Incentive for Sprinklers in Turkey

The Turkish Fire Protection Association, TUYAK, has produced an English translation of the Turkish "Regulation about Fire Protection of Buildings", published in the Official Journal No. 26735 of 19.12.2007 and its amendment published in the Official journal No 27344 on 09.09.2009. There are many requirements and incentives for sprinklers.

Excerpts from the translation are reproduced below:

CHAPTER TWO
General Provisions on Fire Safety of the Buildings

THIRD SECTION
Fire Compartments, Walls, Floors, Facades and Roofs

Facades

ARTICLE 27 (1) … In order to prevent the spread of fire from one storey to another through unprotected openings between the two storeys such as windows, a surface, which is filled with fire resistant façade elements, at minimum 100 cm height in vertical axis shall be provided, or the façade shall be protected by means of an automatic sprinkler system by locating sprinkler heads inside the façade maximum 1.5 m away from the façade, leaving maximum 2 m distance between the heads.

CHAPTER THREE
Escape, Escape Stairs and Special Cases

THIRD SECTION
Escape Stairs

Emergency exit obligation

ARTICLE 39- (3) The exit doors must be remote from each other to the maximum extent possible. In single non-separated spaces, if two exits are necessary, the distance between the doors cannot be less than ½ of the diagonal distance of exits in there is no sprinkler system and cannot be less than 1/3 of the diagonal distance of exits if there is a sprinkler system.

(4) In building occupation classes where exit distances are measured from the door, the distance between 2 escape stairs in a corridor cannot be less than the half of the length of the corridor without a sprinkler system and cannot le less than 1/3 of the length of the corridor with a sprinkler system.

Escape stair specifications

ARTICLE 41- (2) In situations where the escape stair serves more than one floor and it ends in a circulation space such as a hall, corridor, lounge of lobby where the exit on the ground level can be seen and no obstructions are blocking this exit, the distance between the point where the escape stair ends and open-air areas shall not exceed 10 m. In buildings having a sprinkler system, this distance shall be maximum 15 m.

FOURTH SECTION
Special Arrangements According to Building Use Classes

Dwellings

ARTICLE 48- (1) In dwellings not exceeding four floors including the basement storeys besides the buildings such as single houses, double houses and terraced houses, and in buildings serving a single use purpose or in a separated section of such a building, escape can be provided via normal stairs regardless of the escape distance. There is no other requirement for this type of stairs.

(2) Except of the dwellings stated in the first paragraph, the distance from any point in the dwelling to the exit door shall not exceed 20m, in dwellings with a sprinkler system, it shall not exceed 30 m.

Hotels, motels and dormitories

ARTICLE 50- (3) In the hotel bed room or in the suite room, in case the distance measured from the furthest point inside it to the exit door does not exceed 15 m, one exit door is considered sufficient. However:

a) In the hotel bed room or in the suite room, in case the distance measured from the furthest point inside it to the exit door exceeds 15 m, there must be a minimum 2 exit doors which are located far away from each other.

b) In the bed rooms or the suite rooms of those hotels which are completely equipped with sprinkler system, the distance measured from the furthest point inside the room to the door must not exceed 20 m.

CHAPTER FOUR
Regulations Related to Building Sections and Facilities

FIFTH SECTION
Shelters, Parking Spaces and Roofs

Parking Spaces

ARTICLE 60- (1) … In indoor car parks with a total area larger than 600m^2, it is obligatory to install an automatic sprinkler system, fire cabinets and water inlets.

SEVENTH SECTION
Lightning Prevention System, Transformer and Generator

Transformer

ARTICLE 65- (2) In case oil filled transformer is used;

c) Automatic fire detection and extinguishing system in a suitable type shall be installed.

CHAPTER FIVE
Electrical Installation and Systems

FOURTH SECTION
Fire Detection and Alarm Systems

Detection and alarm system

ARTICLE 75 (7) If there is an automatic sprinkler system in the building, necessary arrangements must be made in order to provide fire detection system to detect automatically that the sprinkler head is open. For this purpose, flow switches are installed in each zone line and contact outputs belong to these flow switches are connected to fire alarm system as inputs. The places with an automatic sprinkler system are considered as that they have equipped with automatic temperature detectors. In such places, it is not obligatory to use automatic temperature rise detectors.

