

Pot Watering Systems

Automated
Watering
Systems
for Greenhouse
and Nursery



Improves Plant Quality



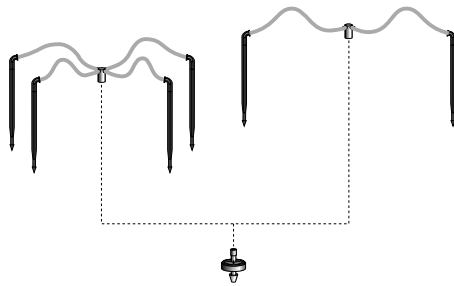
4-Way MOD System



2-Way MOD System



Angle Arrow Dripper



Production Tool

Comparing a Netafim system to hand watering is like comparing a hand saw to a power saw. A hand tool is fine if you have the time, but for production scale growing, power tools are a terrific step forward.

Higher Crop Value

This results from having a highly uniform top quality crop - which is what to expect when water and fertilizer uniformity are improved. Netafim's Multi Outlet Drippers (MOD) feature both pressure compensation and a built-in check valve. This combination of features (referred to

as PCNL) is the highest level of technology available in drippers today. This technology ensures that every plant will receive exactly the same amount of water and fertilizer regardless of where the plant is located within the system. Each dripper adjusts itself automatically to the system pressure and elevation so that even on rolling or sloped ground, the uniformity of watering is 94%. The built-in check valve prevents unwanted drainage of the system onto the lowest plants when the watering cycle is completed.

Flexible and Portable

The 4-Way Flat manifold separates for easy storage or transport in a box. The dripper supply tubing (with the dripper attached) can then be rolled up without tangling the spaghetti tubes. If a different plant spacing is desired, simply change the 4-Way manifold.

Less Disease

Water on foliage and flowers can spread disease rapidly. By applying water directly to the pot, the rest of the plant remains dry. Additionally, pesticides which are applied to the foliage are not washed off by daily watering. This can reduce the need for spraying - further lowering production costs - and decrease run-off contamination.

Payback Period for a Netafim Pot Watering System

Hand Watering Schedule (<i>per plant</i>)	3 seconds once a day			
Cost per Plant	\$0.50			
Wages & Benefits (<i>per hour</i>)	\$7	\$8	\$9	\$12
Netafim System Payback (<i>days</i>)	129	113	100	76

Low Cost and Fast Payback

Payback for a complete system is usually within the first season of operation.

Low Cost and Saves Labor

Three Manifold Options

The Flat manifold is ideal for field applications. The low-profile design and durable construction resists damage from field workers. The Flat Stackable manifold is combined with a 4-Way or 2-Way manifold to create additional configurations.



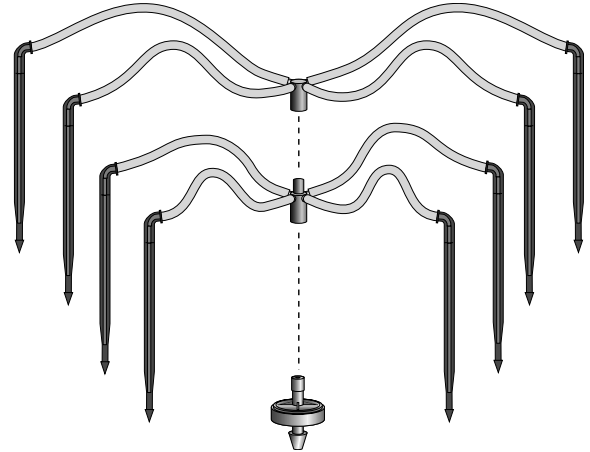
Flat Stackable Manifold



Flat 4-Way Manifold



Flat 2-Way Manifold



Flat Stackable Manifold

When many small pots are to be watered, two manifold assemblies can be stacked together to create an 8-Way assembly. The flow per pot is then .25 gallons per hour (GPH). For every 10 gallons per minute (GPM) available, 2,000 pots can be watered.

Angle Arrow Drippers

Two Angle Arrow Dripper options are available:

- The standard Angle Arrow Dripper is 6 3/8" in length and is used for large pots.
- The Short Angle Arrow Dripper's length is 3 3/4" and is ideal for 4" to 5" pots.



