THE RYA PORTSMOUTH YARDSTICK SCHEME 2007

Specimen Races

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Each specimen is based on an actual race and so the Portsmouth Numbers and their Status will not necessarily be the same as published in the current Lists. All the specimen races illustrate Portsmouth Number adjustment.

Specimen Race Zero is a dinghy race with few classes each with several finishers. It gives entry level race analysis to allow clubs to make a simple start on the review and adjustment of Portsmouth Numbers. The method will not provide ideal Numbers but allows experience to be gained before moving to more sophisticated methods.

Specimen Race One is similarly a dinghy race with few classes each with several finishers. It gives a more sophisticated post race analysis although Crew Skill Factor (see 3.12), because of the nature of the fleet, is assumed to even out and is ignored.

Specimen Race Two is a dinghy race with a limited numbers of boats in each class together with one-offs and when special care must be taken to apply the correct Crew Skill Factor. The method requires new boats to be allocated an estimated Trial Number.

Specimen Race Three is similar to Specimen Race Two but with cruisers.

Specimen Race Four is the same race as Specimen Race Three but illustrates retrospective *Trial* Number Allocation.

SPECIMEN RACE ZERO

A race with few classes each with several finishers (Numbers and Status taken from the 2002 tables)

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*	*o*	*p*	*q*	*r*	*s*
Name	SailNo	Type/Class	Config.	**N**	Status	**E**	**C**	Place		Remarks	**P**	**PI**	**CSF**	**PC**	This race∑PC/∑R	This & past ∑PC/∑R	**NC**	**N**
A		B14		880	RN	3603	4094	2			830	-50		-50	-105 / 4	-221 / 20	-11	869
B		B14		880	RN	3643	4140	4			839	-41		-41				
C		LASER 4000		906	SY	3696	4079	1			851	-55		-55	-17 / 4	-12 / 6	-2	904
D		B14		880	RN	3746	4257	6			863	-17		-17				
E		29ER		925	RN	3790	4097	3			873	-52		-52	-42 / 4	-54 / 24	-2	923
F		B14		880	RN	3833	4356	13			883	3		3				
G		29ER		925	RN	3882	4197	5			894	-31		-31				
H		LASER 4000		906	SY	3926	4333	9			904	-2		-2				
I		LASER 4000		906	SY	4002	4417	17			922	16		16				
J		LASER 4000		906	SY	4037	4456	19			930	24		24				
K		29ER		925	RN	4086	4417	16			941	16		16				
L		29ER		925	RN	4126	4461	20			950	25		25				
M		RS 400		952	SY	4159	4369	14			958	6		6	285 / 5	1229 / 25	49	1001
N		ISO		926	SY	4243	4582	23			977	51		51	150 / 2	233 / 8	29	955
O		RS 400		952	SY	4286	4502	21			987	35		35				
P		RS 400		952	SY	4352	4571	22			1002	50		50				
Q		**LASER II**		**1034**	**PY**	**4431**	**4285**	**8**	**4285**		1020	-14		-14	**4** / **3**	**-4** / **10**	0	
R		ISO		926	SY	4452	4808	25			1025	99		99				
S		RS 400		952	SY	4475	4701	24			1030	78		78				
T		**LASER II**		**1034**	**PY**	**4481**	**4334**	**10**	**4334**		1032	-2		-2				
U		**LASER II**		**1034**	**PY**	**4577**	**4426**	**18**	**4426**		1054	20		20				
V		**LASER**		**1078**	**PY**	**4612**	**4278**	**7**	**4278**		1062	-16		-16	**-5** / **4**	**12** / **19**	1	
W		RS 400		952	SY	4639	4873	26			1068	116		116				
X		**LASER**		**1078**	**PY**	**4674**	**4336**	**11**	**4336**		1076	-2		-2				
Y		**LASER**		**1078**	**PY**	**4675**	**4337**	**12**	**4337**		1076	-2		-2				
Z		**LASER**		**1078**	**PY**	**4747**	**4404**	**15**	**4404**		1093	15		15				
									30400									
									÷7									
								A=	4343									
xx		*LASER EPS*		*1013*	*RN*											*-70* / *15*	*-5*	*1008*

SPECIMEN RACE ZERO

The method below allows a club to make a simple start on analysing races and adjusting Portsmouth Numbers.

The method will not provide ideal Numbers because it ignores 'poor performers', Crew Skill Factor (**CSF**) and other factors, but generally it will give better Numbers than doing nothing or just guessing.

When experience has been gained, the Yardstick Officer can move on to the more sophisticated specimen races which will allow even better Numbers to be set.

Steps 1 to 5 produce the race results

1 Enter the boats in the order in which they finish in columns *a*, *b*, *c*, *d*, and their Elapsed Times (**E**), in seconds, in column *g*.

2 Enter in column *e* for each boat the Portsmouth Number (**N**), which is to be used for calculating the race results. (This Number can be an RYA published Number, or a Club or Trial Number allocated by the race organiser in accordance with the Sailing Instructions.)

