



***Spitfire***  
*intelligent irrigators*

**Performance charts for:**

Ø18, Ø20, Ø22 and Ø24 mm nozzles

Hose pull loads

Speed/Distance/Sweep-speed charts

(Note: Only the HIGH gear ratio values are given. The application amounts increase by 1.5 times, and the travel speeds are reduced by 0.66 when LOW ratio is used. )

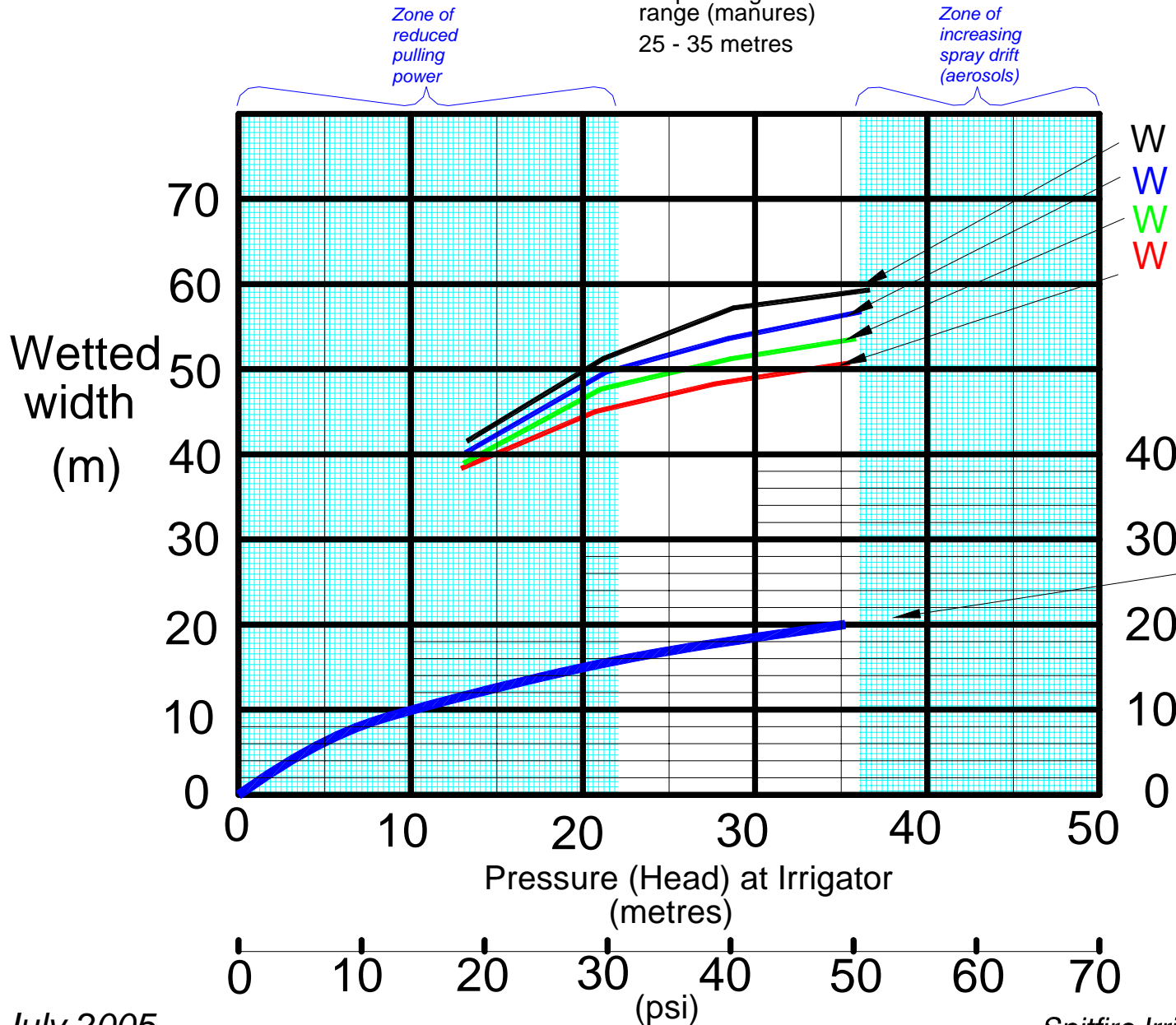
# Ø18 Nozzle

Recommended operating range (water)  
25 - 40 metres

Recommended operating range (manures)  
25 - 35 metres

## WW = Wetted Width versus Pressure

For continuous coverage with a small overlap lane width will be about 90% of the WW shown



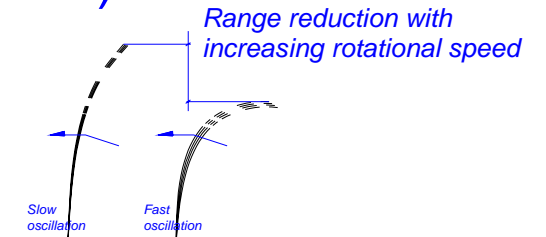
Selector switch setting

- WW @ 60mm application (F)
- WW @ 30mm application (D)
- WW @ 20mm application (C)
- WW @ 8 mm application (A)

Sweep speeds:

Each complete oscillation of the boom (from one side to the other and then back again) advances the irrigator about 80 mm in low ratio and about 120 mm in high ratio. Faster oscillations give rise to a faster travel speed. High ratio is only used for the 10 mm application depth, or less.

