

**TORO**<sup>®</sup>

**Quality  
irrigation  
for quality  
wine**

Guarantee your vintage



**vineyard**



# Quality irrigation for quality wine

Guarantee your vintage

*The evolution of viticulture has seen the establishment of new cultivation techniques essentially represented by the introduction of new international varieties (often more sensitive to drought), the use of new rootstocks (with more superficial development of the root system) and installation of closer planting layouts. Furthermore, among the main effects of climate change, year after year, we are seeing an increase in summer temperatures and the concentration of precipitations at particular times of year.*

*Both of these evolutions have led to an increase in competition between plants for access to the increasingly "scarce" water resource.*

*Therefore, in modern viticulture, drip irrigation represents a particularly important production element which can be used not only to eliminate the risks connected with the unfavourable effects of the seasons, but above all to control production by improving its quality.*

## ADVANTAGES FOR A NEW VINEYARD

In the early stages of the vineyard the main advantages connected with the use of a drip irrigation system are:

- Improved rooting of the cuttings;
- Possibility to bed out the cuttings even beyond the traditional periods;
- Uniform growth of the cuttings due to the high emission uniformity which guarantees the same water and nutrient input to all the plants (even on steep slopes thanks to the use of pressure compensating drippers);
- Production starting earlier (at least 1 year earlier than with a "dry" start);
- Greater contemporaneity of production;
- Possibility to meet the nutritional requirements of the plant during the different phenological stages through targeted management of fertilization;
- Elimination of the costs connected with irrigation operations using tanker trucks (performed in early years to compensate for transplant shock).

## ADVANTAGES FOR AN ESTABLISHED VINEYARD

Later during the production stage, the advantages connected with the use of a drip irrigation system are:

- In normal vintages, the management of water stress allows constant production to be obtained over time, both in terms of quantity and quality;
- In particularly dry vintages, the elimination of intense water stress and consequent protection of the production quality and quantity;



- Optimal distribution of the nutritional elements in relation to the phenological stages thanks to the adoption of targeted fertigation practices (substantial reduction in total fertilizing units used and elimination of distribution costs with traditional methods);
- Possibility to intervene promptly with micro/macro-elements (also on heavy or hilly land);
- Management of the grassing, limiting competition for water and improving the quality of the must thanks to more a balanced and natural ecosystem;
- Better vegetative balance of the plants;
- Better organoleptic quality of the grapes;
- Reduction in fungal pathologies promoted by the wetting of the leaves due to rescue interventions with sprinkler systems.

## How to irrigate

In an established vineyard, irrigation is advantageous in the period between the resumption of growth and the setting time, positively influencing correct and balanced plant development and allowing high quality standards to be reached through the adoption of fertigation techniques.

Subsequently, from the setting time to post-veraison, irrigation "in controlled deficit" promotes an increase in the quantity of sugars, anthocyanins, flavones and the molecular weight of tannins necessary to guarantee quality products.

In particularly dry vintages, drip irrigation represents the essential tools for reaching qualitatively

satisfactory production whilst allowing full protection of the harvest at the same time.

In vintages with normal climatic trends, the control of water stress and the use of just a few targeted irrigation interventions allow high quality levels to be obtained over time.

## OUR EXPERIENCE, OUR SOLUTIONS

Since the '90s Toro has been successfully realising drip irrigation systems for viticulture, all over the world. Neptune is the drip line developed by Toro for the irrigation of vineyards. Its extraordinary uniformity and durability allow precise and reliable irrigation.



**Neptune PC:** It is the Toro Pressure Compensating drip line that guarantees extraordinary resistance to clogging and excellent emission uniformity in the most difficult topographical conditions, especially on undulating terrains.



**Neptune HW:** This is the Toro drip line that installs an emitter that guarantees excellent performance levels, high resistance to clogging and value for money.

If you prefer a Sub-surface Drip Irrigation system (SDI):

- A further increase in irrigation efficiency thanks to lower losses through evaporation;
- Increased fertigation effectiveness with a consequent saving on fertilizers;
- Less weed growth and hence a considerable saving on weedkiller.





## VINEYARDS IN DIFFICULT TOPOGRAPHICAL CONDITIONS

In topographically difficult terrains and especially on undulating land, it is essential to use a pressure compensating drip line that can guarantee constant emission according to the altitude differences.

In all these situations, thanks to its Pressure Compensating system, Neptune PC guarantees extra-

ordinary emission uniformity and high durability in the most severe operating conditions.