Sprinkler system alarm stations

ARTICLE 78- (1) If a sprinkler system or automatic detection system is installed in a building, sprinkler system alarm stations and flow switches shall be connected to the fire alarm system. Alarms coming from sprinkler systems shall be monitored from an individual local monitoring panel or from the fire control panel by creating individual local alarm indicators. Also, monitoring switches belong to line cut-off valves and other failure switches related to sprinkler system must be controlled continuously by the fire alarm system in the same way.

CHAPTER SEVEN
Fire Extinguishing Systems

SECOND SECTION
Water Suppression System

Water tanks and water supplies

ARTICLE 92- (1) There must be at least one safe water supply in the system.

(2) The sections of the water tanks to be used for water suppression systems, which are separated as fire reserves must not be used for other purposes and shall be built in a way to serve only to the water suppression systems only.

(3) In the design of the water suppression systems, the building classes given in article 19 shall be taken into account. The required volume of the water tank shall be designed to supply water for at least 30 minutes for low risk situations, 60 minutes for medium risk situations and 90 minutes for high risk situations.

(4) The water tank volume of the water suppression systems with a sprinkler system, fire cabinet and hydrant system may be calculated by taking the data in the table in Annex-8/A for the preliminary calculation or according to the method given in the fifth paragraph. When using the table, the height value is the highest level of a sprinkler head installed in the system. If the water tank volume is calculated through hydraulic calculation, the tank volume found by use of hydraulic calculation method shall be taken as the basis.

(5) Preliminary dimensions for the water tank volume can be calculated as by multiplying the time specified in the third paragraph based on the risk class with the value found by adding fire cabinet water flow rate specified in Annex-8/C and the hydrant flow rate, if any, to the sprinkler system flow rate calculated according to the Annex-8/B.

Fire pumps

ARTICLE 93- (1) Fire pumps; they are the pumps which supply pressurized water for the water suppression systems and are defined with nominal flow rate and nominal pressure values. The closed valve head (zero flow rate) must be maximum 140% of the nominal head and the head at 150% must not be lower than the 65% of the nominal head. Such pumps can be used for system

requirements with a capacity 130% of their nominal flow rate providing required pressure.

(2) In cases that one pump is used in the system, a stand-by pump with the same capacity is required. If the number of pumps is more than one, sufficient number of stand-by pumps shall be used, provided that minimum 50% of the total capacity is stand-by reserve.

(3) Pump rotation can be provided through an electric motor or internal combustion engine or turbine.

(4) In case that stand-by diesel engine driven pumps are not used, the power shall be supplied from a safe source which is independent from the building's electrical system used for general purposes.

(5) Fire pumps must have auxiliary elements such as air release valve and circulation relief valves.

(6) Each pump must have an individual control panel which is locked. Electric control panel, phase error, phase-sequence error and phase control error must be equipped with information lights. The main circuit breaker of the panel must not be accessible without unlocking the panel.

(7) Each pump must have an individual pressure control switch. Pressure switches; must be mounted inside the panel and must be capable of sensing the water pressure through pipe connections, having water hammer protection with individual and independent upper and lower limit adjustment, lockable after adjustments.

(8) The pump can be pressure-controlled type; full or semi-automatic.

(9) In the pump room or pump station, necessary instruments shall be supplied in order to provide a continuous temperature level of +4 °C for electric motor driven pumps and +10 °C for diesel engine driven pumps.

(10) In the pump station emergency lighting shall be provided in the vicinity of all equipment requiring service, examination and adjustment.

(11) Sufficient inclination shall be provided on the floor for drainage purposes, to prevent water from entering into critical equipment such as driver and control panel.

Fixed piping system and fire cabinets

ARTICLE 94- (1) b) 2) Fire cabinets are located at each floor level, in each section separated by fire walls and in maximum 30 m distance to each other. … In case the building is protected with a sprinkler system and firefighting inlets

are installed at all floor levels, the fire cabinets may be fed from wet sprinkler branch line and the distance between them may be up to 45 m.