Pressure Compensating Drippers

The WPCJL is pressure compensating to provide a constant flow from 10 to 45 psi and has a built-in check valve to prevent system drainage into the lowest plants.

- Flat 4-Way manifold is usually combined with the 2.0 GPH WPCJL Dripper - .50 GPH per plant.
- Flat 2-Way manifold is usually combined with the 1.0 GPH WPCJL Dripper - .50 GPH per plant.



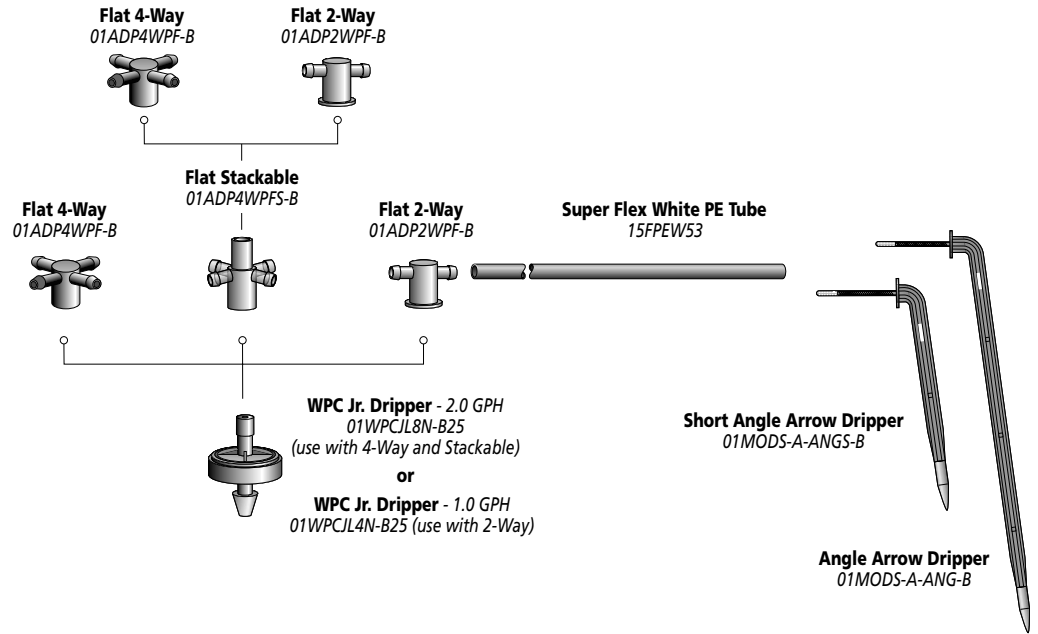
UV White™ PE Tubing

Fully UV resistant and completely opaque to prevent algae growth. This tubing is not coated or layered white, it is solid white for long-term durability. Netafim's UV White™ PE Tubing produces cooler water temperatures and enhances plant growth.

Components and Part Numbers

For complete assembly, order one **A** Manifold Assembly and one **B** Woodpecker Pressure Compensating Junior Dripper.

NOTE: The flow per arrow dripper is equal to the dripper flow divided by the number of arrow drippers on that assembly. To ensure plants will receive equal water flow, use the same assemblies on each zone.



Angle Arrow Dripper Assemblies

Flat 4-Way

Part Number	Tube Lengths	Bundle Quantity
014DM-1818F	(4) at 18"	25
014DM-1830F	(2) at 18" & (2) at 30"	25
014DM-2424F	(4) at 24"	25
014DM-2436F	(2) at 24" & (2) at 36"	25
014DM-3030F	(4) at 30"	25
A 014DM-1818FS	(4) at 18"	25
A 014DM-1830FS	(2) at 18" & (2) at 30"	25
A 014DM-2424FS	(4) at 24"	25
A 014DM-2436FS	(2) at 24" & (2) at 36"	25
A 014DM-3030FS	(4) at 30"	25
B 01WPCJL8N-B25	WPC Jr. Dripper, 2.0 GPH	25

Flat Stackable

Part Number	Tube Lengths	Bundle Quantity
014DMS-1818F	(4) at 18"	25
014DMS-1830F	(2) at 18" & (2) at 30"	25
014DMS-2424F	(4) at 24"	25
014DMS-2436F	(2) at 24" & (2) at 36"	25
014DMS-3030F	(4) at 30"	25
A 014DMS-1818FS	(4) at 18"	25
A 014DMS-1830FS	(2) at 18" & (2) at 30"	25
A 014DMS-2424FS	(4) at 24"	25
A 014DMS-2436FS	(2) at 24" & (2) at 36"	25
A 014DMS-3030FS	(4) at 30"	25
B 01WPCJL8N-B25	WPC Jr. Dripper, 2.0 GPH	25