Neptune PC is available with:

- 16 mm diameter, 0.9, 1.0 and 1.1 mm wall thickness.
- 20 mm diameter, 0.9, 1.0 and 1.2 mm wall thickness
- 4 pressure compensating dripper: 1.2 / 1.6 / 2.4 / 3.8 l/h between 0.5 and 3.5 bar
- Dripper spacing: 25/30/40/45/50/60/70/75/80/90/100 cm (Other spacing available on request)

Neptune PC - AS and AL - 16 mm Diameter  
Slope 0%

Code	Individual Emitter flow rate between 0.5 bar 3.5 bar	Emitter spacing	Maximum Lateral Lengths in meters					
			@ 1.0 bar	@ 1.5 bar	@ 2.0 bar	@ 2.5 bar	@ 3.0 bar	@ 3.5 bar
PPx16xx2538	3.8 l/h	25 cm	45	58	67	74	80	85
PPx16xx4038		40 cm	66	84	97	107	115	123
PPx16xx6038		60 cm	89	113	131	145	157	167
PPx16xx7538		75 cm	104	133	154	170	184	196
PPx16xx10038		100 cm	127	163	189	209	226	241
PPx16xx2524	2.4 l/h	25 cm	61	78	90	99	107	114
PPx16xx4024		40 cm	88	113	130	144	155	166
PPx16xx6024		60 cm	119	152	176	195	211	224
PPx16xx7524		75 cm	140	179	207	229	247	264
PPx16xx10024		100 cm	171	219	253	280	303	323
PPx16xx2516	1.6 l/h	25 cm	80	102	117	130	140	149
PPx16xx4016		40 cm	115	147	169	187	203	216
PPx16xx6016		60 cm	155	198	229	253	274	292
PPx16xx7516		75 cm	181	232	268	297	322	344
PPx16xx10016		100 cm	222	284	329	364	396	421
PPx16xx2512	1.2 l/h	25 cm	84	107	123	136	147	156
PPx16xx4012		40 cm	126	161	185	205	221	236
PPx16xx6012		60 cm	177	226	261	289	312	333
PPx16xx7512		75 cm	211	271	312	346	374	399
PPx16xx10012		100 cm	265	339	392	435	470	501

Neptune PC - AS and AL - 20 mm Diameter  
Slope 0%

Code	Individual Emitter flow rate between 0.5 bar 3.5 bar	Emitter spacing	Maximum Lateral Lengths in meters					
			@ 1.0 bar	@ 1.5 bar	@ 2.0 bar	@ 2.5 bar	@ 3.0 bar	@ 3.5 bar
PPx20xx2538	3.8 l/h	25 cm	66	84	97	107	116	123
PPx20xx4038		40 cm	97	123	142	157	170	181
PPx20xx6038		60 cm	132	168	194	215	232	247
PPx20xx7538		75 cm	155	199	229	253	274	292
PPx20xx10038		100 cm	191	244	282	312	338	360
PPx20xx2524	2.4 l/h	25 cm	89	114	131	144	156	166
PPx20xx4024		40 cm	130	166	191	211	228	243
PPx20xx6024		60 cm	177	226	261	289	312	332
PPx20xx7524		75 cm	209	267	308	341	368	393
PPx20xx10024		100 cm	256	328	379	419	454	484
PPx20xx2516	1.6 l/h	25 cm	116	148	171	189	204	217
PPx20xx4016		40 cm	169	216	249	275	298	317
PPx20xx6016		60 cm	230	294	339	376	407	433
PPx20xx7516		75 cm	271	347	400	443	480	511
PPx20xx10016		100 cm	332	426	492	545	591	630
PPx20xx2512	1.2 l/h	25 cm	145	184	212	234	252	268
PPx20xx4012		40 cm	210	267	309	340	368	392
PPx20xx6012		60 cm	285	364	420	464	502	535
PPx20xx7512		75 cm	335	428	495	547	592	631
PPx20xx10012		100 cm	411	526	607	672	728	776

Neptune PC is also available in other models. Ask for more information.



## VINEYARDS ON FLAT LAND

Where the orography of the land allows it, a classic drip line can be used, which represents a cost effective investment while guaranteeing excellent performance levels at the same time.

**Neptune HW** in the drip line that most effectively fulfils these requirements:

- 16 mm diameter, 0.9, 1.0 and 1.1 mm wall thickness (35 - 39 - 43 mil)
- 20 mm diameter, 0.9, 1.0 and 1.2 mm wall thickness (35 - 39 - 47 mil)
- 5 drippers: 0.67 / 1.08 / 1.30 / 1.99 / 3.16 l/h @ 0.7 bar
- Dropper spacing: 25/30/40/45/50/60/70/75/80/90/100 cm (Other spacing available on request)

