HOW TO SELECT A SPRINKLER

BASICS

V 001.02 - SEPTEMBER 2016

NETAFIM™
GROW MORE WITH LESS

NOTE
All the drawings in this document are for the purpose of illustration only. The actual product details and infrastructure conditions may differ in any actual application.

FOREIGN LANGUAGES
If you are reading this manual in a language other than the English language, you acknowledge and agree that the English language version shall prevail in any case of inconsistency or contradiction in interpretation or translation.

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INTRODUCTION

Use of symbols

The symbols used in this manual refer to the following:

WARNING
The following text contains instructions aimed at preventing bodily injury or direct damage to the crops, the product and/or the infrastructure.

CAUTION
The following text contains instructions aimed at preventing unwanted system operation, installation or conditions that, if not followed, might void the warranty.

ATTENTION
The following text contains instructions aimed at enhancing the effective use of the instructions in the manual.

NOTE
The following text contains instructions aimed at emphasizing certain aspects of the installation or operation of the product.

SAFETY FOOTWEAR
The following text contains instructions aimed at preventing foot injury.

TIP
The following text provides clarification, tips or useful information.

INTRODUCTION

Aim of this document

The aim of this document is to guide the user through the selection of a sprinkler for various applications.

Special attention has been given to exlaining the terms and concepts relevant to the selection of the proper sprinkler according to the crop needs and the grower's objectives.

Safety

- All applicable safety instructions and regulations must be observed and applied.
- The effectiveness of the equipment may be jeopardized or impaired if the equipment is used in a manner other than that specified by the manufacturer.

WARNING
In an agricultural environment - always wear protective footwear.

CAUTION
When opening or closing any manual valve, always do so gradually, to prevent damage to the system by water hammer.

SPRINKLER SELECTION

Introduction

CAUTION
Read this chapter thoroughly and make sure you understand it before selecting a sprinkler.

Sprinkler irrigation is adaptable to most crops, soils and topographical characteristics. However, careful consideration of the design criteria is required in order to obtain an economical system that provides efficient and uniform water distribution over the irrigated area.

Careful consideration of all the factors explained below is required so that water can be applied uniformly at a rate lower than the intake rate of the soil, thereby increasing efficiency and preventing runoff and resulting damage to soil and crops.

Sprinkler irrigation - Terms and concepts

In order to select the appropriate sprinkler system, one must be familiar with the following terms and concepts:

A. Precipitation rate (Pr)
B. Water distribution uniformity
- Christiansen Coefficient of Uniformity (%CU)
- Distribution Uniformity (%DU)
- Scheduling Coefficient (SC)

C. Evaporation loss during sprinkler irrigation
D. Soil infiltration rate
E. Maximum length of lateral
F. Head loss in the riser tube
G. Sprinkler water trajectory

A. Precipitation rate (Pr)

The average amount of water applied to the irrigated area during a specified period of time, measured in this manual in mm/h (millimeters per hour) units.

Calculating Pr
Pr (mm/h) = Sprinkler flow rate (l/h) / [Spacing between sprinklers in the same row (m) x Spacing between rows (m)]

EXAMPLE

Where:

Sprinkler flow rate	580 l/h
Spacing between sprinklers on the same row	10 m
Spacing between rows	12 m

580 / (10 x 12) = 4.83

Pr = 4.83 mm/h

B. Water distribution uniformity

It is of vital importance that the irrigation water is distributed as evenly as possible throughout the irrigated area. Properly designed sprinklers enable greater distribution uniformity.

- Good distribution uniformity contributes to higher yield and a higher quality crop.

- Poor distribution uniformity reduces yield and crop quality and may damage the soil.