Flow rate (m<sup>3</sup>/hr)



Note: The wetted width is reduced by higher boom rotational (oscillation) speeds because the jet of liquid is turned back on itself. That is, it assumes a spiral path because it is encountering more air resistance when it is oscillating faster. Wetted widths are greater at slow speeds, ie higher application depths.

Ø18 Nozzle HIGH Gear Ratio												
	Head	Head	Flow	Flow	Practical Wetted Width (Lane spacing)	Appln Depth	Travel Speed	Sweep period	Pull force in high ratio	Pull force in low ratio	Selector setting	
<b>Boom tele- scoped to 1st stop:</b> Hi = 0.15 Lo = 0.09 (metres per sweep)	(psi)	(m head)	litres per minute	(m <sup>3</sup> /hr)	metres	milli- metres	metres per hour	(From one side to the other and then return to the starting position) seconds	<b>Use <i>low ratio</i> only when pressure is less than 30 psi (21 mhd)</b>	<b>Damage may occur in this <b>RED</b> region</b>		
	<b>0.15</b>	20	14	200	12.0	44	<b>8</b>	34.1	15.8	180 kg	270 kg	<b>A</b>
	<b>0.15</b>	30	21	263	15.8	47	<b>8</b>	42.0	12.9	380 kg	570 kg	
	<b>0.15</b>	40	28	315	18.9	49	<b>8</b>	48.2	11.2	550 kg	<b>825 kg</b>	
<b>0.15</b>	50	35	341	20.5	51	<b>8</b>	50.1	10.8	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	200	12.0	44	<b>15</b>	18.2	29.7	180 kg	270 kg	<b>B</b>	
<b>0.15</b>	30	21	263	15.8	47	<b>15</b>	22.4	24.1	380 kg	570 kg		
<b>0.15</b>	40	28	315	18.9	50	<b>15</b>	25.2	21.4	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	341	20.5	52	<b>15</b>	26.2	20.6	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	200	12.0	44	<b>20</b>	13.6	39.6	180 kg	270 kg	<b>C</b>	
<b>0.15</b>	30	21	263	15.8	48	<b>20</b>	16.4	32.9	380 kg	570 kg		
<b>0.15</b>	40	28	315	18.9	50	<b>20</b>	18.9	28.6	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	341	20.5	53	<b>20</b>	19.3	28.0	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	200	12.0	44	<b>30</b>	9.1	59.4	180 kg	270 kg	<b>D</b>	
<b>0.15</b>	30	21	263	15.8	48	<b>30</b>	11.0	49.3	380 kg	570 kg		
<b>0.15</b>	40	28	315	18.9	52	<b>30</b>	12.1	44.6	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	341	20.5	55	<b>30</b>	12.4	43.5	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	200	12.0	44	<b>45</b>	6.1	89.1	180 kg	270 kg	<b>E</b>	
<b>0.15</b>	30	21	263	15.8	48	<b>45</b>	7.3	73.9	380 kg	570 kg		
<b>0.15</b>	40	28	315	18.9	52	<b>45</b>	8.1	66.9	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	341	20.5	55	<b>45</b>	8.3	65.3	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	200	12.0	44	<b>60</b>	4.5	118.8	180 kg	270 kg	<b>F</b>	
<b>0.15</b>	30	21	263	15.8	48	<b>60</b>	5.5	98.6	380 kg	570 kg		
<b>0.15</b>	40	28	315	18.9	52	<b>60</b>	6.1	89.1	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	341	20.5	55	<b>60</b>	6.2	87.1	<b>800 kg</b>	<b>1050 kg</b>		

# Ø20 Nozzle

## W W = Wetted Width versus Pressure

For continuous coverage with a small overlap lane width will be about 90% of the WW shown

