Maximal Ramp Test

This test assumes a high level of basic fitness and you are in the low risk category for cardio vascular events. Consult your Doctor before you commence any of the Wattbike tests or training plans. A pre participation health screen should be completed before you take part in exercise or an exercise program. This Wattbike test is not suitable if you are beginner, have been recently ill or injured. Exercise prescription for minors should only be carried out under supervision of a qualified scientist. Any self exercise prescription participation is done at your own risk.

Derived from the ACSM's exercise/ test participation recommendations

This Test has been marked as one of the highest risk tests, purely because of the time, the intensity the person is working at and the incrementally harder exertion levels that are required. This test requires the person to work to the point of failure.

We have adopted the British Cycling Ramp Test methodology as a basis for explaining how to conduct a maximal ramp test on a Wattbike. Other maximal ramp test protocols are available and can be configured on a Wattbike using the air resistance, power and cadence tables.

It is possible to conduct maximum ramp tests on either the Wattbike Pro or Wattbike Trainer. Where possible it is recommended that selection of Pro or Trainer is based on being able to use just one level of air resistance setting using increasing cadence in the range 90-100rpm to complete the test.

However it is also possible to use the magnetic resistance on both the Wattbike Pro and Trainer to produce combinations of power and cadence. Using the magnet on the Trainer is very useful for tests and training workouts for MMP* up to 360w as it ensures that warm up, test or workout and cool down can be done effectively without switching from Pro to Trainer.

Maximal ramp tests up to 300w can be conducted on the Wattbike Trainer just using the air resistance. For tests likely to achieve 320w-360w, a combination of one air resistance setting and magnet resistance is needed.

- It is possible to use the magnetic resistance on both the Wattbike Pro and Trainer to produce combinations of power and cadence.
- Using the magnet on the Trainer is very useful for tests and training workouts for MMPs up to 360w as it ensures that warm up, test or workout and cool down can be done effectively without switching from Pro to Trainer, Trainer to Pro.
- Maximal ramp tests up to 300w can be conducted on the Wattbike Trainer just using the air resistance.

Maximal Ramp Test Starting Point for Males

There is only one prerequisite for this test; the participant must have completed the 3-minute Test.

To estimate an adequate test starting point for a male who will be participating in the Maximal Ramp Test, using the score from the 3-minute test use the statements and the table below:

- Watts 3 minute test MUST be over 280w
- Watts achieved in 3 minutes = 315w round to nearest multiple of 20 = 300w
- Count back 10 stages (include the 300w as first stage)
- Starting power for the test 120w
- Test would start at 120w and ramp by 20w every minute.

3' Test	300	320	340	360	380	400	420	440	460	480	500
Start w	100	120	140	160	180	200	220	240	260	280	300

If 3-minute test use score is over 420w use 240w as the start point for the maximal ramp test.

Starting Power, Based on Weight & Ability - Ramp by 20w Every Minute

Weight (kg)	Club Level	National Level	World Class Level
<50	120	140	160
50-59	140	160	180
60-69	160	180	200
70-79	180	200	220
80+	200	220	240



Maximal Ramp Test Starting Point for Females

There is only one prerequisite for this test; the participant must have completed the 3-minute Test.

To estimate an adequate test starting point for a female who will be participating in the Maximal Ramp Test, using the score from the 3-minute test use the statements and the table below:

3' Test	215	230	245	260	275	290	305	320	335	350	375
Start w	65	80	95	110	125	140	155	170	185	200	215

Example:

- Watts 3-minute test MUST be over 215w
- Watts achieved in 3 minutes = 260w round to nearest multiple of 15 = 260w
- Count back 10 stages (include the 260w as first stage)
- Starting power for the test 125w
- Test would be start at 125w and ramp by 15w every minute

If 3' aerobic test score is over 320w use 180w as the start point for the maximal ramp test.

The starting power for the British Cycling Maximal Ramp Test depends on gender, weight and cycling ability.

Starting Power, Based on Weight & Ability - Ramp by 15w Every Minute

Weight (kg)	Club Level	National Level	World Class Level
<45	80	95	110
45-49	95	110	125
50-54	110	125	140
55-59	125	140	155
60-64	140	155	170
65+	155	170	185

Use the tables below to work out the air resistance setting and cadence to use for a maximal ramp test.

Air Resistance & Cadence Setting Recommendations for the Maximal Ramp Test on a Wattbike Pro

Maximal Ramp Test on a Wattbike Pro (Male)

Resistance levels for this test depend on cadence preference. There are a number of ways of conducting a maximal ramp test. However for the purposes of this Guide we recommend a cadence range of 90-100 although for some of the lower starting powers a cadence of < 90 may be needed.