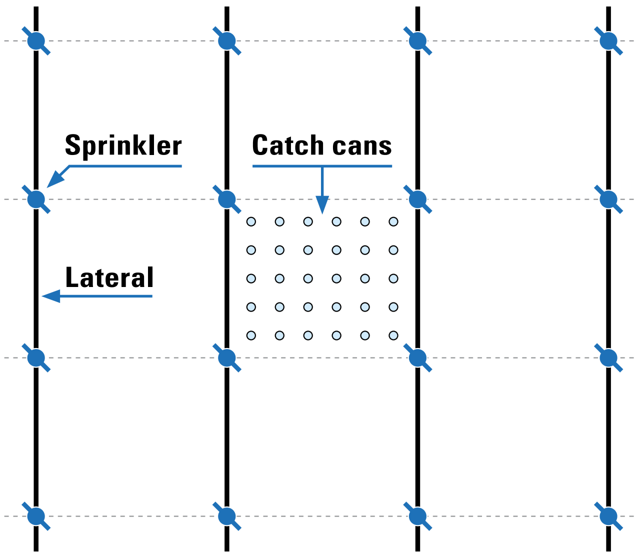
Netafim™ conducts rigorous tests to assess the distribution uniformity capacity of its sprinklers. The following is a brief summary of these testing procedures.

The water distribution uniformity survey: Setup and data collection

1. A 4 X 4 grid (16 sprinklers) is set up according to the planned layout - spacing between sprinklers in the same row and spacing between laterals.

ATTENTION
The survey must be conducted on a flat, leveled and obstruction-free field.

9 rectangular areas - each defined by 4 sprinklers at its 4 corners - are produced.



2. The center area is selected and a grid pattern of rain gauges or catch cans is set up, where the distance between them is -
- 1 meter or less on both axes for sprinklers (flow rate ≥ 200 l/h)
- ½ meter or less on both axes for micro-sprinklers (flow rate < 200 l/h)

ATTENTION
All the rain gauges/catch cans must be identical and placed in the field in a leveled and stable position.

3. The system is operated for 1 hour under normal operating conditions.

ATTENTION
The effect of wind on distribution uniformity is unpredictable.
For an accurate measurement, the system must not be operated under windy conditions.

4. The level of the water collected in each gauge or can is measured and the results (in mm) are noted as a list, from the highest to the lowest.

SPRINKLER SELECTION

There are 3 methods for calculating distribution uniformity:

- Christiansen Coefficient of Uniformity (%CU) - known to produce the most flattering results.
- Distribution Uniformity (%DU) - known to be more rigorous than %CU.
- Scheduling Coefficient (SC) - known to be the most rigorous method of all.

Christiansen Coefficient of Uniformity (%CU)

The %CU is a measurement of uniformity, expressed as the average rate (%) of deviation from the overall average application.

A perfectly uniform application is represented by a CU of 100%.
Lower uniformity applications are represented by lower percentages.

For open field sprinkler irrigation:

92% or higher	Excellent uniformity
88% to 92%	Very good uniformity
86% to 88%	Good uniformity
Lower than 86%	Acceptable for certain low-value crops only

Limitation of the %CU method:
Due to the statistical nature calculation of the %CU method, it does not account for individual spots that receive no water at all.

Calculating %CU

1. The records of the levels of water previously collected in each gauge or can (mm) are used [a].

2. All the numbers in column [a] are summed up.

3. The sum is divided by the number of gauges or cans placed in the field. This provides the average net application of the surveyed area [b].

4. The average net application of the surveyed area [b] is subtracted from the amount of water collected in each gauge or can (mm) [a]. Each result, whether lower or higher than the average net application, is recorded as a positive number in column [c].

5. All application deviations [c] are summed up.

6. The sum is divided by the number of gauges/cans placed in the field. This provides the average deviation from the average net application of the surveyed area [d].

7. The average deviation from the average net application [d] is divided by the average net application of the surveyed area [b] and the result is subtracted from 1. This provides the CU of the surveyed area as a percentage (%) [e].

NOTE
For simplicity, the examples below are based on only 20 gauges/cans placed in the field.

EXAMPLE

a	b	c	d	e
Net application measurements [mm]	**Average net application [AVG]**	**Measurements [mm] - average net application = application deviations***	**Average deviation from average net application**	**%CU**
5.14		0.57		
5.06		0.49		
5.02		0.45		
4.99		0.42		
4.87		0.30		
4.87		0.30		
4.83		0.26		
4.77		0.20		
4.75		0.22		
4.73		0.24		
4.70	91.35 / 20 = 4.57	0.23	7.29 / 20 = 0.36	1 - (0.36 / 4.57) = 92.12
4.62		0.05		
4.41		0.16		
4.40		0.17		
4.38		0.19		
4.26		0.31		
4.25		0.32		
4.12		0.45		
3.82		0.75		
3.36		1.21		
Sum: 91.35		**Sum:** 7.29		

*Application deviations are always recorded as positive numbers, whether the result is lower or higher than the average net application [AVG].