Neptune HW - 16 mm Diameter					
Slope 0%					
Code	Individual Emmitter flow rate		Emitter spacing	Emission Uniformity (EU)	Maximum Lateral Lengths in meter @ 1.0 bar
	@ 0.7 bar	@ 1.0 bar			
PTW16xx2506-yy	0.67 l/h	0.80 l/h	25 cm	90%	143
PTW16xx4006-yy			40 cm	90%	197
PTW16xx5006-yy			50 cm	90%	228
PTW16xx6006-yy			60 cm	90%	257
PTW16xx2511-yy			25 cm	90%	98
PTW16xx4011-yy	1.08 l/h	1.30 l/h	40 cm	90%	135
PTW16xx5011-yy			50 cm	90%	156
PTW16xx6011-yy			60 cm	90%	176
PTW16xx2514-yy	1.30 l/h	1.50 l/h	25 cm	90%	83
PTW16xx4014-yy			40 cm	90%	114
PTW16xx5014-yy			50 cm	90%	132
PTW16xx6014-yy			60 cm	90%	149
PTW16xx2520-yy			25 cm	90%	66
PTW16xx4020-yy	1.99 l/h	2.40 l/h	40 cm	90%	91
PTW16xx5020-yy			50 cm	90%	105
PTW16xx6020-yy			60 cm	90%	119
PTW16xx2532-yy			25 cm	90%	46
PTW16xx4032-yy	3.16 l/h	3.80 l/h	40 cm	90%	63
PTW16xx5032-yy			50 cm	90%	73
PTW16xx6032-yy			60 cm	90%	83

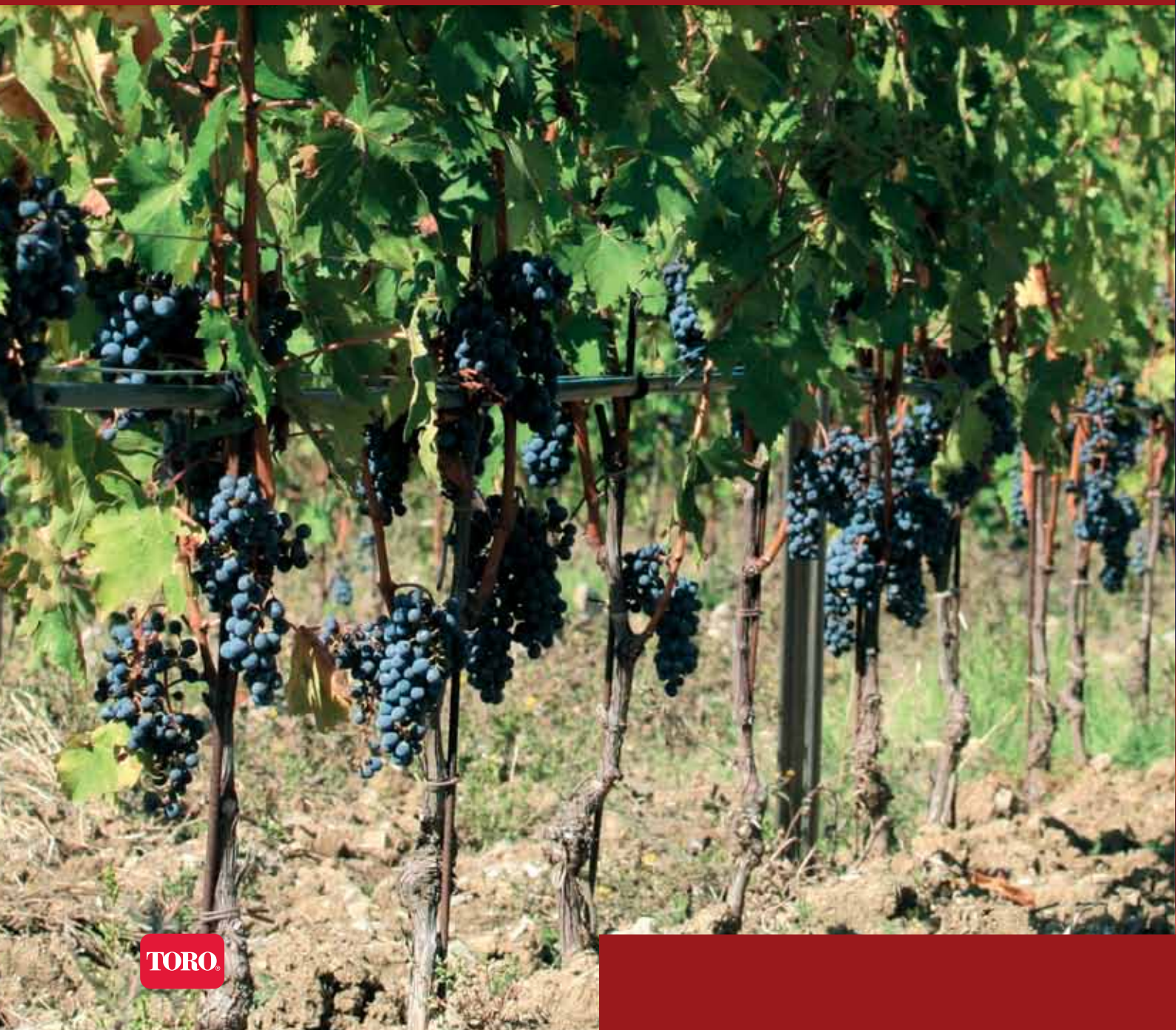
Neptune HW - 20 mm Diameter					
Slope 0%					
Code	Individual Emmitter flow rate		Emitter spacing	Emission Uniformity (EU)	Maximum Lateral Lengths in meter @ 1.0 bar
	@ 0.7 bar	@ 1.0 bar			
PTW20xx2506-yy	0.67 l/h	0.80 l/h	25 cm	90%	214
PTW20xx4006-yy			40 cm	90%	296
PTW20xx5006-yy			50 cm	90%	345
PTW20xx6006-yy			60 cm	90%	389
PTW20xx2511-yy			25 cm	90%	147
PTW20xx4011-yy	1.08 l/h	1.30 l/h	40 cm	90%	204
PTW20xx5011-yy			50 cm	90%	237
PTW20xx6011-yy			60 cm	90%	267
PTW20xx2514-yy	1.30 l/h	1.50 l/h	25 cm	90%	124
PTW20xx4014-yy			40 cm	90%	172
PTW20xx5014-yy			50 cm	90%	200
PTW20xx6014-yy			60 cm	90%	226
PTW20xx2520-yy			25 cm	90%	99
PTW20xx4020-yy	1.99 l/h	2.40 l/h	40 cm	90%	137
PTW20xx5020-yy			50 cm	90%	159
PTW20xx6020-yy			60 cm	90%	180
PTW20xx2532-yy			25 cm	90%	69
PTW20xx4032-yy	3.16 l/h	3.80 l/h	40 cm	90%	96
PTW20xx5032-yy			50 cm	90%	111
PTW20xx6032-yy			60 cm	90%	126

