehicles, made of metal for the most part	5
Vehicles made of plastics for the most part	5
Vehicles, aircraft, made of metal for the most part	4
Watercraft made of plastics for the most part	5
Chemical operations, plastics	
Oil refineries, petrochemical plants	6
Inorganic and organic chemistry operations	6

Webs, strips, films, moulded parts, laminates, coatings made of unfoamed plastics	6
Webs, ... when using no easily flammable or explosion-hazardous substances	6
Coating of substrates with bitumen	6
Injection moulding and extrusion products, casting and centrifugal casting products	6
Treatment of unfoamed plastics	6
Polyester (including glass fibre-reinforced)	5
Polyester (including glass fibre-reinforced), in production/use of substances tending to self-ignite	5
Foamed plastics and foamed rubber	6
Foamed plastics and foamed rubber, when using no easily flammable or explosion-hazardous substances	5
Slab production including further processing	6
Slab production including further processing when using no easily flammable or explosion-hazardous substances	6
Colorants, pigments and dyestuffs	4
Colorants, pigments and dyestuffs when using no easily flammable or explosion-hazardous substances	3
Colorants etc., including production/use of substances tending to self-ignite	4
Colorants etc., including production/use of peroxides	4
Varnishes, paints and printing inks	5
Varnishes, paints and printing inks, when using no easily flammable or explosion-hazardous substances	4
Varnishes, paints and printing inks including production/use of explosives	5
Vegetable fat and oil, candles	6
Vegetable fat and oil, candles, when using no easily flammable or explosion-hazardous substances	6
Production of bio-diesel fuel	6
Soaps and cleaning agents	5
Soaps and cleaning agents, when using no easily flammable or explosion-hazardous substances	4
Soaps and cleaning agents, including production/use of substances tending to self-ignite	5
Soaps and cleaning agents, including production/use of peroxides	5
Adhesives	6
Adhesives, when using no easily flammable or explosion-hazardous substances	5
Adhesives, including production/use of substances tending to self-ignite	6
Adhesives, including production/use of peroxides	6
Pharmaceutical and cosmetic products	4
Pharmaceutical and cosmetic products, when using no easily flammable or explosion-hazardous substances	4
Pharmaceutical and cosmetic products, at pressure levels above 200 bar or temperatures above 500°C	4
Pharmaceutical and cosmetic products, including production/use of substances tending to self-ignite	4
Pharmaceutical and cosmetic products, including production/use of peroxides	4
Research institutes and laboratories	5
Research institutes and laboratories, when using no easily flammable or explosion-hazardous substances	4
Research institutes and laboratories, at pressure levels above 200 bars or temp. above 500°C	4

Research institutes and laboratories, including production/use of substances tending to self-ignite	5
Research institutes and laboratories, including production/use of peroxides	5
Research institutes and laboratories, including production/use of explosives	3
Textile industry operations	
Treatment of textile waste	6
Cotton wool, felt and fleece materials	5
Spinning mills	5
Weaving mills when using natural fibre yarns	5
Weaving mills using artificial fibre yarns exclusively	6
Textile floor coverings	6
Treatment and refinement	5
Processing of yarns	4
Confectioning operations	5
Bedding, mattresses, upholstery	4
Bedding, mattresses, upholstery (including the use of foamed plastics and foamed rubber)	6
Laundries, ironing, chemical cleaning	5
Artificial silk, cellular wool	5
Production of fully synthetic fibres	5
Leather, rubber and paper processing	
Leather production	4
Leather processing - shoes	5
Leather processing - other leather articles	4
Production of rubber products	5
Paper production - semi-finished product	3
Paper production - wood processing, wood store, chip production	5
Paper production - paper, cardboard	3
Paper production - paper, cardboard (including corrugated cardboard and vulcanized fibre)	6
Printing house without use of easily flammable printing inks (e.g. offset printing)	5
(Gravure) Printing house with use of easily flammable printing inks	5
Bookbinder's shop	5
Waste paper/rag sorting/pressing shop	6
Wood processing	
Sawmills	5
Veneers, plywood	6
Pressed boards - wood chip and wood fibre plates	5
Pressed boards - magnesite- or cement-bound boards	4
Production of wood furniture	5
Production of upholstered furniture	6
Other wood processing	5
Production of pencils	6
Production and processing of foodstuffs	
Grain mills	4
Coarse meal, barley and shelling mills	4
Sugar	5
Malt house	4
Malt house with grain processing	4

Brewery	4
Brewery with filling into plastic bottles	4
Spirit, alcohol, brandy, liqueur etc.	4
Wine and non-alcoholic beverages	3
Wine and non-alcoholic beverages with filling into plastic bottles	4
Vinegar, mustard	4
Starch	4
Dry ready-to-serve dishes	5
Potato products	4
Potato products including deep-frying	5
Dairy, cheese dairy, ice cream (including dry powder production)	4
Margarine, edible fat	6
Baked food	5
Pasta	4
Sweets (sugar products, chocolate)	5
Sweets (jam, syrup)	4
Canned foods, deep-frozen foods (fruit, vegetables, delicatessen)	3
Canned foods, deep-frozen foods (meat, sausage and fish products)	5
Slaughterhouses	4
Coffee	5
Concentrated feed - fish and mean meal, secondary products	5
Concentrated feed - substitute feed based on skimmed milk and others	4
Concentrated feed - others	6
Tobacco, cigarettes, cigars	4
Communal and other operations	
Power stations, water-driven	3
Power stations, steam-driven	3
Transformers, converters, outdoor stations	4
District heating plants	4
Block-type thermal power station	3
Block-type thermal power station with biogas production	3
Waste incineration plants	6
Composting plants	3
Boiler houses and powerhouses	5
Free-standing cooling towers	6
Regenerative energy generation: Solar plants (photovoltaic plants)	3
Regenerative energy generation: Wind power plants onshore and offshore	6
Gas plants	3
Waterworks	2
Sewage treatment plants	1
IT centres	5
Radio and TV broadcasting companies	5
Film studios and copying companies	5
Exhibitions, museum	5
Fairs	6
Hospitals	5
Hotels	5
Car repair company	5
Car care company	4

Paint shops	4
Vehicle fleet and railroad operations	5
Gliders	5
Aircraft engines	5
Aircraft hangars	5
Aircraft repair and maintenance	5
Airport operations	5
Building and civil engineering, road construction including site cabins and others	5
Valuable substance recycling Classification/sorting/treatment of unsorted mixtures (waste sorting)	6
Valuable substance recycling Treatment of sorted substances	5
Valuable substance recycling Dismounting of products into components	5

Table 5: Assignment of fire water classed to sectors

About HDI Risk Consulting.

HDI Risk Consulting GmbH supports major corporations, industrial and mid-size companies with loss prevention and in establishing risk management systems.

HDI Risk Consulting offers its' customers access to some 180 engineers and experts from a wide range of technical disciplines. We aim to support companies with the management of risks and the development of individual risk-based concepts for insurance cover.

HDI Risk Consulting operates globally in the Property, Motor, Engineering and Marine markets, with particular focus on the identification and assessment of risks and the development of appropriate, individual protection concepts.

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