Distribution Uniformity (%DU)

The %DU is a measurement of uniformity, based on comparison of the driest 25% of the surveyed area with the overall average net application, as a percentage.

%DU = (average of the lowest 25% / overall average) x 100

A perfectly uniform application is represented by a DU of 100%.
A less uniform application is represented by a lower percentage:

For open field sprinkler irrigation:

90% or higher	Excellent uniformity
80% to 90%	Very good uniformity
75% to 80%	Good uniformity
Lower than 75%	Acceptable for certain low-value crops only

SPRINKLER SELECTION

Advantage of the %DU method:
The measurement of %DU takes the driest results into account. Therefore it is better than %CU, as it compares the area that receives the least water with the average application of the entire area.

Calculating %DU

1. The records of the levels of water previously collected in each gauge or can (mm) are used [a].

2. All the numbers in column [a] are summed up.

3. The sum is divided by the number of gauges or cans placed in the field. This provides the average net application of the entire surveyed area [b].

4. The lowest 25% of the numbers in the column are summed up.

5. The sum of the lowest 25% of the numbers in the column is divided by 25% of the number of gauges or cans placed in the field. This provides the average net application of the lowest 25% of the numbers representing the surveyed area [c].

6. The average net application of the lowest 25% of the numbers is divided by the average net application of the entire surveyed area. This provides the DU of the surveyed area as a percentage (%) [d].

EXAMPLE

<table>
<tr><th colspan="2">a</th><th>b</th><th>c</th><th>d</th></tr>
<tr><th colspan="2">Net application measurements [mm]</th><th>Average net application of the entire area [AVG]</th><th>Average net application of the lowest 25% [AVG low]</th><th>%DU</th></tr>
<tr><td colspan="2">5.14</td><td rowspan="22">91.35 / 20 = 4.57</td><td rowspan="22">19.81 / (20 x 25%) = 3.96</td><td rowspan="22">(3.96 / 4.57) x 100 = 86.65</td></tr>
<tr><td colspan="2">5.06</td></tr>
<tr><td colspan="2">5.02</td></tr>
<tr><td colspan="2">4.99</td></tr>
<tr><td colspan="2">4.87</td></tr>
<tr><td colspan="2">4.87</td></tr>
<tr><td colspan="2">4.83</td></tr>
<tr><td colspan="2">4.77</td></tr>
<tr><td colspan="2">4.75</td></tr>
<tr><td colspan="2">4.73</td></tr>
<tr><td colspan="2">4.70</td></tr>
<tr><td colspan="2">4.62</td></tr>
<tr><td colspan="2">4.41</td></tr>
<tr><td colspan="2">4.40</td></tr>
<tr><td colspan="2">4.38</td></tr>
<tr><td rowspan="5">lowest 25%</td><td>4.26</td></tr>
<tr><td>4.25</td></tr>
<tr><td>4.12</td></tr>
<tr><td>3.82</td></tr>
<tr><td>3.36</td></tr>
<tr><td colspan="2">Sum - entire area: 91.35</td></tr>
<tr><td colspan="2">Sum - lowest 25%: 19.81</td></tr>
</table>

Scheduling Coefficient (SC)

The Scheduling Coefficient is a run-time multiplier. It is the amount of time one needs to over-irrigate to achieve the average application rate of the entire area in the driest part of the irrigated area.

SC = overall average net application / average net application in the driest 5% of the irrigated area

Advantage of the SC method:
SC measurement takes into account the driest area (the part that receives the least water) while ensuring that the entire area is irrigated with at least the minimum required quantity, according to the crop value.

NOTE
In open field applications, it is customary to consider 5% of the entire surveyed area as the driest area..

NOTE
The SC method is applicable only for testing purposes, in order to validate the %CU and %DU methods and is not recommended for irrigation planning.