Maximal Ramp Test at a Set Resistance Level & Increasing Cadence:

Example: Starting power 120w;

- 1. 8 stages 120w to 260w on air resistance setting 1 cadence range 82-113
- 2. 12 stages 120w to 300w on air resistance setting 2 cadence range = 79-114.

Maximal Ramp Test in a Restricted Cadence Range

Example:

Cadence restricted to max of 100;

- Starting power 120w
- 8 stages 120w to 260w on air resistance setting 3 cadence range 73-100
- 12 stages 120w to 300w on air resistance setting 4 cadence range = 69-100.

Using a Fixed Cadence Maximal Ramp Test

Example:

Fixed cadence of 90 (or nearest cadence level) – this can only be achieved if starting power is greater than 160w (lower starting powers need a lower cadence). To do a fixed cadence test the air resistance setting may need to be moved at each stage.

• 8 stages 160w to 300w

Watts	160	180	200	220	240	260	280	300
Air Resistance	1	2	3	4	4	5	5	6
Cadence	92	89	91	89	92	89	92	90

• 12 stages 160w to 380w

Watts	160	180	200	220	240	260	280	300	320	340	360	380
Air Resistance	1	2	3	4	4	5	5	6	6	7	8	9
Cadence	92	89	91	89	92	89	92	90	92	91	91	91

Note: for males, 90 cadence restriction is only possible up to 400w using the air resistance only so a 12 stage test with a starting power of 180w using the air resistance settings 1 to 10. For tests with a starting power of 200w to 240w a combination of the air resistance and magnetic resistance are needed if cadence is fixed.

Male starting power - ramp rate 20 W every minute

Watts	1	2	3	4	5	6	7	8	9	10
120	82	79	73	69	65	64	62	60	59	58
140	87	84	80	73	69	68	66	64	62	61
160	92	89	84	79	73	71	69	67	66	65
180	96	93	87	82	76	74	72	71	69	67
200	103	98	91	86	79	77	75	73	72	70
220	106	101	94	89	84	80	78	76	74	73
240	110	105	97	92	87	82	80	79	77	75
260	113	108	100	94	89	85	83	81	79	77
280	116	111	103	97	92	87	85	83	81	79
300	119	114	105	100	94	90	87	85	83	81
320	122	116	108	102	97	92	89	87	85	83
340	125	119	110	104	99	94	92	89	87	85
360	128	124	113	106	101	96	93	91	89	87
380	130	126	115	109	103	98	95	93	91	89
400	133	129	117	111	105	100	97	95	93	91
420	135	131	121	113	107	103	99	97	94	92
440	138	133	123	115	109	104	101	98	96	94
460	140	135	125	117	110	106	102	100	98	95
480	142	137	127	118	112	106	104	101	99	97
500	144	140	129	120	114	110	106	103	101	98





It is far easier to conduct this test by selecting a cadence progression that maintains the air resistance setting at the same level throughout the test or a cadence that needs the minimum number of air resistance settings.

It is recommend that in general cadence should be kept in the range of 90-100 although for some of the low powers a lower cadence less than 90 may be needed. For high powers a greater range of air resistance settings may be needed to get the cadence/power combination needed.

For example:

- a. 8 stages from 120w to 260w can be achieved by increasing the cadence for 73 at 120w to 100 cadence at 260w leaving the air resistance setting at level 3 throughout the whole of the test.
- b. 12 stages from 120w to 340w can be achieved using air resistance setting 5 (cadence 65 to 99) or air resistance setting 4 (cadence 65 to 95).

Maximal Ramp Test on a Wattbike Pro (Female)

Resistance levels for this test depend on cadence preference. There are a number of ways of conducting a ramp test.

Example of how to complete a maximal ramp test at a set resistance level and increasing cadence:

Starting power 80w,

- 8 stages 80w to 180w on air resistance setting 1 cadence range 69-100
- 12 stages 80w to 260w on air resistance setting 2 cadence range = 66-108 OR air resistance setting 3 cadence range = 62-100

Example of how to complete a maximal ramp test in a restricted cadence range:

Cadence restricted to max of 100rpm

• This can be achieved for all the starting power levels for female cyclists i.e. up to a starting power of 180w for 8 to 12 stages

Example of how to complete a maximal ramp test using a fixed cadence:

Fixed cadence of 90 (or nearest cadence level) – this can only be achieved for starting power greater than 150w (lower starting powers need a lower cadence). To do a fixed cadence test requires the air resistance setting to be moved at each stage.