Flat 2-Way

Part Number	Tube Lengths	Bundle Quantity
012DM-2424F	(2) at 24"	25
012DM-3030F	(2) at 30"	25
A 012DM-2424FS	(2) at 24"	25
A 012DM-3030FS	(2) at 30"	25
B 01WPCJL4N-B25	WPC Jr. Dripper, 1.0 GPH	25

Short Angle Arrow Dripper Assemblies

Flat 4-Way

Part Number	Tube Lengths	Bundle Quantity
014DM-1818FS	(4) at 18"	25
014DM-1830FS	(2) at 18" & (2) at 30"	25
014DM-2424FS	(4) at 24"	25
B 01WPCJL8N-B25	WPC Jr. Dripper, 2.0 GPH	25

Flat Stackable

Part Number	Tube Lengths	Bundle Quantity
014DMS-1818FS	(4) at 18"	25
014DMS-1830FS	(2) at 18" & (2) at 30"	25
014DMS-2424FS	(4) at 24"	25
B 01WPCJL8N-B25	WPC Jr. Dripper, 2.0 GPH	25

Flat 2-Way

Part Number	Tube Lengths	Bundle Quantity
012DM-1818FS	(2) at 18"	25
012DM-2424FS	(2) at 24"	25
B 01WPCJL4N-B25	WPC Jr. Dripper, 1.0 GPH	25

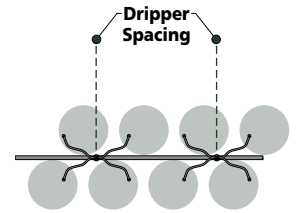
Selecting and Sizing an MOD System

4-Way MOD Dripper Supply Pipe Sizing

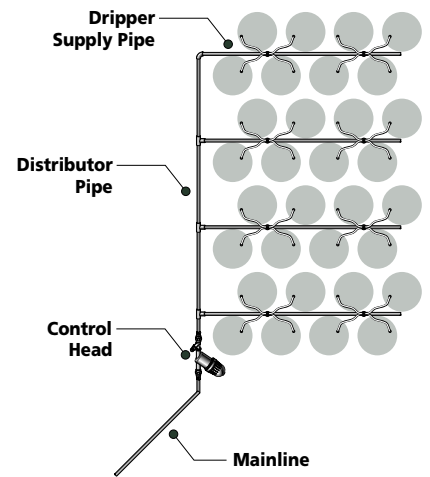
Length of Pipe (feet)	Dripper Spacing (inches)				
	6"	12"	18"	24"	36"
50	16mm poly	16mm poly	16mm poly	16mm poly	16mm poly
100	1/2"				
150	3/4" poly	1/2" poly			
200		3/4" poly	1/2" poly		
250	1" poly		3/4" poly	1/2" poly	
300				3/4" poly	1/2" poly
350					1/2" poly
400		1" poly			

Assumes 35 psi inlet pressure, 10 psi at last dripper & no slope.

Step 1 Using the top row of the table at left, select the dripper spacing to be used. By matching this to the length of pipe column, the correct size Dripper Supply Pipe can be determined.



Step 2 Use the Zone Flow Chart below to determine the Flow Demand for the system. Select from the chart the number of plants to be watered at the same time. Use the resulting flow from this to determine the correct sizing for the pipe and control head components. Note that the 4-Way MOD has a flow of 0.5 gallons per hour (GPH) per plant, and the 8-Way MOD has a flow of 0.25 GPH per plant.



Zone Flow Chart (GPM) Assumes use of a 2 GPH dripper.

Number of Plants	200	400	600	800	1000	1200	1400	1600	1800	2000
GPM 4-Way MOD	2	3	5	7	8	10	12	13	15	17
GPM 8-Way MOD	1	2	3	3	4	5	6	7	8	8

Step 3 Size the Distributor and Mainline Pipes using the maximum Flow Demand from the largest zone or combination of zones which may be watered at the same time. Either PVC, or polyethylene pipe can be used for the Distributor and Mainline. If PVC is used above ground, it should be painted to prevent light penetration, which can result in the growth of algae within the pipe. These charts are appropriate for distributor lengths of up to 40 ft. and mainlines of up to 100 ft. When slopes are a factor, when longer length pipes are needed, or for other special conditions, please consult a certified Netafim System Designer for assistance.

