

# UniRam™ CNL

Integral pressure-compensated, continuously self-flushing, anti-siphon and anti-drain mechanism dripper, ideal for greenhouses, deciduous plantations, tree irrigation, and permanent applications that require intensive irrigation scheduling.

→ 16009 - 16010 - 16011 - 16012 - 20010 - 20012



Pressure-compensated




Anti-drain mechanism



Self-flushing mechanism

## / Benefits & Features

- Pressure-compensated  
Precise and equal amounts of water delivered over a broad pressure range, ensuring 100% uniformity of water and nutrient distribution along the laterals.
- Anti-siphon mechanism  
Prevents contaminants from being drawn into the dripper, making it ideal for sub surface applications.
- Anti-drain mechanism (CNL)  
Eliminates drainage and refill effect, and improves efficiency in pulse irrigation even in steep topography.
- Continuously self-flushing  
Flushes debris throughout operation, while ensuring constant dripper operation even in challenging water quality.
- Physical root barrier  
Better protection against root intrusion, utilizing unique dripper design that creates physical barriers protecting the dripper from root growth into its labyrinth.
- Wide filtration area  
Ensures optimal performance even under harsh water conditions, preventing the entrance of sediment into the labyrinths.
- Wide water passages  
TurboNet™ labyrinth ensures wide water passages, large deep and wide cross-section that improves clogging resistance. The water is drawn into the dripper from the stream center, preventing the entrance of sediments into the drippers.
- Hybrid (optional)  
 New patented add-on to UniRam™, features an on line saddle that allows to combine the benefits of an integral dripper to connect Netafim™ press fit adaptors and prevents drop migration on slopes in certain conditions\*.

\*Please contact your Netafim™ local representative to get more information on the drop migration feature.

# / Specifications

- Pressure-compensated range: 1.0 - 4.0 bar.
- Largest filter in the industry. Recommended filtration: 130 micron / 120 mesh. Filtration method selected based on the kind and concentration of dirt particles contained in the water. Wherever sand exceeding 2 ppm exists in the water, a Hydrocyclone should be installed before the main filter. Where sand/silt/clay solids exceed 100 ppm, pre treatment it should be applied following Netafim™ expert instructions.
- Double TurboNet™ labyrinth with large water passage.
- Weldable into thick wall driplines (0.90, 1.00, 1.10, 1.20 mm).
- Injected dripper, very low CV with injected silicon diaphragm.
- High UV resistant. Resistant to standard nutrients used in agriculture.
- Compliance ISO 9261 international standards.

## → Drippers technical data

Flow rate* (l/h)	Working pressure range (bar)	Water passages dimensions width-depth-length (mm)	Filtration area (mm <sup>2</sup> )	Constant K	Exponent* X	Recommended filtration (micron)/(mesh)	Shut off pressure (bar)
0.70	1.0 – 4.0	0.70 x 0.65 x 40	110	0.70	0	130/120	0.14
1.00		0.83 x 0.74 x 40	130	1.00	0	130/120	0.14
1.60		1.09 X 0.76 x 40	130	1.60	0	130/120	0.14
2.30		1.26 x 0.93 x 40	130	2.30	0	130/120	0.14
3.50		1.59 x 1.07 x 40	150	3.50	0	130/120	0.14

\* Within working pressure range

## → Driplines technical data

Model	Inside diameter (mm)	Wall thickness (mm)	Outside diameter (mm)	Max. working pressure (bar)	Max. flushing pressure (bar)	KD
16009	14.20	0.90	16.00	3.0	3.9	1.30
16010	14.20	1.00	16.20	3.5	4.6	1.30
16011	14.20	1.10	16.40	3.5	4.6	1.30
16012	14.20	1.20	16.60	4.0	5.2	1.30
20010	17.50	1.00	19.50	3.5	4.6	0.40
20012	17.50	1.20	19.90	4.0	5.2	0.40

## → Driplines package data (on bundled coil)

Model	Wall thickness (mm)	Distance between drippers (m)	Coil length (m)	Average* coil weight (kg)	Coils in a 40 feet container (units)	Total in a 40 feet container (m)
16009	0.90	0.15 to 1.00	500	20.3	330	165000
16010	1.00	0.15 to 1.00	500	22.2	330	165000
16011	1.10	0.15 to 1.00	500	23.4	330	165000
16012	1.20	0.15 to 1.00	400	21.2	352	140800
20010	1.00	0.15 to 1.00	300	17.4	330	99000
20012	1.20	0.15 to 1.00	300	20.2	330	99000

\* Calculated weight average. For further details see "Average Coil Weight Disclaimer"

## / Drippers flow rate vs working pressure

In order to calculate the right flow rate of each dripper, under different working pressures, we use the following formula:

$$Q = K * P^X$$

Where:

Q = Dripper flow rate (liters/hour)

K = Constant (each dripper has his singular constant and must be defined by the dripper producer)

P = Real working pressure (meter)

X = Exponent (each dripper has its singular exponent and must be declared and defined by the dripper producer)

\*ISO 9261 require from the manufacturer to declare the constant K and dripper exponent

In all Netafim™ pressure-compensated drippers - including UniRam™ (shown in this document) – the dripper exponent X is equal to 0 [zero] (within the pressure range defined for each of the drippers), so the right flow rate of the dripper will be always equal (+/- 7% as defined by the international standard: ISO 9261).

