UniRam™ HCNL

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

→ 16009 - 16010 - 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 (HCNL)	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.

Specifications

- Pressure-compensated range: 1.5 - 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, 1.20 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^2)	Constant K	Exponent* X	Recommended filtration (micron)/(mesh)	Shut off pressure (bar)
0.85	1.5 – 4.0	0.70 x 0.65 x 40	110	0.85	0	130/120	0.25
1.25		0.83 x 0.74 x 40	130	1.25	0	130/120	0.25
2.00		1.09 X 0.76 x 40	130	2.00	0	130/120	0.25
2.90		1.26 x 0.93 x 40	130	2.90	0	130/120	0.25
4.40		1.59 x 1.07 x 40	150	4.40	0	130/120	0.25

* 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
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
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 Netfaim™ 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™ HCNL 16009/16010/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 0.85 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%	2.0	75	101	123	141	155	167	178	186	194
	2.5	99	137	171	200	225	247	267	285	301
	3.0	116	162	203	240	272	302	329	353	375
	3.5	129	182	229	271	310	344	377	407	434
	4.0	140	198	250	298	341	380	417	451	483
Flat terrain	2.0	84	121	155	187	217	246	274	301	326
	2.5	107	153	197	238	277	314	349	383	415
	3.0	122	176	226	274	319	361	402	441	479
	3.5	135	194	250	303	352	399	444	488	530
	4.0	146	210	270	327	380	431	480	527	573
Downhill 2%	2.0	94	141	188	236	283	330	378	425	472
	2.5	114	170	224	277	330	382	434	485	536
	3.0	129	191	250	309	365	421	477	532	586
	3.5	141	207	272	334	395	454	514	572	628
	4.0	151	222	290	356	421	483	545	606	665

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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

UniRam™ HCNL 16009/16010/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 1.25 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%	2.0	60	82	101	117	131	143	154	162	170
	2.5	78	110	137	162	184	204	222	238	253
	3.0	91	128	162	192	220	245	268	290	310
	3.5	101	143	181	216	248	277	305	330	354
	4.0	109	156	198	236	272	305	335	365	391
Flat terrain	2.0	65	94	121	146	169	192	214	234	254
	2.5	83	119	153	185	215	244	272	298	324
	3.0	95	137	176	213	248	281	313	344	373
	3.5	105	151	194	235	274	311	346	380	413
	4.0	113	163	210	254	296	335	374	410	446
Downhill 2%	2.0	71	106	140	175	209	243	277	311	344
	2.5	87	129	169	209	247	286	323	360	397
	3.0	99	146	190	234	276	318	358	399	438
	3.5	108	159	207	254	300	344	388	430	472
	4.0	116	170	222	272	320	367	413	458	502

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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

UniRam™ HCNL 16009/16010/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 2.00 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%	2.0	45	63	78	92	104	114	124	133	141
	2.5	58	82	104	124	142	158	173	187	200
	3.0	67	96	122	146	167	188	206	224	240
	3.5	75	107	136	163	188	211	233	253	272
	4.0	81	116	148	177	205	230	254	277	299
Flat terrain	2.0	48	69	89	107	125	141	158	173	187
	2.5	61	88	112	136	158	180	200	220	239
	3.0	70	101	130	157	182	207	230	253	275
	3.5	77	111	143	173	202	229	255	280	304
	4.0	83	120	154	187	218	247	275	302	329
Downhill 2%	2.0	51	76	100	123	146	169	192	214	236
	2.5	63	93	121	149	176	202	228	254	279
	3.0	72	105	137	168	198	227	255	284	311
	3.5	79	115	150	184	215	247	278	308	337
	4.0	85	124	161	197	231	264	297	329	359

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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

UniRam™ HCNL 16009/16010/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 2.90 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%	2.0	36	50	63	75	85	95	103	111	118
	2.5	46	65	83	99	114	127	141	152	164
	3.0	53	76	97	116	134	151	166	181	195
	3.5	59	84	108	130	149	169	186	203	220
	4.0	64	92	117	141	163	184	203	222	240
Flat terrain	2.0	38	54	70	84	98	111	124	136	147
	2.5	48	69	88	107	125	141	158	173	188
	3.0	55	79	102	123	143	162	182	199	216
	3.5	60	87	112	136	158	180	200	221	239
	4.0	65	94	121	147	171	194	217	238	259
Downhill 2%	2.0	40	58	76	94	111	128	145	161	178
	2.5	49	72	94	115	135	155	174	194	213
	3.0	56	82	106	130	153	175	197	218	238
	3.5	61	89	116	142	167	191	214	237	259
	4.0	66	96	125	153	179	204	230	254	277

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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

UniRam™ HCNL 16009/16010/16012 • ID 14.2 mm • Kd 1.3 • Flow rate 4.40 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%	2.0	28	39	49	59	67	75	82	89	96
	2.5	35	50	64	77	89	100	110	120	129
	3.0	41	58	74	90	104	117	130	141	153
	3.5	45	65	83	100	116	131	145	158	171
	4.0	49	70	90	108	125	142	158	173	187
Flat terrain	2.0	29	41	53	64	75	85	94	104	113
	2.5	36	52	67	82	95	108	120	132	144
	3.0	41	60	77	94	109	124	138	152	165
	3.5	46	66	85	104	121	137	153	168	183
	4.0	49	71	92	112	130	148	165	182	198
Downhill 2%	2.0	30	44	57	70	83	95	107	119	130
	2.5	37	54	70	86	101	116	130	144	158
	3.0	42	62	80	98	115	131	147	163	178
	3.5	46	68	88	107	125	144	161	178	194
	4.0	50	73	94	115	135	154	173	191	208