Distributor Pipe Sizing

Pipe Size	Maximum GPM
1/2"	4
3/4"	7
1"	13
1 1/4"	30
1 1/2"	45

Mainline Pipe Sizing

Pipe Size	Maximum GPM
3/4"	8
1"	12
1 1/4"	22
1 1/2"	30
2"	45

Step 4 Size the Head Control (filter, pressure regulator, and valve) based on the Flow Demand determined in step 2. It is very important to recognize the minimum flow for the pressure regulator. Be sure to size the pressure regulator by determining both the minimum, and the maximum number of plants which may be watered at the same time. Use a 20 psi Low Flow Pressure Regulator with zones of 400 pots or less and 4-Way MODs. The size of the Head Control components should be determined by the flow demand, and not the size of the pipe that connects to them. Mixed size pipes and components (e.g. 1" filter on 1 1/2" pipe) will have no negative effect on the operation of the system if properly sized by the flow demand.

Filter, Valve and Pressure Regulator Sizing

	Flow Range (GPM)	Unit Size
Electric Valve (AC)	Up to 50	1"
	Up to 125	1 1/2"
	Up to 175	2"
	Up to 225	323
Disc Filter (120 mesh)	Up to 18	3/4"
	Up to 26	1"
	Up to 52	1 1/2" Super
	Up to 120	2" Dual
Pressure Regulator (35 psi)	3.5 to 17.6	3/4"
	7 to 35	1 1/2"
	14 to 70	2" (x4)

See back page for Part Numbers.

A Proven Solution



Higher Crop Value

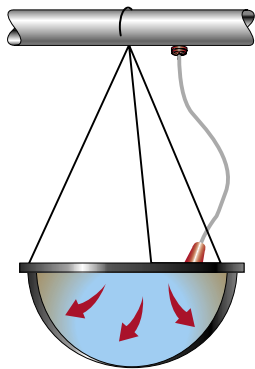
This results from having a highly uniform top quality crop - which is what to expect when water and fertilizer uniformity are improved. Netafim's drippers for hanging baskets feature both pressure compensation and a built-in check valve. This combination of features (referred to as PCNL) is the highest level of technology available in drippers today. This technology ensures that every plant will receive exactly the same amount of water and fertilizer regardless of where the plant is located within the system. Each dripper adjusts itself automatically to the system pressure resulting in a watering uniformity of 94%. The built-in check valve assures that all the drippers will turn on at the same time (when the system is fully pressurized), and prevents the drainage of the system onto the lowest plants when the system is turned off. Netafim drippers may be individually shut-off to prevent unwanted dripping when a basket is removed.

Low Cost and Fast Payback

Payback for a complete system is usually within the first season of operation.

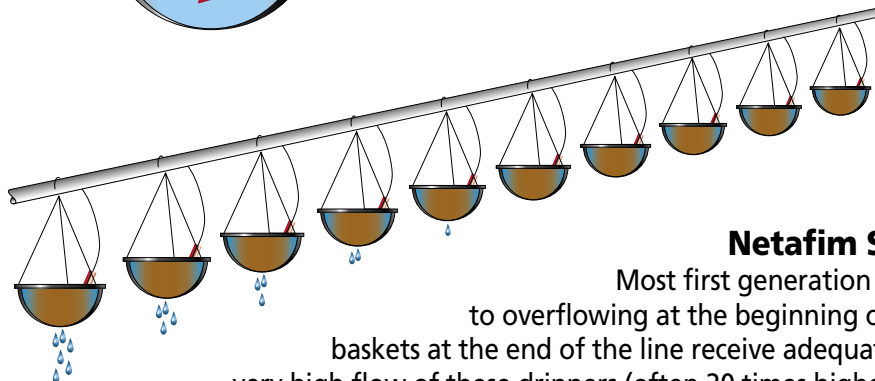
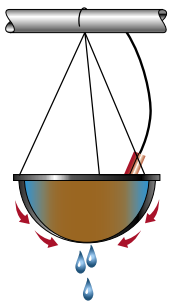
Slow, Low Flow Drippers

Netafim drippers flow slowly, and uniformly, so the soil media is easily wetted without any run-off around the edges of the basket. The PCNL features of the dripper ensure that each plant receives the same amount of water at the same time.