Neptune HW is also available in other models. Ask for more information.

Where long laterals are required Neptune PC provides superior performance.



**It will always be  
a good vintage**



**TORO**

# TESTIMONIALS



Fulvio De Carlo  
"De Carlo Irrigazioni"  
Villa Adriana, Tivoli, Rome, Italy

"A drip irrigation system in the vineyard represents a fundamentally important investment for a modern winery. In fact, it eliminates the risks connected with the failure of the cuttings and allows production to start sooner and uniformly.

The costs for the purchase and installation of a drip irrigation system do not exceed 10% of the total costs sustained for the system of a new vineyard.

The initial investment is recovered quickly (2-3 years) and allows production to be protected in particularly dry vintages and makes it possible to guarantee quality and quantity targets being met."



Jose Antonio Ayerra  
Riegos y Viñedos, SA  
La Cistèrniga (Valladolid), Spain

"We installed the first Toro drip line irrigation system in 2002. Since then we have successfully completed numerous projects on new or established vineyards.

With targeted irrigation management it is possible to improve the quality of the grapes and the quantity of the harvest, ensuring constant production year after year.

In the areas where there is easy access to water, the investment is recovered very quickly (1-2 years).

In modern viticulture, therefore, drip irrigation is an essential tool from an agricultural and commercial point of view because thanks to that, the wine production can be managed and controlled."



Nikolay Vladimirovich  
Holupenko Herson, Ukraine

"Since 2004 we have been irrigating 30 hectares of vineyard with the Toro drip line. The extraordinary emission uniformity enables us to achieve uniform, constant production over time. We are pleased with our choice but above all we are certain that we have guaranteed the productivity of our company."



Gorb Ivan Vasilevich  
"Kamenskiy" Winery  
Ukraine

"In 2005 we installed the Toro drip line to efficiently irrigate 70 hectares of our vineyard.

The system allows us to easily manage targeted irrigation and to guarantee quality production.

In dry seasons, which are becoming increasingly common, the drip irrigation system prevents harmful water stress conditions for the plants and allows us to protect the production".



Fabio and Matteo Gaiotto  
Gaiotto Impianti s.n.c.  
Annone Veneto, Venezia, Italy

"Gaiotto Impianti has been dealing with irrigation system for more than fifteen years. Considering the climate changes and global warming, the reduction of water waste and the optimization of the water use are now needed more than ever. Hence, the adoption of a drip irrigation system is the solution. Our company installs Toro's drip line on vineyards utilizing both sub-surface and hanging on a wire techniques. Drip irrigation on vineyards is now important to assure the correct plants' growth in the early stages.

In the production phase, the growers can now control the quantity and the quality of the grapes thanks to the drip irrigation system".



**I.S.E. S.r.l.**

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