A perfectly uniform application is represented by an SC of 1.0.
A less uniform application is represented by a higher SC value:

For open field sprinkler irrigation:

Up to 1.1	Excellent uniformity
1.1 - 1.2	Very good uniformity
1.3 - 1.4	Good uniformity
Higher than 1.4	Acceptable for certain low-value crops only

Calculating SC

1. The records of the levels of water previously collected in each gauge or can (mm) are used [a].

2. All the numbers in column [a] are summed up.

3. The lowest 5% of the numbers in column [a] are summed up [only 1 number in this example].

4. The sum of all the numbers in the column [a] is divided by the number of gauges or cans placed in the field. This provides the average net application of the entire surveyed area [b].

5. The sum of the lowest 5% of the numbers in column [a] is divided by 5% of the number of gauges or cans placed in the field. This provides the average net application of the 5% lowest numbers in the surveyed area [c].

6. The sum of all the numbers in column [a] is divided by the sum of the lowest 5% of the numbers in column [a]. This provides the SC value [d].

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EXAMPLE

a	b	c	d
Net application measurements [mm]	**Average net application of the entire area [AVG]**	**Average net application of the lowest 5% [AVG low]**	**SC value**
5.14	91.35 / 20 = 4.57	3.36 / (20 x 5%) = 3.36	(4.57 / 3.36) = 1.36
5.06			
5.02			
4.99			
4.87			
4.87			
4.83			
4.77			
4.75			
4.73			
4.70			
4.62			
4.41			
4.40			
4.38			
4.26			
4.25			
4.12			
3.82			
lowest 5% 3.36			
Sum - entire area: 91.35			
Sum - lowest 5%: 3.36			

Conclusion: The 3 examples above show that each method of calculating the distribution uniformity produces a different result.

Method	Value	Level of distribution uniformity
%CU	92.12	Excellent
%DU	86.65	Very good
SC	1.36	Good

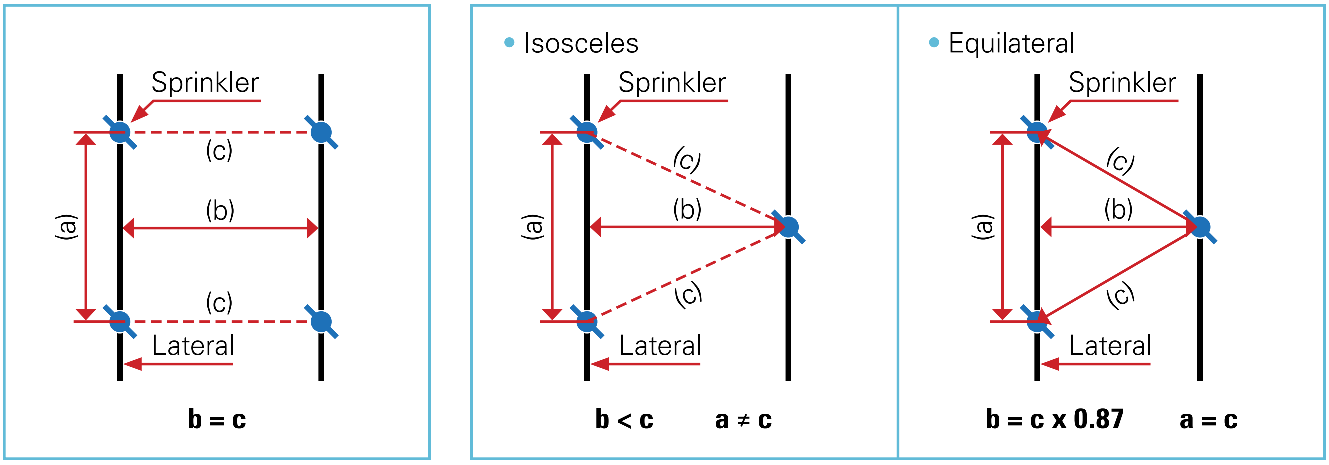
It is common practice among sprinkler manufacturers to advertise the results of the %CU method only, which are known to be the most flattering. Netafim™, however, insisting on strict standards and zealous R&D procedures, tests its sprinklers with all 3 methods and provides its customers with the results of the most rigorous analyses.