Watts	155	170	185	200	215	230	245	260	275
Air Resistance	1	2	3	3	4	4	4	5	5
Cadence	91	91	88	91	88	90	93	89	91

8 stages 155w to 275w

Watts	155	170	185	200	215	230	245	260	275	290	305	320	335
Air Resistance	1	2	3	3	4	4	4	5	5	6	6	7	7
Cadence	91	91	88	91	88	90	93	89	91	89	90	89	91

12 stages 155w to 335w

Starting power (Female) - ramp rate 15w every minute

Watts	1	2	3	4	5	6	7	8	9	10
80	69	66	62	59	56	55	52	52	51	49
95	74	71	67	63	60	59	56	55	54	53
110	79	76	71	67	63	62	60	58	57	56
125	84	80	74	70	66	65	63	61	60	59
140	87	84	80	73	69	68	66	64	62	61
155	91	88	83	76	72	70	68	66	65	64
170	97	91	85	81	76	73	71	69	68	66
185	100	95	88	83	77	75	73	71	70	68
200	103	98	91	86	79	77	75	73	72	70
215	106	101	93	88	83	79	77	75	74	72
230	108	105	96	90	85	81	79	77	76	74
245	111	105	98	92	87	83	81	79	77	76
260	113	108	100	94	89	85	83	81	79	77
275	116	110	102	96	91	87	85	83	81	79
290	118	112	104	98	93	88	86	84	82	80
305	120	114	106	100	95	90	88	86	84	82
320	122	116	108	102	97	92	89	87	85	83
335	124	118	110	104	98	93	91	89	87	85
350	126	122	112	105	100	95	93	90	88	86
365	128	124	113	107	101	96	94	92	90	88

It is far easier to conduct this test by selecting a cadence progression that maintains the air resistance setting at the same level throughout the test or a cadence that needs the minimum number of air resistance settings.

We recommend that, in general cadence should be kept in the range of 90-100 although for some of the low powers a lower cadence less than 90 may be needed. For high powers a greater range of air resistance settings may be needed to get the cadence/power combination needed.

For example:

- 8 stages from 125w to 230w can be achieved by increasing the cadence for 74 at 125w to 96 cadence at 230w leaving the air resistance setting at level 3 throughout the whole of the test
- 12 stages from 125w to 260w can be achieved using air resistance setting 3 (cadence 74 to 100) or air resistance setting 4 (cadence 70 to 94).



Air Resistance and Cadence Setting Recommendations for a Maximal Ramp Test on a Wattbike Trainer

Ramp test on a Wattbike Trainer (Male)

Starting Power - ramp rate 20w every minute

Watts	6	М	7	М	8	М	9	М	10	М
120	80		77		75		74		73	
140	84		81		79		77		76	
160	88		85		83		81		80	
180	92		89		87		85		83	
200	95		93		90		88		86	
220	99		96		93		91		90	
240	100	3	99		96		94		92	
260	101	4	100	3	99		97		95	
280	103	4	100	4	100	3	99		98	
300	n/a		103	4	101	4	100	3	100	
320	n/a		n/a		103	4	101	3	101	3
340	n/a		n/a		n/a		103	4	101	4
360	n/a		n/a		n/a		n/a		103	4

Ramp test on a Wattbike Trainer (Female)

Starting power - ramp rate 10w every minute

Watts	4	М	5	М	6	м	7	М	8	М	9	м	10	м
80	74		71		68		66		65		64		63	
95	79		76		73		70		69		68		66	
110	84		80		77		74		73		71		70	
125	88		84		81		78		76		75		74	
140	92		87		84		81		79		77		76	
155	95		91		87		84		82		80		79	
170	99		94		90		87		85		83		82	
185	100	3	97		93		90		88		86		84	
200	100	4	100		96		93		90		88		87	
215	102	4	100	3	98		95		93		90		89	
230			101	4	101		97		95		93		91	
245			102	4	100	3	100		97		95		93	
260			n/a		101	4	100	3	99		97		95	
275			n/a		103	4	100	4	101		99		97	
290			n/a		n/a		102	4	102	3	101		99	
305			n/a		n/a		n/a		101	4	101	3	100	
320			n/a		n/a		n/a		103	4	101	4	101	3
335			n/a		n/a		n/a		n/a		103	4	101	4
350			n/a		102	4								
365			n/a		104	4								

Conducting a Maximal Ramp Test

To set up a Maximal Ramp test follow the instructions below.