Sprinkler system

ARTICLE 96- (1) The purpose of the sprinkler system; to provide early response to the fire and to pour water in determined quantity on the design area within a certain time interval in order to bring the fire under control and extinguish it. The sprinkler system, in addition, may also activate some emergency functions such as alarming the people inside the building and calling the fire department. The sprinkler system; it is consisting of components such as sprinkler heads, pipes, connecting parts and hangers, piping control valves, alarm sirens, flow indicators, water pumps and emergency power supply unit. The sprinkler system components must comply with TS EN 12259.

(2) In the places given below, it is obligatory to install an automatic sprinkler system:

a) In all buildings with a height exceeding 30.50m, except of dwellings,

b) In dwellings with a building height exceeding 51.50m,

c) In the indoor car parks where the sum of surface areas exceeds 600m^2 and in garages where more than 10 vehicles are taken into the garage through an elevator,

ç) In hotels, dormitories, boarding houses, guest houses where the number of bedrooms is over 100 or the number of beds is over 200, in one building with more than one storey, and in all accommodation buildings with a height exceeding 21.50m,

d) In multi-storey stores and in shopping commercial and entertainment venues having a total area exceeding 2000m^2,

e) In buildings where easily ignitable and flammable materials are contained and having a total area exceeding 1000m2,

(3) The sprinkler system may not be installed in wet areas which do not contain combustible materials or where such materials are not stored, stairwells which do not contain combustible materials or separated by construction elements resistant to fire, lift shaft and the spaces that are protected with gaseous, dry powder, water spray and other automatic fire extinguishing systems.

(4) The sprinkler system are not required in spaces where water-expanding materials or materials which may cause fire growth through reacting with the fire are contained.

(5) The design of the sprinkler system must comply with TS EN 12845. The locations of the sprinkler heads are determined by considering the risk class of the area of use and the protection area of the sprinkler head. In Low Risk and Medium Risk 1 use areas, a standard sprinkler head can be located for protecting a maximum area of $21m^2$.

(6) In first and second degree seismic zones, it is required to use four-way supports in order to prevent the rising mains from drifting in any direction due to seismic movements. Provide flexible couplings for pipe connections with a nominal diameter of 65mm or higher at the connection points to the main distribution pipes, and use two-way mounting brackets to fix the pipes to the ceiling in longitudinal and latitudinal directions in order to prevent pipes from breaking. At building dilatation passages, the details which will maintain movements in three dimensions shall be applied.

(7) If the main supply pipe of the sprinkler system is used for more than one fire zone, each zone or column line shall be equipped with flow switches, test cocks, drainage valves and line cut-off valves with monitoring switches.

(8) In case of a probable small fires, if a sprinkler head is broken or some of them are damaged, these shall be replaced immediately, and for providing sustainability of the fire safety system, sufficient number of spare sprinkler heads, providing a minimum number for spare heads of 6, and special wrenches for replacement of the heads shall be supplied.

(9) Cut-off valves shall be supplied in the pipes feeding the sprinkler system. Necessary measures must be taken to keep the valves in the pipes, zone control valves and all valves between the water supply and the sprinkler system in the open position.

(10) In case that pressure reducing valves are used in the system, 1 manometer shall be installed at both inlet and outlet sides of each pressure reducing valve.

CHAPTER TEN
Provisions Applicable for Existing Buildings

SECTION TWO
Special Provisions for Existing Buildings

Sprinkler system

ARTICLE 165- (1) In existing buildings, sprinkler systems shall be provided in below stated areas, provided that provisions of Article 96 remain valid:

a) In all buildings where the height of the building exceeds 30.50 m, except for residential and office buildings,

b) In office buildings where building height exceeds 51.50 m,

c) In parking garages where total area is larger than 1000 m^2 and parking garages where more than 10 cars are allowed in elevators,

ç) In hotels, boarding houses and guest houses where number of beds exceeds 200 in a building with more than two storeys,

d) In multi-storey stores, shopping malls, entertainment and meeting facilities where the construction area is larger than 3000 m^2.

e) Unless otherwise specified, storage areas in multi-storey buildings where easily inflammable materials are stored and where the total enclosed area does not exceed 2000 m^2 in basements and 4000 m^2 in other floors.