C. Sprinkler spacing pattern

In order to achieve the best possible water distribution uniformity with any given sprinkler it is important to plan an adequate sprinkler spacing pattern.

There are 2 main types of sprinkler spacing patterns:

Rectangular **Triangular**



(a) The distance between 2 adjacent sprinklers on the same lateral.
(b) The distance between adjacent laterals.
(c) The distance between 2 sprinklers on adjacent laterals.

NOTE
Do not confound isosceles with equilateral. Isosceles is usually referred to in open-field applications. Equilateral is occasionally referred to in orchards due to the tree planting pattern.

Each individual sprinkler has different distribution patterns depending on 3 factors:

- Sprinkler flow rate
- Working pressure
- Sprinkler height above ground

NOTE
There are some prejudices regarding the sprinkler spacing pattern issue:

- The sprinkler spacing pattern offering the highest water distribution uniformity is a triangle.
- The higher the working pressure the higher the distribution uniformity.
- The closest to each other the sprinklers are the higher the distribution uniformity.

In reality it is not as simple as that.
The sprinkler's distribution pattern is influenced by the above 3 factors in a non-linear manner. Netafim™ conducts tests and simulations to deduce the distribution patterns of its sprinklers under various combinations of the above 3 factors. The performance tables provided in each sprinkler literature are derived from these tests and simulations.

Sprinkler comfort zone
In the sprinklers performance tables, a uniformity coefficient of 88% or higher (green/blue boxes) is considered to represent the sprinkler comfort zone regarding full coverage open field sprinkler irrigation. To achieve adequate water distribution uniformity it is recommended to select a sprinkler spacing pattern and working pressure compliant with this uniformity range.

Conclusion
Always select a sprinkler spacing pattern based on the sprinkler performance tables provided in the sprinkler literature and not on instinct or intuition.

D. Evaporation loss during sprinkler irrigation

During sprinkler operation, some water evaporates as the droplets are sprayed through the air.

Evaporation loss depends on the following factors:

	High evaporation loss	Low evaporation loss
Relative humidity (RH)	Low	High
Air temperature	High	Low
Nozzle size	Small	Large
Working pressure	High	Low
Wind speed	High	Low

Sprinkler evaporation loss can be reduced by changing sprinkler operating conditions to increase water droplet size or by operating the system under conditions of low climate demands (high RH, low air temperature and low wind speed). The climate demands are low at night and during early morning and early evening hours.

EXAMPLE

Evaporation loss (%) - Different scenarios

Each of the 4 tables below presents the evaporation losses calculated for 3 values of air temperature with different values of other affecting factors, using the Frost & Schwalen nomogram*.

*The Frost & Schwalen nomogram is a graphic method to predict evaporation loss based on the values of different factors.

With different RH values

RH (%)	Air temp. (°C)	Nozzle size (mm)	Working pressure (bar)	Wind speed (m/sec)	Evaporation loss (%)
20	15.0	3.0	2.5	1.0	4.2
40					4.0
60					3.0
80					2.7
20	25.0	3.0	2.5	1.0	5.5
40					5.3
60					4.0
80					3.1
20	35.0	3.0	2.5	1.0	9.0
40					7.0
60					5.5
80					4.0

With different nozzle sizes

RH (%)	Air temp. (°C)	Nozzle size (mm)	Working pressure (bar)	Wind speed (m/sec)	Evaporation loss (%)
20	15.0	2.5	2.5	1.0	4.5
		3.0			4.2
		3.5			4.0
		4.0			3.4
20	25.0	2.5	2.5	1.0	6.0
		3.0			5.6
		3.5			5.2
		4.0			4.8
20	35.0	2.5	2.5	1.0	9.7
		3.0			9.2
		3.5			8.0
		4.0			6.8

With different working pressures

RH (%)	Air temp. (°C)	Nozzle size (mm)	Working pressure (bar)	Wind speed (m/sec)	Evaporation loss (%)
40	15.0	3.0	2.0	1.0	3.0
			2.5		3.9
			3.0		4.5
			3.5		5.3
40	25.0	3.0	2.0	1.0	4.2
			2.5		4.9
			3.0		5.5
			3.5		6.3
40	35.0	3.0	2.0	1.0	5.6
			2.5		6.7
			3.0		8.0
			3.5		10.0