Payback Period for a Netafim Hanging Basket System

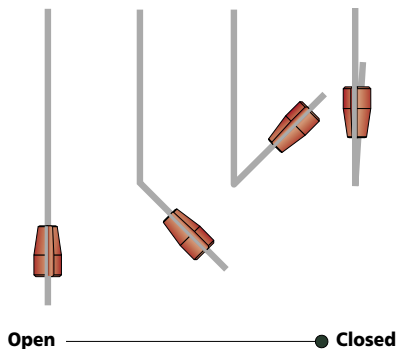
Hand Watering Schedule (per plant)	3 seconds once a day			
Cost per Plant	\$0.75			
Wages & Benefits (per hour)	\$7	\$8	\$9	\$12
Netafim System Payback (days)	129	113	100	76



Netafim Solves This Problem

Most first generation drippers soak the baskets to overflowing at the beginning of the line by the time the baskets at the end of the line receive adequate water. One cause is the very high flow of these drippers (often 20 times higher than Netafim drippers). When the soil media dries and shrinks away from the wall of the basket, the high flow from the drippers runs to the edge, into this gap and around the soil, pouring out on the soil and plants below. The relatively low uniformity of these systems compounds the problem.

Advanced Technology

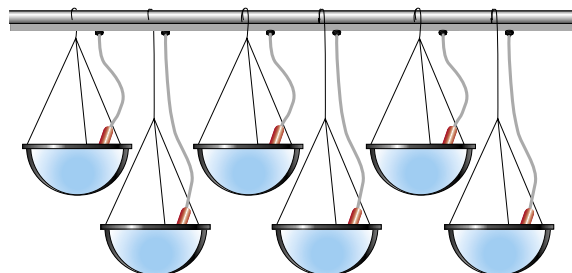


Shut-Off Feature

This feature allows the dripper assembly to be closed easily with one hand. It also provides a quick visual reference for determining if the assembly is open or closed.

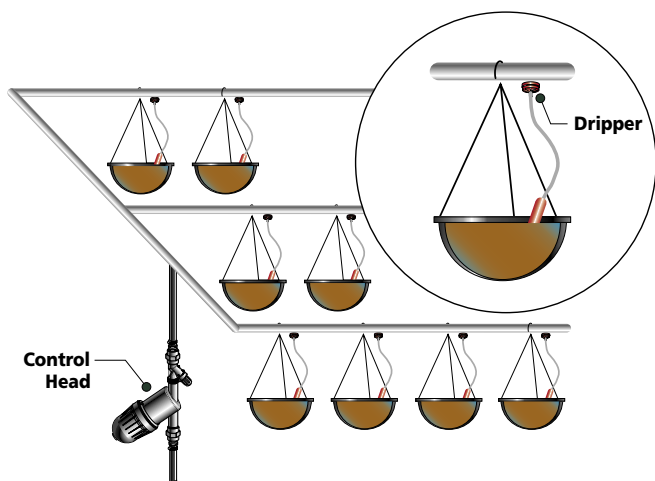
Multi-Tier Uniformity

Netafim Hanging Basket Drippers all flow precisely the same, regardless of the length of tube (unlike lead weight drippers). This means that several lengths of drippers can be combined on the same line, with each dripper emitting precisely the same amount of water.



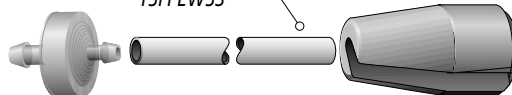
Super Flex UV White™ PE Tubing

Fully UV resistant and completely opaque to prevent algae growth. This tubing is not coated or layered white, it is solid white for long-term durability. Netafim's Super Flex UV White™ PE Tubing produces cooler water temperatures and enhances plant growth.



Super Flex UV White™ PE Tube

15FPEW53



WPCJ Dripper
.5 GPH
01WPCJL2-B

Plastic Weight
1107008C-B

Part Numbers

Part Number	Tube Length	Bundle Quantity
01PWAJLC2W-18	18"	25
01PWAJLC2W-24	24"	25
01PWAJLC2W-36	36"	25
01PWAJPC5W-48*	48"	25

*Assembled with WPC5 dripper.