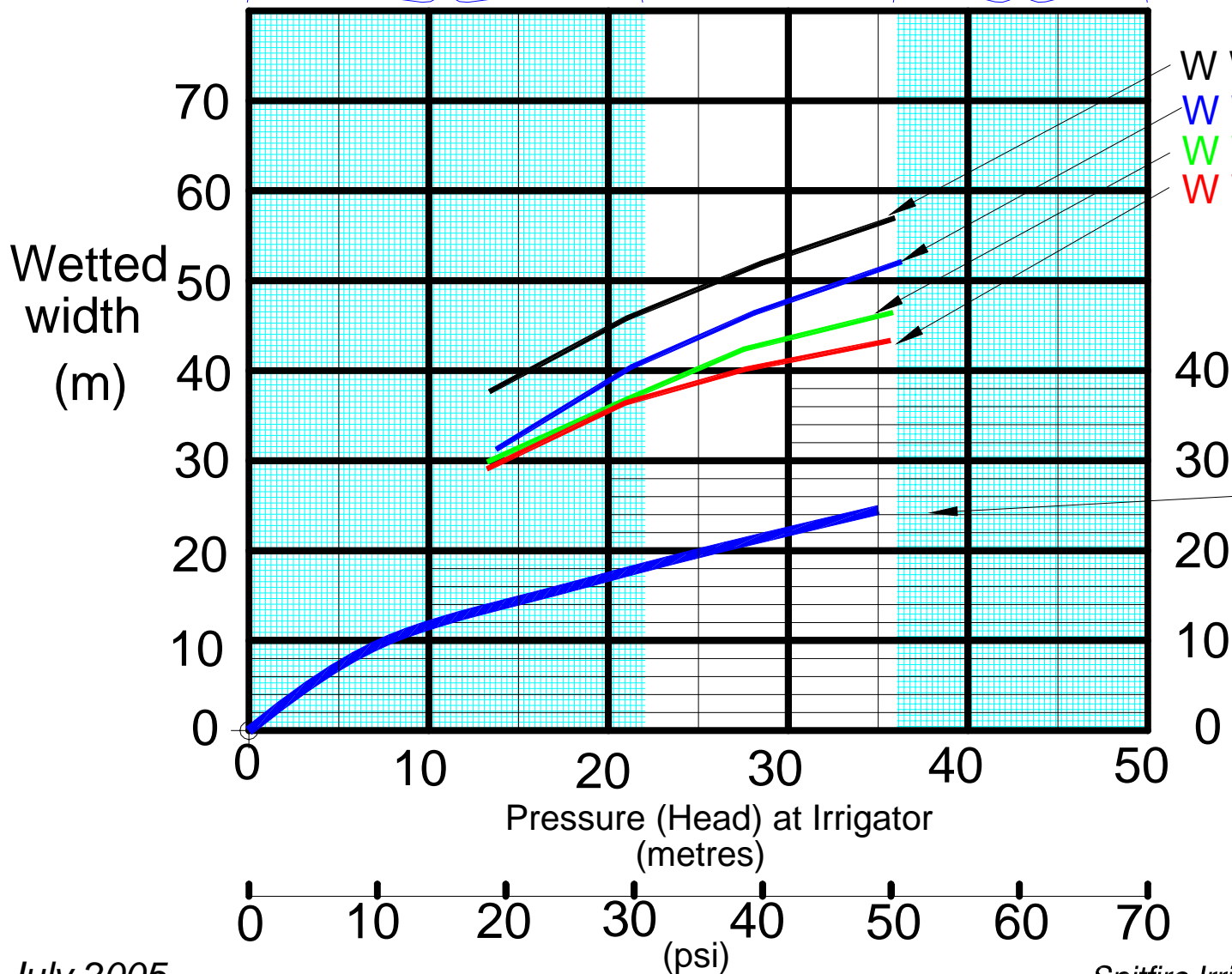
Recommended operating range (water)  
25 - 40 metres

Recommended operating range (manures)  
25 - 35 metres

Zone of reduced pulling power

Zone of increasing spray drift (aerosols)

Selector switch setting

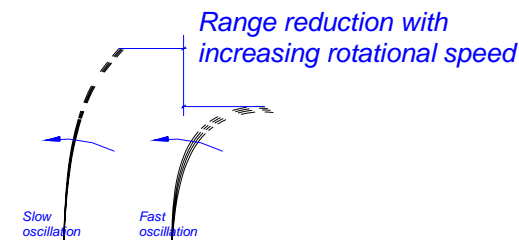


- W W @ 60mm application (F)
- W W @ 40mm application (D)
- W W @ 30mm application (C)
- W W @ 20mm application (A)

Sweep speeds:

Each complete oscillation of the boom (from one side to the other and then back again) advances the irrigator about 80 mm in low ratio and about 120 mm in high ratio. Faster oscillations give rise to a faster travel speed. High ratio is only used for the 10 mm application depth, or less.

Flow rate (m³/hr)



Note: The wetted width is reduced by higher boom rotational (oscillation) speeds because the jet of liquid is turned back on itself. That is, it assumes a spiral path because it is encountering more air resistance when it is oscillating faster. Wetted widths are greater at slow speeds, ie higher application depths.

