GW–S Automatic Sprinkler
Sprinkler world terminology
……. what does it mean?

GW SPRINKLER A/S

STYLE / TYPE
Sprinkler heads come in various style/types, depending on their application and installation.

CU/P: also known as “Old Style”, stands for *Conventional Upright/Pendent*, and can be installed both in the upright (above pipe) and pendent (below pipe) position. It generates a spherical spray pattern where ~60% of the water is distributed in the flow direction and ~40% is reversed by the deflector. It is typically used where there is a requirement for wetting the ceiling and cooling of hot gasses under the ceiling.

SSP: stands for *Sprinkler Spray Pendent*. This type is always installed in the pendent position, pointing downwards from below the pipe. It generates a conical spray pattern with a spray angle of ~140°. Typically used in ceilings, where the pipework is hidden.

SSU: stands for *Sprinkler Spray Upright*. This type is always installed in the upright position, pointing upwards from above the pipe. It generates a reverse action spray where all water is redirected from the deflector to form an umbrella shaped reverse spray.

WUP: stands for *Wall Upright/Pendent*. This type is similar to the CU/P and can be installed both in the upright (above pipe) and pendent (below pipe) position. It is intended for installation close to the wall. The asymmetric shape of the deflector ensures that water is distributed 180° onto and downwards the wall – and 180° into the room.

WHEC: stands for *Wall Horizonal Extended Coverage*. This type is always installed in the horizontal position, penetrating from the wall. Typical application is hotel rooms etc.

HSW: stands for *Horizontal Sealed Window drencher*. This type is always installed in the horizontal position above and away from window/glazing surfaces. The special deflector design generates a reverse spray that will both provide a uniform “water run down” on the glazing surface, and a heat shielding water curtain in front of the glass surface.

SIZE
Sprinkler heads come in various sizes and are typically denominated by the size of the threaded connection.

10mm BSPT (3/8”)	is the smallest size
15mm BSPT (1/2”)	is the medium size, and most commonly used.
20mm BSPT (3/4)	is the largest size

BSPT (British Standard Pipe Taper) is the norm pipe thread in Europe, and the standard thread on GW-S sprinklers. NPT (National Pipe Thread Taper) is the US standard for tapered threads. Sprinklers can be manufactured with this type thread on special request.

K-FACTOR
The K-factor is a “constant” that expresses the flow performance of the sprinkler head. It is determined by the size and shape of the internal waterway and water exit orifice (bore diameter). Sprinkler K-factors are internationally standardized:

K57	is the smallest	and normally the standard in 10mm sprinklers .
K80	is the medium	and normally the standard in 15mm sprinklers
K115	is the largest	and normally the standard in 20mm sprinklers

The metric unit for K-factor is: LPM / $\sqrt{bar}$

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The K-factor is one of the most important numbers when it comes to performance design (hydraulic calculation) of the sprinkler system, and is used to determine flow or pressure requirements, based on the formula:

$Q = K \times \sqrt{P}$

Where:

Q = flow (liters/minute)
K = sprinkler K-factor (metric)
P = water pressure at sprinkler inlet (barg)

As can be taken form the above relation, the K-factor number expresses how much water (liters/minute) will flow through the sprinkler orifice when subject to 1 barg inlet pressure.

It must be noted that imperial (US) units for K-factor are different than the above and based on GPM and PSI units and should never be interchanged. K-factor conversion metric to imperial: divide by 14,37.

RTI
RTI stands for Response Time Index and is a measure of the speed with which heat transfer occurs from the hot air to the glass bulb (heat responsive element). The RTI unit is $ms^{½}$ and is an indicator for the thermal sensitivity of the sprinkler.

THERMAL RESPONSE
Sprinkler heads come with various types of thermal response, depending on the type of glass bulb fitted in the sprinkler. The thermal response is linked to the RTI and classifies the sprinkler into the following groups, depending on how quickly they operate after having reached the operating temperature:

QR (quick response)	0 < RTI < 50
RS (special response)	50 < RTI < 80
SR (standard response A)	100 < RTI < 200
SR (standard response B)	200 < RTI < 350

Upon having reached the desired operating temperature, an approximate 30 seconds to 4 minute time lag will follow before the glass bulb actually shatters. Standard response sprinklers operate closer to the 3-4 minute mark while quick response sprinklers operate in significantly shorter periods.
It is important to notice that the response time is independent of operating temperature. A quicker responding sprinkler will not activate at a lower temperature than a comparable standard sprinkler head.

The thermal response is typically directly linked to the dimension (diameter) of the glass bulb. As a rule of thumb the following relation between bulb diameter (Ø) and thermal response class can be expected:

QR (quick response)	Ø = 3 mm
RS (special response)	Ø = 4 mm
SR (standard response A)	Ø = 5 mm
SR (standard response B)	Ø = +8 mm

OPERATING TEMPERATURE
The operating temperature of a sprinkler is determined by the temperature rating of the glass bulb fitted. The glass bulb is filled with an alcohol fluid and contains a small air bubble. The small air bubble within the glass bulb determines the activating temperature of the sprinkler. As heat expands the fluid, the air bubble is compressed and absorbed. When the bubble disappears the pressure rises rapidly until the bulb shatters. The larger the air bubble the longer it takes before the sprinkler activates.

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The operating temperature should be selected so to avoid unintended activation and a rule of thumb is to install sprinklers with nominal operating temperature 20-30 °C above expected normal peak temperature.
The sprinkler head glass bulbs are color coded to reflect their nominal operating temperature:

Temperature Rating		Color of Fluid Within Bulb	
Celcius	Fahrenheit		
57	135	Orange	
68	155	Red	
79	174	Yellow	
93	200	Green	
141	286	Blue	
182	360	Mauve	
227 / 260	440 / 500	Black	

MATERIAL
The standard base material used for fire sprinklers is brass, which provides a robust, ductile and fairly corrosion resistant product suitable for most in-door and public applications.

Where automatic sprinkler heads are required for protection of harsh industrial and off-shore environments, corrosion resistant materials are offered – such as: nickel aluminium bronze, SS316 stainless steel, SMO (6Mo) stainless steel and titanium.

PLATING
For improved appearance and corrosion resistance brass sprinklers can be chrome plated or electroless nickel plated (ENP).

COLORED SPRINKLERS
To blend perfectly in with the surroundings and satisfy the highest architect standards, the sprinkler heads can be epoxy powder coated in any RAL color.
Note: it is prohibited to apply any kind of paint to the sprinklers after they have left the factory.

APPROVALS
Sprinkler heads are life saving products and manufactured to the most rigid internationally recognized standards.
Only tested and approved sprinklers should ever be installed to guarantee maximum operational reliability.
GW-S sprinkler heads are tested annually by international approval bodies, and hold listings by:

VdS	VKF	LPCB	FM	CE
VdS (Germany)	VKF (Swizerland)	LPCB (UK)	FM (USA)	CE to EN12259-1

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