Each dripper has a compensation range which includes minimum and maximum pressure; under the minimum pressure defined, the dripper will perform as non-pressure-compensated dripper and provide flow that increases with the pressure increase until reaching the minimum defined limit working pressure.

If the Netafim™ pressure-compensated drippers are exposed to a higher pressure than the defined maximum pressure, the drippers will continue to regulate the flow rate, but become more sensitive to clogging, usually the maximum working pressure of the drippers are determined by the driplines limitations (diameter and wall thickness) and most importantly the pipe and its associated connections.

## / Max. lateral length

Flow Variation (FV) expresses the flow variation between the dripper “sensing” the highest pressure and the one “sensing” the lowest pressure in an irrigation block (zone).

These drippers will not always be the first and last drippers on the dripline.

$$FV \% = (Q_{max} - Q_{min}) / Q_{max} * 100$$

\*International standards define 10% flow variation to be considered as uniform irrigation.

In order to calculate the maximum run lengths that can be planned for specific dripline (considering all the hydraulic factors influencing the flow within the same dripline), we use a calculation software that was developed by Netafim™ based on Darcy-Waisbach formulas + years of design experience and cooperation with academic institutes.

All the tables presented in this document are for initial reference only; the exact run length of the driplines is obtained from design software that considers various hydraulic factors in the entire system.

There might be small variance between the different software's in the market due to the calculation method and assumptions each software is using. For an initial estimate of the dripline length, the data that is presented in this document (within the tables shown) is sufficiently accurate.

As we have already seen, pressure-compensated drippers of Netafim™ will provide equal flow irrespective of the working pressure, therefore, the factors that are affecting the dripline run lengths will be: the dripline inlet pressure, the minimum working pressure set for the dripper and the slope.

## Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 16009/16010/16011/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 0.70 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	83	112	135	153	168	180	190	197	204
	2.0	111	154	190	221	248	271	291	310	326
	2.5	130	182	227	267	302	334	362	388	411
	3.0	145	204	256	303	345	383	418	449	478
	3.5	158	223	281	333	380	424	463	500	534
	4.0	169	239	302	359	412	459	503	545	583

Flat terrain	1.5	96	137	176	213	247	279	310	340	369
	2.0	121	174	224	270	314	356	395	434	471
	2.5	139	200	257	311	361	410	456	500	543
	3.0	153	221	284	343	400	453	504	554	600
	3.5	165	239	306	371	431	489	545	598	649
	4.0	176	254	326	395	460	522	581	637	692

Downhill 2%	1.5	108	163	219	275	331	387	443	500	557
	2.0	131	195	258	321	382	444	505	565	626
	2.5	148	218	288	355	422	488	553	617	681
	3.0	161	238	312	384	455	524	593	661	727
	3.5	173	254	332	409	483	557	628	698	768
	4.0	183	269	351	431	509	585	659	733	805

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition  
Due to lateral filling time and flushing effectiveness it is not recommended to exceed 800 meters lateral length

## Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 16009/16010/16011/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 1.00 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	68	93	113	131	145	158	167	176	184
	2.0	90	125	156	183	207	228	247	265	280
	2.5	105	147	185	219	249	277	302	326	347
	3.0	116	164	208	247	282	315	345	373	399
	3.5	126	179	227	270	310	347	381	412	442
	4.0	135	192	243	291	334	375	412	447	480

Flat terrain	1.5	76	109	140	169	196	222	246	270	293
	2.0	96	138	177	214	249	282	314	345	374
	2.5	110	158	204	246	286	325	362	397	431
	3.0	121	175	225	272	317	359	400	439	477
	3.5	131	189	243	294	342	388	432	474	515
	4.0	139	201	258	313	364	414	461	506	549

Downhill 2%	1.5	83	125	166	208	248	290	330	372	412
	2.0	102	151	199	246	292	337	382	428	472
	2.5	115	170	223	274	325	374	422	471	518
	3.0	126	185	242	298	352	404	456	507	556
	3.5	135	198	259	318	374	430	484	537	590
	4.0	144	210	274	336	395	453	510	565	620