Ø20 Nozzle HIGH Gear Ratio											Selector setting	
	Head	Head	Flow	Flow	Practical Wetted Width (Lane spacing)	Appln Depth	Travel Speed	Sweep period	Pull force in high ratio	Pull force in low ratio		
<b>Boom tele- scoped to 2nd stop:</b> Hi = 0.15 Lo = 0.09 (metres per sweep)	(psi)	(m head)	litres per minute	(m <sup>3</sup> /hr)	metres	milli- metres	metres per hour	(From one side to the other and then return to the starting position) seconds	<b>Use <i>low ratio</i> only when pressure is less than 30 psi (21 mhd)</b>	<b>Damage may occur in this RED region</b>		
	<b>0.15</b>	20	14	240	14.4	39	<b>20</b>	18.5	29.3	180 kg	270 kg	<b>A</b>
	<b>0.15</b>	30	21	305	18.3	42	<b>20</b>	21.8	24.8	380 kg	570 kg	
	<b>0.15</b>	40	28	357	21.4	47	<b>20</b>	22.8	23.7	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	398	23.9	49	<b>20</b>	24.4	22.2	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	240	14.4	39	<b>25</b>	14.8	36.6	180 kg	270 kg	<b>B</b>
	<b>0.15</b>	30	21	305	18.3	42	<b>25</b>	17.4	31.0	380 kg	570 kg	
	<b>0.15</b>	40	28	357	21.4	47	<b>25</b>	18.2	29.6	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	398	23.9	49	<b>25</b>	19.5	27.7	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	240	14.4	39	<b>30</b>	12.3	43.9	180 kg	270 kg	<b>C</b>
	<b>0.15</b>	30	21	305	18.3	42	<b>30</b>	14.5	37.2	380 kg	570 kg	
	<b>0.15</b>	40	28	357	21.4	47	<b>30</b>	15.2	35.5	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	398	23.9	49	<b>30</b>	16.2	33.2	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	240	14.4	39	<b>40</b>	9.2	58.5	180 kg	270 kg	<b>D</b>
	<b>0.15</b>	30	21	305	18.3	42	<b>40</b>	10.9	49.6	380 kg	570 kg	
	<b>0.15</b>	40	28	357	21.4	47	<b>40</b>	11.4	47.4	550 kg	<b>825 kg</b>	
<b>0.15</b>	50	35	398	23.9	49	<b>40</b>	12.2	44.3	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	240	14.4	39	<b>50</b>	7.4	73.1	180 kg	270 kg	<b>E</b>	
<b>0.15</b>	30	21	305	18.3	42	<b>50</b>	8.7	62.0	380 kg	570 kg		
<b>0.15</b>	40	28	357	21.4	47	<b>50</b>	9.1	59.2	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	398	23.9	49	<b>50</b>	9.7	55.4	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	240	14.4	39	<b>60</b>	6.2	87.8	180 kg	270 kg	<b>F</b>	
<b>0.15</b>	30	21	305	18.3	42	<b>60</b>	7.3	74.4	380 kg	570 kg		
<b>0.15</b>	40	28	357	21.4	47	<b>60</b>	7.6	71.1	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	398	23.9	49	<b>60</b>	8.1	66.5	<b>800 kg</b>	<b>1050 kg</b>		

# Ø22 Nozzle

## W W = Wetted Width versus Pressure

For continuous coverage with a small overlap lane width will be about 90% of the WW shown

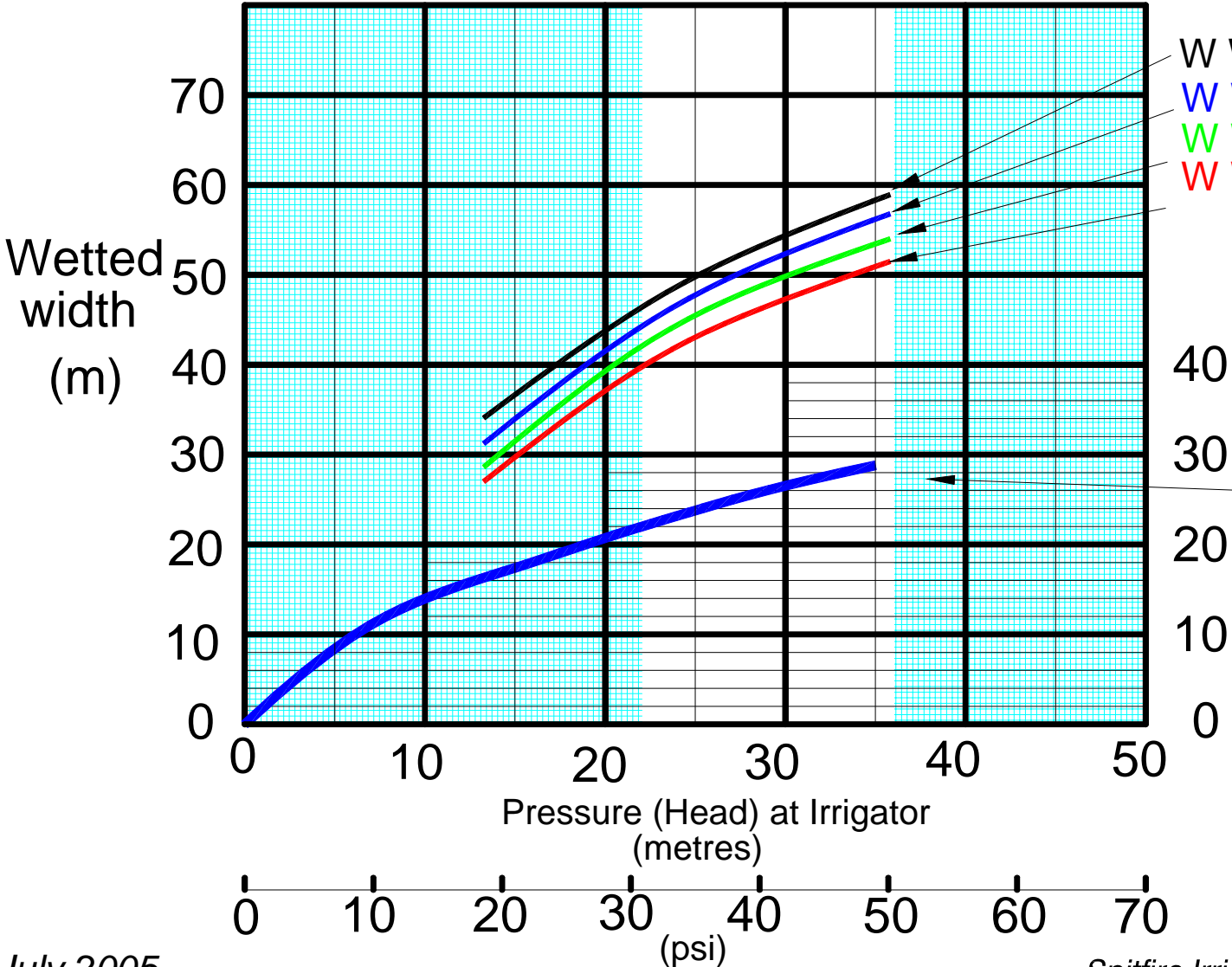
Recommended operating range (water)  
25 - 40 metres