Appendix-3/C Fire Resistance Periods According to Building Occupancy Classes

Occupancy Classes		Fire Resistance Periods of Construction Materials (min)					
		Basement Floors (flooring above included)		Ground or Upper Floors			
		Depth of Basement Floors (m)		Building Height (m)			
		More than 10m	Less than 10m	Less than 5m	Less than 21.50m	Less than 30.50m	More than 30.50m
1. Dwellings	a) Houses with one or two families	---	30	30	60	---	---
	b) Apartments	90	60	30	60	90	120
2. Buildings with accommodation purpose							
- without sprinkler system		90	60	60	60	90	Not allowed
- with sprinkler system		60	60	30	60	60	120
3. Institutional Buildings							
- without sprinkler system		90	60	60	60	90	Not allowed
- with sprinkler system		60	60	30	60	90	120
4. Office Buildings							
- without sprinkler system		90	60	60	60	90	Not allowed
- with sprinkler system		60	60	30	60	60	120
5. Commercial Buildings							
- without sprinkler system		90	60	60	60	90	Not allowed
- with sprinkler system		60	60	30	60	60	120
6. Industrial Buildings							
- without sprinkler system		120	90	60	90	120	Not allowed
- with sprinkler system		90	60	30	60	90	120
7. Buildings used with purpose of meeting							
- without sprinkler system		90	60	60	60	90	Not allowed
- with sprinkler system		60	60	30	60	60	120
8. Facilities used with purpose of storage							
a) Warehouses							
- without sprinkler system		120	90	60	90	120	Not allowed
- with sprinkler system		90	60	30	60	90	120
b) Parking spaces							
- Open parking spaces		---	---	15	15	15	60
- Closed parking spaces		90	60	30	60	90	120

Appendix-4 Maximum Compartment Areas in Buildings

Building occupancy classes			Maximum compartment area (m^2)
1	Dwellings		Unlimited
2	Accommodation		4000 (1)
3	Institutional Buildings	Buildings with purpose of health care	1500 (1)
		Educational facilities	6000 (2)
4	Office Buildings		8000 (1)
5	Commercial Buildings (4)		2000 (2)
6	Buildings used with the purpose of meeting	Eating drinking	4000 (2)
		Entertainment	
		Museums and exhibition places	
		Other buildings used with the purpose of meeting	6000 (2)
7	Industrial Buildings	Moderate risk-3 and above (See Appendix-1)	6000 (2)
		Moderate risk-1 and Moderate risk-2 (See Appendix-1)	15000 (3)
8	a) Warehouses	Moderate risk-3 and above (See Appendix-1)	1000 (2)
		Moderate risk-1 and Moderate risk-2 (See Appendix-1)	5000 (3)
	b) Parking garages		No limitation

NOTES

(1) If relevant fire control systems are installed in buildings (automatic detection, sprinkler system, smoke release systems and similar), the area of compartment may be increased to two fold.

(2) If relevant fire control systems are installed in buildings (automatic detection, sprinkler system, smoke release systems and similar), the area of compartment is unlimited.

(3) There is not any limitation if the building is single-storey. If relevant fire control systems are installed in buildings (automatic detection, sprinkler system, smoke release systems and similar), the area of compartment is unlimited.

(4) Except for fruit and vegetable wholesale market halls, fish markets, places where there are metal spare parts and similar places.

Appendix-14 Maximum Emergency Escape Distances Leading to Exits

Occupancy Class	Maximum one-way distance (m)		Maximum two-way distance (m)	
	Without sprinkler system	With sprinkler system	Without sprinkler system	With sprinkler system
High Risk Places	10	20	20	35
Industrial Buildings(1)	15	25	30	60
Dormitories, Sleeping Quarters	15	30	45	75
Stores, Shops, Markets	15	25	45	60
Office Buildings	15	30	45	75
Car Parks and Storages(1)	15	25	45	60
School and Educational Buildings	15	30	45	75
Buildings used with meeting purposes	15	25	45	60
Hospital, Nursing Homes	15	25	30	45
Hotels, Hostels	15	20	30	45
Apartments	15	30	30	75

(1) Distance to industrial plants where easily inflammable materials are not produced, distance may be increased up to 2 fold.