With different wind speeds

RH (%)	Air temp. (°C)	Nozzle size (mm)	Working pressure (bar)	Wind speed (m/sec)	Evaporation loss (%)
60	15.0	3.0	2.5	1.0	2.9
				1.5	3.3
				2.0	3.9
				2.5	4.3
60	25.0	3.0	2.5	1.0	3.5
				1.5	4.2
				2.0	4.9
				2.5	5.3
60	35.0	3.0	2.5	1.0	5.3
				1.5	6.0
				2.0	6.7
				2.5	8.0

The two scenarios below demonstrate the influence of extreme combinations of the factors on evaporation loss:

Scenario resulting in a high evaporation loss

RH (%)	Air temp. (°C)	Nozzle size (mm)	Working pressure (bar)	Wind speed (m/sec)	Evaporation loss (%)
20	35.0	2.5	3.5	2.5	19.0

Scenario resulting in a low evaporation loss

RH (%)	Air temp. (°C)	Nozzle size (mm)	Working pressure (bar)	Wind speed (m/sec)	Evaporation loss (%)
80	15.0	4.0	2.0	1.0	1.7

Conclusion: This example shows that the outcome of different combinations of factors is predictable only when all the factors are taken into account, since only the interaction among all of them determines the actual evaporation loss.

ATTENTION

The effect of wind

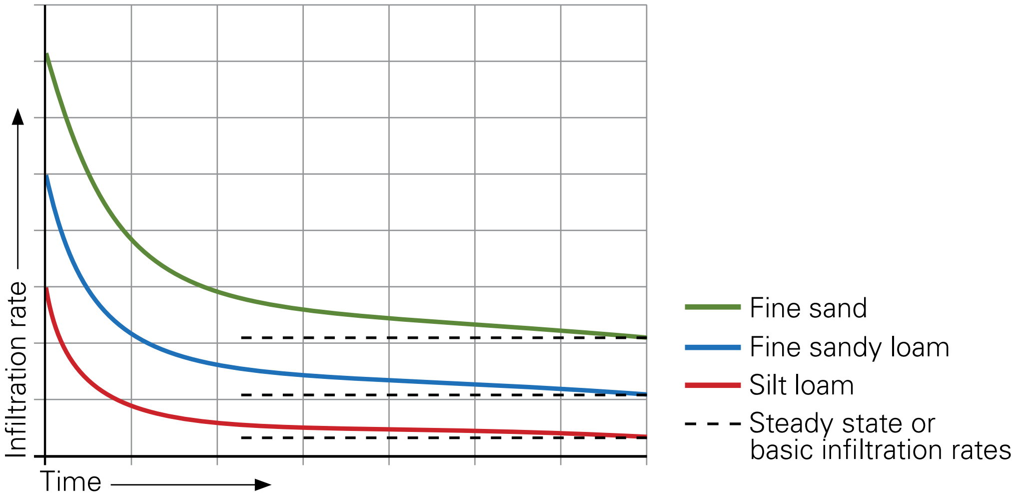
This chapter discusses the effect of wind on evaporation loss. Wind speed and direction also have an unpredictable effect on distribution uniformity. Do not irrigate when wind speed is over 2 m/sec.

E. Soil infiltration rate

Infiltration is the process by which water on the ground surface enters the soil. In soil science, infiltration rate is the rate at which soil is able to absorb rainfall or irrigation. It is measured in millimeters per hour or inches per hour. The rate decreases as the soil becomes saturated. If the precipitation rate exceeds the infiltration rate, runoff will usually occur unless there is some physical barrier. This is related to the saturated hydraulic conductivity of the near-surface soil. Infiltration rate can be measured using an infiltrometer.

In general, soil is composed of three components: sand, silt and clay. The relative amounts of these components affect the texture of the soil, influencing the rate at which water can infiltrate the soil.