Recommended operating range (manures)  
25 - 35 metres

Zone of reduced pulling power

Zone of increasing spray drift (aerosols)

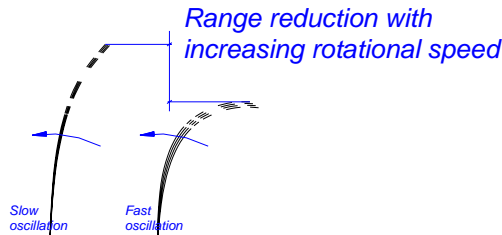
Selector switch setting



- W W @ 65mm application (F)
- W W @ 40mm application (D)
- W W @ 30mm application (C)
- W W @ 20mm application (A)

Sweep speeds:  
Each complete oscillation of the boom (from one side to the other and then back again) advances the irrigator about 80 mm in low ratio and about 120 mm in high ratio. Faster oscillations give rise to a faster travel speed. High ratio is only used for the 10 mm application depth, or less.

Flow rate (m<sup>3</sup>/hr)



Note: The wetted width is reduced by higher boom rotational (oscillation) speeds because the jet of liquid is turned back on itself. That is, it assumes a spiral path because it is encountering more air resistance when it is oscillating faster. Wetted widths are greater at slow speeds, ie higher application depths.

Ø22 Nozzle HIGH Gear Ratio											Selector setting	
	Head	Head	Flow	Flow	Practical Wetted Width (Lane spacing)	Appln Depth	Travel Speed	Sweep period	Pull force in high ratio	Pull force in low ratio		
<b>Boom tele- scoped to 3rd stop:</b> Hi = 0.15 Lo = 0.09 (metres per sweep)	(psi)	(m head)	litres per minute	(m <sup>3</sup> /hr)	metres	milli- metres	metres per hour	(From one side to the other and then return to the starting position) seconds	<b>Use <i>low ratio</i> only when pressure is less than 30 psi (21 mhd)</b>	<b>Damage may occur in this <b>RED</b> region</b>		
	<b>0.15</b>	20	14	298	17.9	37	<b>20</b>	24.2	22.3	180 kg	270 kg	<b>A</b>
	<b>0.15</b>	30	21	385	23.1	45	<b>20</b>	25.7	21.0	380 kg	570 kg	
	<b>0.15</b>	40	28	455	27.3	50	<b>20</b>	27.3	19.8	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	500	30.0	53	<b>20</b>	28.3	19.1	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	298	17.9	37	<b>25</b>	19.3	27.9	180 kg	270 kg	<b>B</b>
	<b>0.15</b>	30	21	385	23.1	45	<b>25</b>	20.5	26.3	380 kg	570 kg	
	<b>0.15</b>	40	28	455	27.3	50	<b>25</b>	21.8	24.7	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	500	30.0	53	<b>25</b>	22.6	23.9	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	298	17.9	37	<b>30</b>	16.1	33.5	180 kg	270 kg	<b>C</b>
	<b>0.15</b>	30	21	385	23.1	45	<b>30</b>	17.1	31.6	380 kg	570 kg	
	<b>0.15</b>	40	28	455	27.3	50	<b>30</b>	18.2	29.7	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	500	30.0	53	<b>30</b>	18.9	28.6	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	298	17.9	37	<b>40</b>	12.1	44.7	180 kg	270 kg	<b>D</b>
	<b>0.15</b>	30	21	385	23.1	45	<b>40</b>	12.8	42.1	380 kg	570 kg	
	<b>0.15</b>	40	28	455	27.3	50	<b>40</b>	13.7	39.6	550 kg	<b>825 kg</b>	
<b>0.15</b>	50	35	500	30.0	53	<b>40</b>	14.2	38.2	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	298	17.9	37	<b>50</b>	9.7	55.9	180 kg	270 kg	<b>E</b>	
<b>0.15</b>	30	21	385	23.1	45	<b>50</b>	10.3	52.6	380 kg	570 kg		
<b>0.15</b>	40	28	455	27.3	50	<b>50</b>	10.9	49.5	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	500	30.0	53	<b>50</b>	11.3	47.7	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	298	17.9	37	<b>65</b>	7.4	72.6	180 kg	270 kg	<b>F</b>	
<b>0.15</b>	30	21	385	23.1	45	<b>65</b>	7.9	68.4	380 kg	570 kg		
<b>0.15</b>	40	28	455	27.3	50	<b>65</b>	8.4	64.3	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	500	30.0	53	<b>65</b>	8.7	62.0	<b>800 kg</b>	<b>1050 kg</b>		