From the Main menu select **workout/Tests** and then **Tests** – the Tests screen appears. Select **Max Ramp**.

Tests			
Power Peak 6"	30" Test		
Submax Ramp	<u>Max Ramp</u>		
3' Aerobic	10' Progress		
20' Threshold	Ramp Varied		
4/01/2016 ID:05	9283 🔱 🔲 79% 11:37		

1.

2. Input age, body mass in kg, gender, ramp start power (w) and stage ramp power (w). Input age:

Ramp Test - Please enter	vour data
Aae	30
Weight	
Gender	: Male \bigtriangledown
Start/Stage	: 100W / 25W
Back	Start
ESC + For ne	ext and last ENTER

3. Input body mass in kg:

Ramp Test - Please enter your data			
Age	:		
Weight	: 0 <u>8</u> 2.0 kg		
Gender	∶└┳		
Start/Stage	: 100W / 25W		
Back	Start		
ESC + For	next and last ENIER		

4. Input gender:

Ramp Test - Please enter your data			
Age	:	30	Ì
Weight	:	82.0 kg	ĥ
Gender	:	Male 🔻	Ķ
Start/Stage Back	:	Male Female	Ķ
ESC + For	next a	and last ENTER	Į
U TTOTICTO TO		11.0	9

5. Input target start power (w):





:	30	
:	82.0	kg
:	Male	
:	100\	25
	Ļ	<u> </u>
next a	and last [ENTER
	: : : next a	: 30 : 82.0 : Male : 100 hext and last (

7. Live screen shows Target power (w):



8. Once the person has reached their failure point press **ESC** and the results screen (The test 'Tab') will show:

Int. \Summ. \Spl. \Rev. \Gen. \Test \Zones \			
Ramp Test Max	: Results		
Max. Minute Power (MMP)	: 341 W		
Max. Heart Rate (MHR)	: 188 bpm		
Power/mass	: 4.16 W/kg		
V02max estimate	: 4.3 l/min, 52.6 ml/kg/min		
METs	: 15.0		

*This VO2max estimate is derived from Storer et al. (1990 Storer Tw, Davis JA, & Caiozzo VJ. Accurate prediction of VO2max in cycle ergometry. Med Sci Sports Exerc 1990; 22:704-712

The formula has the advantage of estimating maximum oxygen uptake (VO2max) using body weight (kg), age and MMP to determine the result. Compared to direct measures it gives a good estimate $[\pm 6\%]$.

Int. \Summ. \Spl. \Rev. \Gen. \Test \Zones			
Training Zone	HR(bpm)	Power(W)	METs
Recovery	< 113	< 119	< 6.31
Zone 1 Basic	114-122	120-153	6.32-7.36
Zone 2 Basic	123-141	154-188	7.37-9.46
Zone 3 Intensive	142-154	189-222	9.47-10.81
Zone 4 Intensive	155-167	223-256	10.82-12.46
Zone 5 Maximal	168-177	257-290	12.47-13.81
Zone 6 Maximal	178-188	291-341	13.82-15.01
Supra-maximal	n/a	> 342	n/a

Heart rate and power training zones

Test Tab

9.

This tab will show:

- 1. MMP
- 2. MHR
- 3. Power/mass
- 4. VO2max estimate
- 5. METs

Int. \Summ. \Spl. \Rev. \Gen. \Test Zones \			
Ramp Test Max	: Results		
Max. Minute Power (MMP)	: 341 W		
Max. Heart Rate (MHR)	: 188 bpm		
Power/mass	: 4.16 W/kg		
V02max estimate	: 4.3 l/min, 52.6 ml/kg/min		
METs	: 15.0		

Zones Tab

This tab will use estimated MMP and estimated MHR to calculate training zones based on the British Cycling heart rate and power training zones.

The data can be viewed in graph form in Intervals with the power data (scroll across the graph for each minute) and with all the parameter data available in Summary (again scroll up/down for each minute).

Int. \[Summ. \ Spl. \ Rev. \ Gen. \ Test \ <mark>Zones</mark> \			
Training Zone	HR(bpm)	Power(W)	METs
Recovery	< 113	< 119	< 6.31
Zone 1 Basic	114-122	120-153	6.32-7.36
Zone 2 Basic	123-141	154-188	7.37-9.46
Zone 3 Intensive	142-154	189-222	9.47-10.81
Zone 4 Intensive	155-167	223-256	10.82-12.46
Zone 5 Maximal	168-177	257-290	12.47-13.81
Zone 6 Maximal	178-188	291-341	13.82-15.01
Supria-maximal	n/a	> 342	n/a