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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

UniRam™ HCNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 0.85 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%	2.0	118	150	172	188	199	209	215	221	225
	2.5	164	215	256	289	315	337	355	372	385
	3.0	195	260	314	359	396	428	457	482	504
	3.5	219	296	359	413	460	501	538	570	599
	4.0	239	325	397	459	513	561	605	644	679
Flat terrain	2.0	148	206	258	306	350	392	432	470	506
	2.5	188	262	329	391	448	501	552	601	648
	3.0	216	302	379	451	517	579	638	694	748
	3.5	239	334	420	499	572	641	706	769	829
	4.0	258	361	454	539	619	694	765	833	898
Downhill 2%	2.0	178	265	351	437	521	607	691	776	860
	2.5	212	310	405	498	589	679	769	857	945
	3.0	238	344	447	546	643	738	831	923	1015
	3.5	258	373	481	586	688	787	885	980	1075
	4.0	276	397	512	621	727	831	932	1031	1129

Minimum considered pressure 1.5 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™ HCNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 1.25 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%	2.0	97	126	147	164	177	188	196	203	209
	2.5	131	176	211	242	266	288	307	324	338
	3.0	155	210	255	295	329	358	386	410	431
	3.5	174	236	290	336	377	414	447	477	504
	4.0	189	259	319	371	418	460	498	533	566
Flat terrain	2.0	115	160	201	239	273	306	337	366	395
	2.5	146	204	256	304	349	391	431	469	506
	3.0	168	235	295	351	403	452	498	542	584
	3.5	185	260	327	389	446	500	551	600	647
	4.0	200	281	353	420	482	541	597	650	701
Downhill 2%	2.0	133	196	258	318	378	438	497	555	614
	2.5	161	233	302	370	435	500	563	626	688
	3.0	181	261	336	409	479	548	615	681	747
	3.5	197	283	364	442	516	589	659	729	797
	4.0	211	303	388	470	548	624	698	770	841

Minimum considered pressure 1.5 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™ HCNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 2.00 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%	2.0	75	99	118	135	148	159	168	176	183
	2.5	99	135	164	190	212	232	250	266	280
	3.0	117	159	196	228	257	282	306	327	347
	3.5	130	179	221	258	292	322	350	375	399
	4.0	141	195	242	283	320	355	386	416	443
Flat terrain	2.0	85	118	148	176	202	226	249	271	292
	2.5	107	150	189	225	257	289	318	347	374
	3.0	124	173	218	259	297	333	368	401	432
	3.5	136	191	241	287	329	369	407	444	478
	4.0	147	207	260	310	356	400	441	480	518
Downhill 2%	2.0	94	137	179	220	259	298	337	375	413
	2.5	115	166	214	260	305	348	390	433	474
	3.0	131	187	240	291	339	386	432	477	521
	3.5	143	204	261	316	367	418	466	514	560
	4.0	153	219	279	337	392	445	496	546	595

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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

UniRam™ HCNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 2.90 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%	2.0	60	81	98	113	125	135	145	153	160
	2.5	79	108	133	155	175	192	207	222	235
	3.0	93	128	158	185	209	230	250	269	287
	3.5	103	143	177	208	236	261	285	307	327
	4.0	112	155	193	227	258	287	314	338	361
Flat terrain	2.0	66	93	116	139	159	178	196	213	230
	2.5	84	118	148	177	203	228	251	274	295
	3.0	97	136	171	204	234	263	290	315	340
	3.5	107	150	189	226	259	291	321	349	377
	4.0	116	162	204	244	280	314	347	378	408
Downhill 2%	2.0	72	105	136	166	194	223	251	278	306
	2.5	89	128	164	199	232	264	296	327	357
	3.0	101	144	185	223	260	295	330	363	395
	3.5	111	158	202	243	283	321	357	392	428
	4.0	119	170	216	261	302	342	381	419	455

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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

UniRam™ HCNL 20010/20012 • ID 17.5 mm • Kd 0.4 • Flow rate 4.40 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%	2.0	47	64	78	91	101	111	119	127	134
	2.5	61	84	104	123	139	153	166	179	190
	3.0	71	99	123	145	164	182	198	214	229
	3.5	79	110	137	162	184	205	224	242	259
	4.0	86	119	149	177	201	224	246	266	285
Flat terrain	2.0	51	71	89	106	121	137	150	164	176
	2.5	64	90	113	135	155	174	192	209	225
	3.0	74	104	131	156	179	201	222	241	260
	3.5	81	115	144	172	198	222	245	267	288
	4.0	88	124	156	186	214	240	266	289	312
Downhill 2%	2.0	54	78	100	122	142	162	182	202	221
	2.5	67	96	122	148	172	195	218	240	262
	3.0	76	109	138	167	194	220	245	269	293
	3.5	84	119	152	183	212	239	266	293	318
	4.0	90	128	163	196	227	257	286	313	340

Minimum considered pressure 1.5 bar. Max. working pressure according the dripline wall thickness definition

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