# Ø24 Nozzle

## W W = Wetted Width versus Pressure

For continuous coverage with a small overlap lane width will be about 90% of the WW shown

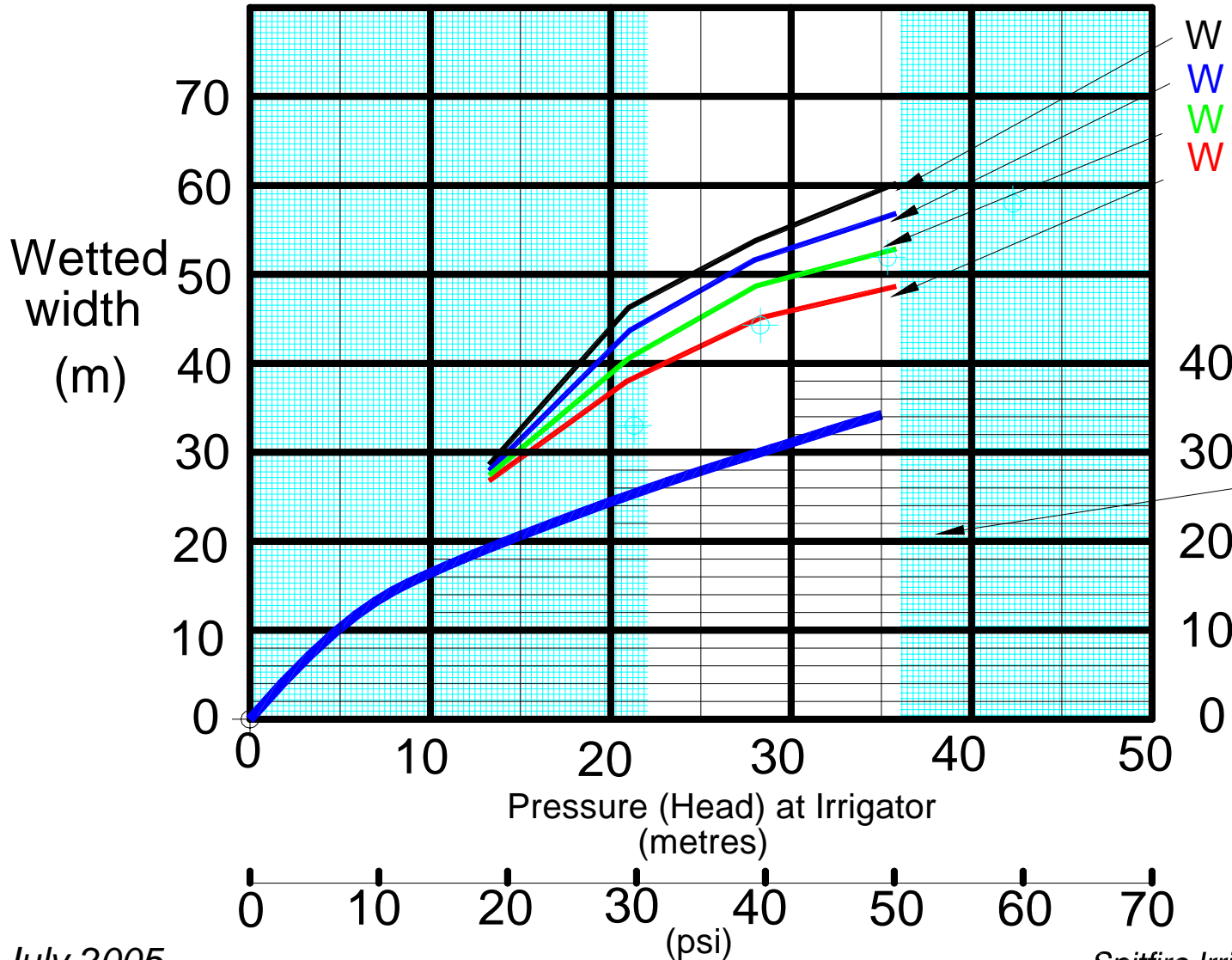
Recommended operating range (water)  
25 - 40 metres

Recommended operating range (manures)  
25 - 35 metres

Zone of reduced pulling power

Zone of increasing spray drift (aerosols)

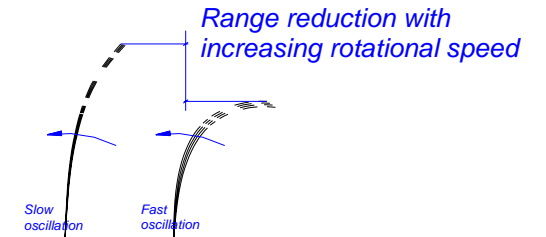
Selector switch setting



- W W @ 70mm application (F)
- W W @ 50mm application (D)
- W W @ 40mm application (C)
- W W @ 20mm application (A)