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition

### Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 16009/16010/16011/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 1.60 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	51	71	88	103	116	127	138	147	155
	2.0	67	95	119	141	160	179	195	210	224
	2.5	78	110	140	166	191	214	234	254	272
	3.0	86	123	156	187	214	241	265	288	309
	3.5	93	133	170	204	235	263	290	316	340
	4.0	100	143	182	218	251	284	313	341	367
Flat terrain	1.5	56	80	103	124	144	163	182	200	216
	2.0	70	101	130	158	184	208	231	254	276
	2.5	81	116	150	181	211	239	266	293	318
	3.0	89	128	165	200	233	265	294	324	352
	3.5	96	139	178	216	252	286	318	350	380
	4.0	102	147	190	230	268	305	339	373	405
Downhill 2%	1.5	60	89	117	145	173	200	228	255	282
	2.0	74	108	142	175	206	238	269	299	329
	2.5	84	122	160	197	232	266	300	333	365
	3.0	92	134	175	214	252	289	325	360	395
	3.5	98	144	187	229	269	309	346	384	421
	4.0	104	152	198	242	285	326	366	405	444

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition

### Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 16009/16010/16011/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 2.30 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	41	58	72	85	97	106	116	124	132
	2.0	53	76	96	114	130	146	160	174	186
	2.5	62	88	112	134	154	173	190	207	222
	3.0	68	98	124	150	172	194	214	233	251
	3.5	74	106	135	163	188	211	234	256	276
	4.0	79	113	145	174	202	228	251	275	297
Flat terrain	1.5	44	63	81	98	114	130	144	158	171
	2.0	55	80	103	125	145	165	183	201	218
	2.5	64	92	118	143	167	189	210	231	251
	3.0	70	101	130	158	184	209	233	256	278
	3.5	76	109	141	171	199	226	252	276	301
	4.0	80	116	150	182	212	241	268	294	320
Downhill 2%	1.5	46	68	90	111	132	153	173	193	212
	2.0	57	84	110	135	160	183	206	230	252
	2.5	65	95	124	153	179	206	231	257	281
	3.0	72	105	136	167	196	224	252	279	305
	3.5	77	113	146	179	209	240	270	298	326
	4.0	82	119	155	189	222	254	285	315	344

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition

### Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 16009/16010/16011/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 3.50 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	32	45	56	67	77	85	94	101	108
	2.0	41	58	74	89	102	114	126	137	147
	2.5	47	68	86	104	119	134	149	162	175
	3.0	52	75	96	115	133	151	166	182	196
	3.5	56	81	104	125	145	164	182	198	215
	4.0	60	86	111	134	155	175	194	213	230
Flat terrain	1.5	33	48	62	75	87	99	110	121	131
	2.0	42	61	78	95	110	125	139	153	166
	2.5	48	70	90	109	127	144	161	176	192
	3.0	53	77	99	120	140	159	178	195	212
	3.5	57	83	107	130	151	172	192	211	229
	4.0	61	88	114	138	161	183	204	224	244
Downhill 2%	1.5	35	51	67	82	97	112	126	140	154
	2.0	43	63	82	101	119	136	153	169	186
	2.5	49	72	94	114	134	153	173	191	209
	3.0	54	79	102	125	147	168	188	208	228
	3.5	58	85	110	134	158	180	202	223	244
	4.0	62	90	117	143	167	191	214	236	258

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition

### Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 0.70 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	130	162	184	199	209	217	223	228	231
	2.0	182	238	280	313	340	361	378	393	406
	2.5	218	289	346	393	432	466	494	518	539
	3.0	246	329	398	456	505	548	586	618	648
	3.5	269	363	442	509	566	617	662	703	739
	4.0	289	392	479	554	620	678	730	777	819
Flat terrain	1.5	168	233	292	347	397	445	489	532	573
	2.0	213	297	373	443	507	568	626	681	734
	2.5	245	343	430	511	586	656	722	787	848
	3.0	271	379	476	565	648	727	801	871	939
	3.5	293	409	514	611	701	786	866	943	1017
	4.0	312	436	548	652	748	839	925	1006	1085
Downhill 2%	1.5	207	309	412	514	616	718	817	905	990
	2.0	245	359	471	581	689	796	900	995	1087
	2.5	273	397	517	634	748	860	969	1068	1166
	3.0	296	429	556	678	797	914	1027	1132	1235
	3.5	316	456	587	717	841	962	1079	1189	1295
	4.0	334	480	619	752	880	1005	1126	1239	1350

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition  
Due to lateral filling time and flushing effectiveness it is not recommended to exceed 800 meters lateral length

### Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 1.00 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	109	140	162	178	190	200	208	214	219
	2.0	149	198	236	268	295	316	335	352	366
	2.5	177	238	288	331	367	398	426	451	473
	3.0	199	269	328	380	424	463	498	530	558
	3.5	217	296	362	420	472	517	558	596	630
	4.0	233	318	392	456	512	564	610	653	692
Flat terrain	1.5	133	185	232	276	316	353	389	423	456
	2.0	169	236	296	352	403	452	498	542	583
	2.5	194	272	341	406	465	522	574	626	674
	3.0	215	300	378	449	515	577	636	693	747
	3.5	232	325	408	485	557	624	689	750	809
	4.0	247	346	435	518	594	666	734	800	863
Downhill 2%	1.5	157	233	308	382	455	528	601	673	745
	2.0	189	275	358	439	518	596	674	750	826
	2.5	212	306	396	483	568	650	731	812	891
	3.0	230	332	428	520	609	696	781	864	947
	3.5	247	354	455	552	645	736	824	911	996
	4.0	261	374	480	581	677	771	863	953	1041

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition  
Due to lateral filling time and flushing effectiveness it is not recommended to exceed 800 meters lateral length

### Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 1.60 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	85	111	132	148	161	173	182	190	196
	2.0	114	153	186	214	237	258	277	293	308
	2.5	134	182	222	258	289	317	342	365	386
	3.0	149	204	252	293	330	363	394	421	447
	3.5	162	223	276	323	364	402	437	469	499
	4.0	174	240	297	348	394	436	474	510	544
Flat terrain	1.5	98	137	171	203	233	261	287	313	337
	2.0	124	174	218	260	298	333	368	401	431
	2.5	143	200	252	299	343	385	425	463	498
	3.0	158	221	278	331	380	426	470	512	552
	3.5	170	239	301	358	411	461	509	554	598
	4.0	181	255	321	382	439	492	542	591	638
Downhill 2%	1.5	111	163	212	262	310	357	404	451	498
	2.0	135	195	252	307	361	412	464	515	564
	2.5	152	219	281	341	399	455	510	564	617
	3.0	166	238	306	370	431	491	549	606	661
	3.5	178	255	326	394	459	522	582	642	700
	4.0	189	270	345	416	484	550	613	674	735

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition

## Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 2.30 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	69	92	110	126	139	150	159	167	175
	2.0	91	124	152	176	197	216	233	248	263
	2.5	107	146	181	211	238	262	284	304	323
	3.0	119	164	203	238	269	298	324	348	371
	3.5	129	179	222	261	296	328	358	385	411
	4.0	138	192	238	281	319	354	386	417	446

Flat terrain	1.5	77	108	136	161	184	207	228	248	267
	2.0	98	137	173	205	235	264	291	317	342
	2.5	113	158	199	237	272	305	336	366	395
	3.0	124	175	220	262	301	337	372	405	437
	3.5	134	189	238	283	325	365	402	439	473
	4.0	143	201	254	302	347	389	430	468	505

Downhill 2%	1.5	85	124	161	197	232	267	302	335	369
	2.0	105	150	194	235	275	314	351	389	425
	2.5	119	170	217	263	307	349	390	430	469
	3.0	130	185	237	286	332	378	422	464	506
	3.5	139	199	254	306	355	403	449	494	537
	4.0	148	210	268	323	375	425	474	520	566

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition

## Max. lateral length (meter) at different inlet pressure and different slopes

UniRam™ CNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 3.50 l/h

	Distance between drippers (meter)									
	Inlet pressure (bar)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Uphill 2%	1.5	54	73	89	102	114	124	133	141	149
	2.0	71	97	120	140	157	174	188	202	214
	2.5	82	114	141	166	187	207	226	243	259
	3.0	92	127	158	186	211	235	256	276	295
	3.5	99	138	172	203	231	257	281	303	325
	4.0	106	148	184	218	248	277	302	328	351

Flat terrain	1.5	59	82	103	123	141	158	174	189	204
	2.0	75	104	132	157	179	202	222	242	261
	2.5	86	120	152	181	207	232	257	280	302
	3.0	95	133	168	200	229	258	284	310	334
	3.5	102	144	181	216	248	279	307	335	361
	4.0	109	153	193	230	265	297	328	357	386

Downhill 2%	1.5	63	92	118	144	169	193	217	240	264
	2.0	78	112	144	174	202	230	258	284	310
	2.5	89	127	162	196	227	258	288	317	345
	3.0	98	139	177	214	248	281	313	344	374
	3.5	105	149	190	229	265	300	334	367	399
	4.0	111	158	202	243	281	318	354	388	421

Minimum considered pressure 1.0 bar. Max. working pressure according the dripline wall thickness definition