Change in infiltration rate with time
When irrigating of dry soil, at first the rate of infiltration is high. After a few hours, the soil becomes more saturated and the infiltration rate gradually stabilizes.



The curves in the graph above indicate infiltration rates over time for 3 types of soil textures. As shown, the infiltration rate is initially very high and as time progresses, or more correctly, as the amount of water that has infiltrated increases, the infiltration rate decreases. Therefore, a downward curve results, indicating a decreasing rate of infiltration. As irrigation continues, the infiltration rate approaches a nearly steady state, also called the basic infiltration rate.

Surface sealing
Surface sealing is another factor that influences the infiltration rate. Surface sealing occurs when the shear effect of flowing water or impact energy of large drops causes the aggregates on the soil surface to decompose into smaller aggregates and individual particles, which tend to form a thin layer with low permeability on the soil surface. It is common to find large differences between infiltration during the first irrigation event and infiltration during later irrigation events, due to surface sealing, especially in the case of surface irrigation.

F. Maximum length of lateral

When planning an irrigation system (drippers or sprinklers), it is of utmost importance not to exceed the maximum possible length of laterals in order to avoid severe reduction of irrigation uniformity, and therefore efficiency, resulting in lower yield.

Various factors influence the maximum possible length of laterals:
- Emitter flow rate
- Inside diameter of the lateral (ID)
- Internal texture (roughness) of the lateral (C)
- Distance between emitters on the lateral
- Topographic slope of the lateral
- Pressure at the inlet of the lateral

The calculation of the maximum possible length of a lateral is not a straightforward process because it is dependent on various factors that interact in a non-linear manner. The result of the combination of the different factors is not intuitively predictable (as demonstrated in the examples below).

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The maximum possible length of a lateral is reached when there is a 20% difference between the pressure at the inlet of the sprinkler that receives the highest pressure and the pressure at the inlet of the sprinkler that receives the lowest pressure along the lateral (a 20% pressure difference corresponds to a 10% flow rate difference, which is the accepted maximum for defining uniform irrigation).

The selection of the diameter of a lateral must be based on the required flow rate. This is the factor that has the greatest influence on the maximum possible length of the lateral.

EXAMPLE

Max. lateral length at different slopes - 10% flow rate loss

Where:

Sprinkler	D-Net™ 8550
Nominal flow rate	580 l/h
Inlet pressure	2.8 Bar

Lateral	FlexNet™ 2"
ID	51.5 mm

	Slope	**Distance between sprinklers (m)**		
		10	**11**	**12**
		Max. lateral length (m)		
Uphill	2%	180	187	192
	1%	210	220	228
Flat terrain	0	250	275	288
Downhill	-1%	290	319	336
	-2%	330	363	384

TIP

It is possible to avoid pressure loss, thus avoiding the length-of-lateral limitation, by using pressure-regulated emitters. Netafim™ sprinklers can be pressure-regulated by adding pressure-regulating valves (PRV) at their inlets.

G. Head loss in the riser tube

Since correct planning requires the consideration of the pressure needed at the sprinkler inlet, the head loss in the riser tube cannot be ignored.

The head loss in the riser tube is defined by 2 factors:

- **Friction loss**
  The friction loss inside the riser tube, depends on:
  - The flow rate
  - The inside diameter (ID) of the riser tube
  - The length of the riser tube
  - The internal texture (roughness) of the riser tube (C)
- **Elevation loss**
  The elevation loss depends on the elevation of the sprinkler above the lateral (1 meter = 0.1 bar).