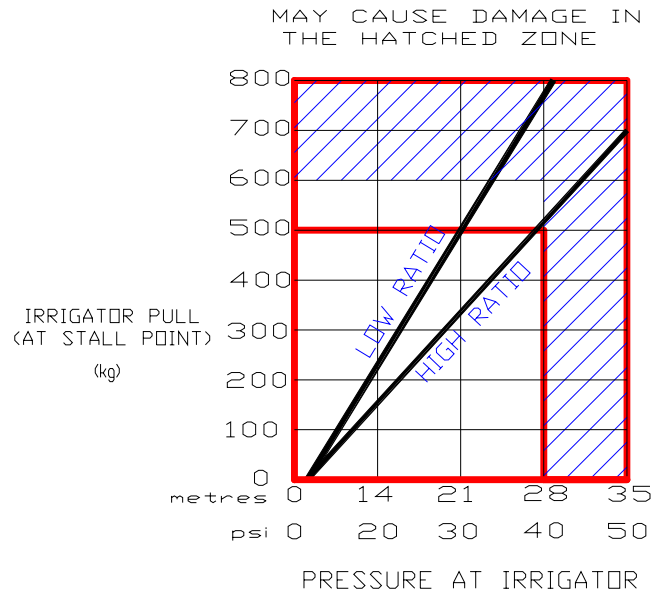
Sweep speeds:  
Each complete oscillation of the boom (from one side to the other and then back again) advances the irrigator about 80 mm in low ratio and about 120 mm in high ratio. Faster oscillations give rise to a faster travel speed. High ratio is only used for the 10 mm application depth, or less.

Flow rate (m<sup>3</sup>/hr)



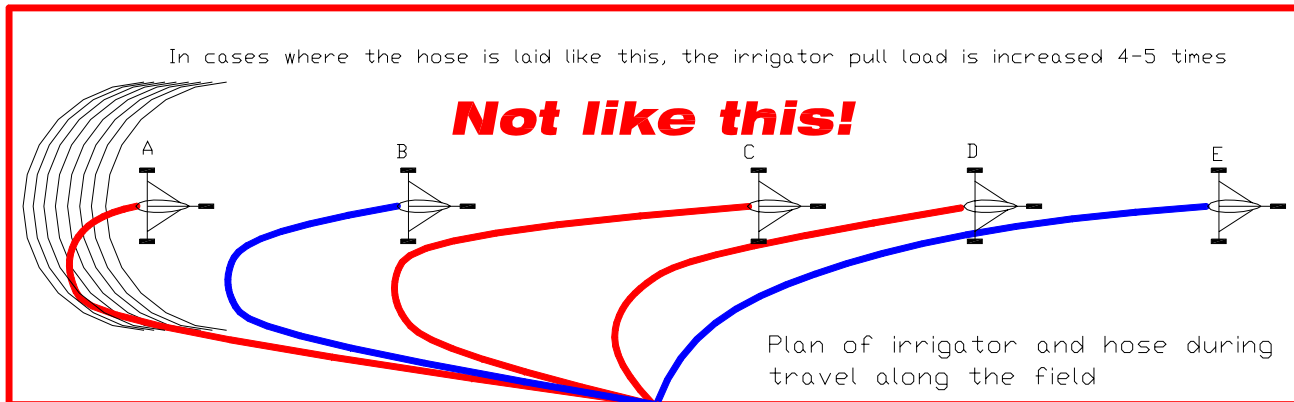
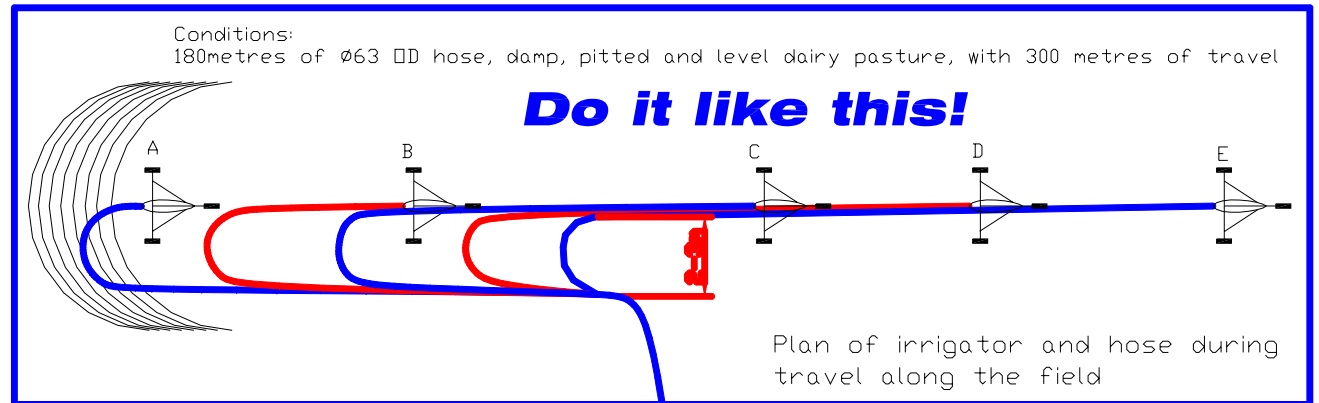
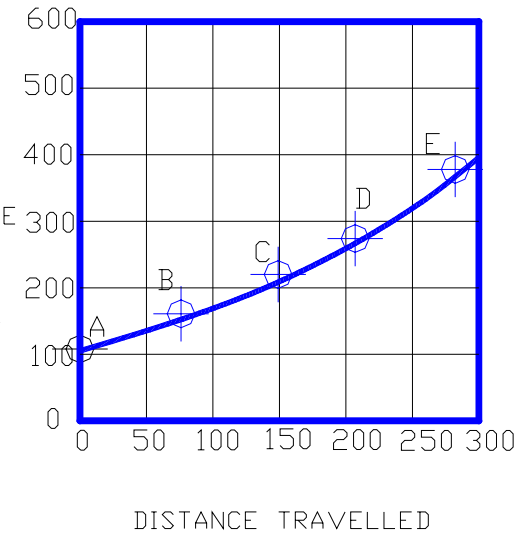
Note: The wetted width is reduced by higher boom rotational (oscillation) speeds because the jet of liquid is turned back on itself. That is, it assumes a spiral path because it is encountering more air resistance when it is oscillating faster. Wetted widths are greater at slow speeds, ie higher application depths.