Sizing a System for Hanging Baskets

Step 1 Using the top row of the table, at right, select the dripper spacing to be used. By matching this to the length of pipe column, the correct size Dripper Supply Pipe can be determined.

Step 2 Use the Zone Flow Chart to determine the Flow Demand for the system. Select from the chart the number of baskets to be watered at the same time. Use the resulting flow from this to determine the correct sizing for the pipe and control head components. Each dripper has a flow rate of 0.5 gallons per hour (GPH).

Step 3 Size the Distributor and Mainline Pipes using the maximum Flow Demand from the largest zone or combination of zones which may be watered at the same time. Either PVC, or polyethylene pipe can be used for

the Distributor and Mainline. If PVC is used above ground, it should be painted to prevent light penetration, which can result in the growth of algae within the pipe. Note that these charts are appropriate for distributor lengths of up to 40 ft. and mainlines of up to 100 ft. When slopes are a factor, when longer length pipes are needed, or for other special conditions, please consult a certified Netafim System Designer for assistance.

Step 4 Size the Control Head (filter, pressure regulator, and valve) based on the Flow Demand determined in step 2. It is very important to recognize the minimum flow for the pressure regulator. Be sure to size the pressure regulator by determining both the minimum, and the maximum number of plants which may be watered at the same time. The size of the Head Control components should be determined by the flow demand, and not the size of the pipe that connects to them. Mixed size pipes and components (e.g., 1" filter on 1 1/2" pipe) will have no negative effect on the operation of the system if properly sized by the flow demand.

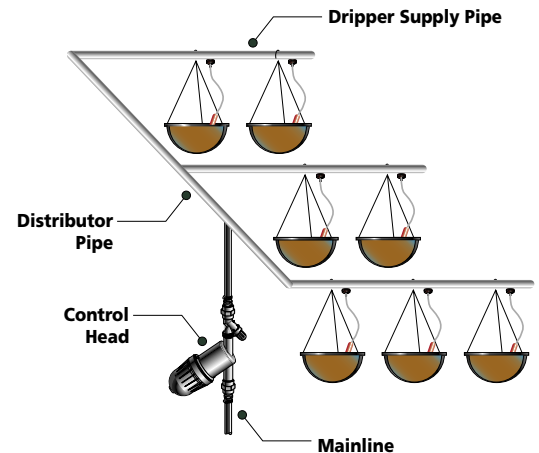
PCNL Dripper Supply Pipe Sizing

Length of Pipe (feet)	Dripper Spacing (inches)				
	6"	12"	18"	24"	36"
50	16mm poly	16mm poly	16mm poly	16mm poly	16mm poly
100	1/2" poly				
150					
200					
250	3/4"				
300					

Assumes 35 psi inlet pressure, 10 psi at last dripper & no slope.

Zone Flow Chart (GPM)

Number of Hanging Baskets	200	400	600	800	1000	1200	1400	1600	1800	2000
GPM	2	3	5	7	8	10	12	13	15	17



Filter, Valve and Pressure Regulator Sizing

	Flow Range (GPM)	Unit Size	Part Number
Electric Valve (AC)	Up to 50	1"	61ET1PBI
	Up to 125	1 1/2"	61ET1.5PBI2
	Up to 175	2"	61ET2PBI2
	Up to 225	3/2"	61ET3/2PBI2
Disc Filter (120 mesh)	Up to 18	3/4"	25A45-120
	Up to 26	1"	25A45-120
	Up to 52	1 1/2" Super	25A17-120
	Up to 120	2" Dual	25A30-120
Pressure Regulator (35 psi)	3.5 to 17.6	3/4"	32PRV.75-35V2K
	7 to 35	1 1/2"	32PRV1.5-35V2K
	14 to 70	2" (x4)	32PRV2-435V2K

Distributor Pipe Sizing

Pipe Size	Maximum GPM
1/2"	4
3/4"	7
1"	13
1 1/4"	30
1 1/2"	45

Mainline Pipe Sizing

Pipe Size	Maximum GPM
3/4"	8
1"	12
1 1/4"	22
1 1/2"	30
2"	45



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