EXAMPLE

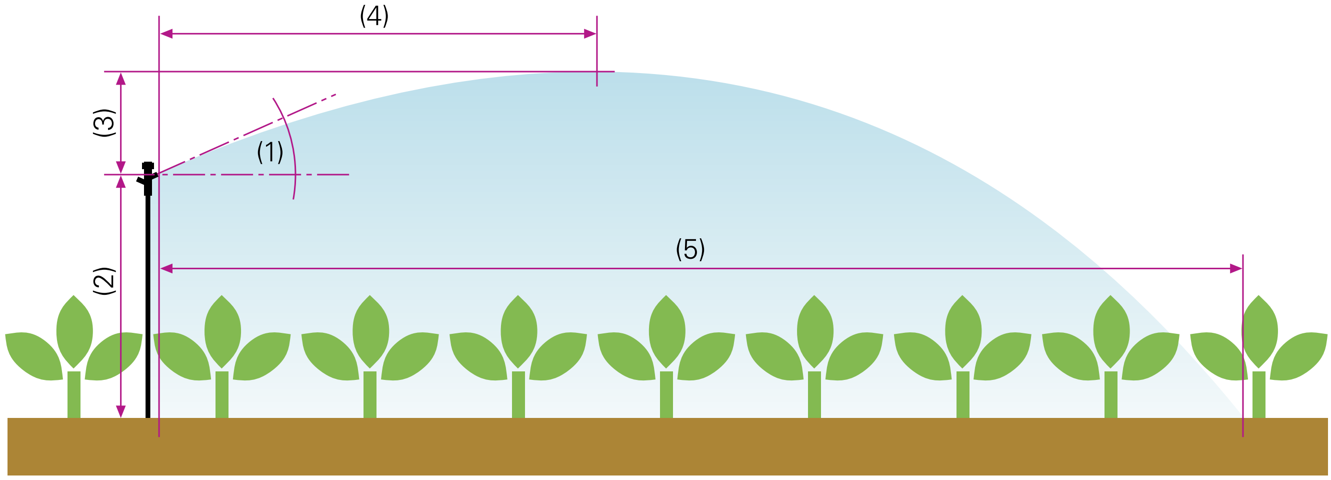
Friction loss in the riser tube

Where:

Riser tube	
OD	12.0 mm
ID	9.0 mm

Riser tube length (m)	**Flow rate (l/h)**				
	510	**580**	**680**	**810**	**940**
	Head loss (bar)				
1.2	0.094	0.110	0.145	0.197	0.257

H. Sprinkler water trajectory



1. Sprinkler nozzle angle
2. Elevation of sprinkler nozzle above ground
3. Elevation of max. trajectory height above sprinkler nozzle
4. Distance of max. trajectory height from sprinkler nozzle
5. Max. wetted distance (dependant on sprinkler nozzle elevation above ground).

Trajectory height above sprinkler nozzle

The maximum trajectory height above the sprinkler nozzle is relevant in the following cases:

- When sprinklers are used under the canopy to prevent wetting the foliage.
- When sprinklers are used in a net-house or inside a roofed structure such as a glasshouse, to prevent wetting the net or the ceiling.

NOTE
In most cases a sprinkler with a shallower trajectory is less vulnerable to wind influence.

SPRINKLER SELECTION

Selecting a sprinkler

CAUTION

A sprinkler can be properly selected only after gaining knowledge of all the factors of sprinkler performance explained above.

The sprinkler is selected according to:

- The crop needs
- The soil
- The grower's objectives

Definition of the following parameters is required:

- The precipitation rate (Pr), based on the type of soil, the weather conditions in the region and the period of sprinkler operation.
- The distance between distribution lines according to the agricultural practices and the agro-mechanic vehicles and tools used in the field/plantation during the growing season.
- The required water distribution uniformity according to the crop value and the expected profit.
- The operating pressure
- The height of the sprinkler above the ground
- The practicable trajectory height

It is not always possible to pinpoint the sprinkler that perfectly satisfies all the above requirements. In such a case, the most suitable sprinkler should be selected by weighing the above parameters according to their relative relevance to the crop needs and the grower's objectives.

TIP

After selecting the sprinkler, select the distribution pipe.

Netafin™ recommends to use the FlexNet™ pipe for its numerous advantages:

- User friendly and faster layout and retrieving process.
- Lower installation and setup costs.
- Flat and compact coil design, reduces freight and storage costs.
- Integral connectors reduce significant labor time and increase confidence in the connections between distribution pipes and risers.
- Light and flexible, easily moved from one installation to another.
- Low expansion and zero axial elongation, no snaking.
- Up to 80% lighter than other similar products.
- Robust and durable reinforced polyethylene weaves.
- White colored for high solar resistance, high chemical resistance and UV resistance.

For a full description of the FlexNet™ pipe range go to www.netafim.com

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