Ø24 Nozzle HIGH Gear Ratio											Selector setting	
	Head	Head	Flow	Flow	Practical Wetted Width (Lane spacing)	Appln Depth	Travel Speed	Sweep period	Pull force in high ratio	Pull force in low ratio		
<b>Boom tele- scoped to 4th stop:</b> Hi = 0.15 Lo = 0.09 (metres per sweep)	(psi)	(m head)	litres per minute	(m <sup>3</sup> /hr)	metres	milli- metres	metres per hour	(From one side to the other and then return to the starting position) seconds	<b>Use low ratio only when pressure is less than 30 psi (21 mhd)</b>	<b>Damage may occur in this RED region</b>		
	<b>0.15</b>	20	14	330	19.8	37	<b>20</b>	26.8	20.2	180 kg	270 kg	<b>A</b>
	<b>0.15</b>	30	21	420	25.2	42	<b>20</b>	30.0	18.0	380 kg	570 kg	
	<b>0.15</b>	40	28	503	30.2	47	<b>20</b>	32.1	16.8	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	570	34.2	51	<b>20</b>	33.5	16.1	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	330	19.8	37	<b>30</b>	17.8	30.3	180 kg	270 kg	<b>B</b>
	<b>0.15</b>	30	21	420	25.2	43	<b>30</b>	19.5	27.6	380 kg	570 kg	
	<b>0.15</b>	40	28	503	30.2	48	<b>30</b>	21.0	25.8	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	570	34.2	53	<b>30</b>	21.5	25.1	<b>800 kg</b>	<b>1050 kg</b>	
	<b>0.15</b>	20	14	330	19.8	37	<b>40</b>	13.4	40.4	180 kg	270 kg	<b>C</b>
	<b>0.15</b>	30	21	420	25.2	45	<b>40</b>	14.0	38.6	380 kg	570 kg	
	<b>0.15</b>	40	28	503	30.2	51	<b>40</b>	14.8	36.5	550 kg	<b>825 kg</b>	
	<b>0.15</b>	50	35	570	34.2	55	<b>40</b>	15.5	34.7	<b>800 kg</b>	<b>1050 kg</b>	
<b>0.15</b>	20	14	330	19.8	37	<b>50</b>	10.7	50.5	180 kg	270 kg	<b>D</b>	
<b>0.15</b>	30	21	420	25.2	45	<b>50</b>	11.2	48.2	380 kg	570 kg		
<b>0.15</b>	40	28	503	30.2	51	<b>50</b>	11.8	45.6	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	570	34.2	55	<b>50</b>	12.4	43.4	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	330	19.8	37	<b>60</b>	8.9	60.5	180 kg	270 kg	<b>E</b>	
<b>0.15</b>	30	21	420	25.2	45	<b>60</b>	9.3	57.9	380 kg	570 kg		
<b>0.15</b>	40	28	503	30.2	51	<b>60</b>	9.9	54.8	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	570	34.2	55	<b>60</b>	10.4	52.1	<b>800 kg</b>	<b>1050 kg</b>		
<b>0.15</b>	20	14	330	19.8	37	<b>70</b>	7.6	70.6	180 kg	270 kg	<b>F</b>	
<b>0.15</b>	30	21	420	25.2	45	<b>70</b>	8.0	67.5	380 kg	570 kg		
<b>0.15</b>	40	28	503	30.2	51	<b>70</b>	8.5	63.9	550 kg	<b>825 kg</b>		
<b>0.15</b>	50	35	570	34.2	55	<b>70</b>	8.9	60.8	<b>800 kg</b>	<b>1050 kg</b>		



PULL REQUIRED FOR 180 m OF HOSE (kg)

(Includes irrigator rolling friction)



You will need at least 40 psi at the irrigator to travel 300 metres in high ratio. (ie When 10 mm or less is to be applied)

**Spitfire Irrigators Ltd**