3 Enter in column *f* each boat's status as Primary Yardstick (**PY**), Secondary Yardstick (**SY**), Recorded Number (**RN**), Club Number (**CN**) or Trial Number (**TN**).

4 Using the formula (6.2 page 5):

$$C = \frac{E \times 1000}{N}$$

Where **C** = Corrected Time
E = Elapsed Time
N = Portsmouth Number

calculate a Corrected Time (**C**), in seconds, for each boat and enter in column *h*.

5 From the **C**s, give the position of each boat in the race in column *i* (1 to 26 in the example).

This is the race result

Normally steps 1 to 5 would be completed by the Race Officer, with steps 6 to 19 being completed by the Yardstick Officer.

Steps 6 to 10 gives the performance of the boats

6 Select and enter in column *j* the **C**s of all the **PY** boats.

If there are no **PY** boats then select and enter in column *j* the **C**s of all the **SY** boats. If there are no **PY** or **SY** boats then select and enter in column *j* the **C**s of all the **RN** boats.

7 Calculate the Race Average Time (**A**) by averaging the **C**s in column *j*.

Steps 8 and 9 are not used

10 Using the formula (6.3 page 5) $P = \frac{E \times 1000}{A}$

Where **P** = Performance Number
E = Elapsed Time
A = Race Average Time

calculate and in column *l* enter a **P** for each boat to the nearest whole number. The **P** is the Number to which the boat has performed in this race.

If steps 1 to 10 have been carried out correctly, the **P**s in column *l* will always be in ascending order.

Steps 11 to 17 produce data for the review of Numbers

11 The difference between the **P** in column *l* and the **N** in column *e* is called the Performance Indicator (**PI**) and is entered in column *m*, for all boats.

12 Specimen Race Zero does not include the effect of Crew Skill Factor (**CSF**) in calculations and so column *n* is ignored and the **PC**, entered in column *o*, is equal to the **PI** entered in column *m*.

Steps 13 and 14 are not used

15 Enter in column *p*, on the first line of each class, the sum of the **PC**s (∑PC)] and the number of boats (∑R) of the class in this race. ∑PC should be entered in the top left hand side of the box and ∑R in the bottom right hand side. For one-off boats or if there is only one boat of a class the ∑PC will equal the **PC** in column *o* and the ∑R will equal 1.

e.g. for the B 14, ∑PC = - 50 - 41 - 17 + 3 = - 105 and ∑R = 4. This is entered as - 105/4 in the column *p* box of boat A, the first B 14 in the race.

16 Except for boats with Trial Numbers (**TN** in column *f*), enter in column *q*, on the first line of each class the sum of the **PC**s (∑PC) and the number of boats (∑R)of the class in this race and the previous races since the last Number review. This will be the sum of the figures entered in column *p* for this race and in column *q* for the previous race for this class.

e.g. for the B 14, ∑PC = -105 (from this race) -116 (from the previous race) =-221 and ∑R = 4 (from this race) +16 (from the previous race) = 20. This is entered as - 221/20 in the column *q* box of boat A, the first B 14 in the race.

For **TN** boats the ∑PC/∑R in column *q* should be the same as the ∑PC/∑R in column *p*, i.e. it should not include data from the previous races.

17 Details of classes and boats which, although not finishers in this race, did finish in previous races are added at the bottom in columns *c*, *d*, *e*, & *q* to be ready for the next race calculations.

e.g. the Laser EPS.

Steps 18 and 19 are the review of Numbers

A review and adjustment of **TN** boats should be undertaken after every race.

A periodic review and, if appropriate, adjustment of **PY, SY, RN** and **CN** boats should be undertaken at periods determined by the club and as specified in Sailing
Instructions (7.4 page 5).In this specimen race it is assumed that the club undertakes a periodic review of Numbers after every fourth race in which a class is adequately represented. It is also assumed that all classes have been adequately represented for the last four races.

Note: When adjusting any Portsmouth Numbers, great care should be exercised. The proposed change should only, and truly, reflect the performance of that design of boat on your club's sailing waters and not be because the class has better (or worse) sailors than the club average. Additionally, Primary Yardsticks are Portsmouth Numbers well attested over many years and should not require adjustment. However it is possible that, in your club on your sailing waters, small changes may be necessary to a Primary Yardstick in order to maintain fair relationships between classes. Secondary Yardsticks are also well attested though not as well as Primary Yardsticks, so the same recommendation applies though changes may be made with less reluctance.

18 Review of **TN** boats undertaken boat by boat. There are no **TN** boats in this specimen race so no review is undertaken

19 Periodic Review undertaken class by class.

The Number Change (**NC**), entered in column *r* in the first line for each class, is the sum of the **PC**s for all boats of the class in the last four races (the number of races since the last periodic review) divided by the total number of races completed by these boats

i.e. the ∑PC as entered in the top left hand side of boxes in column *q* divided by the ∑R as entered in the bottom right hand side of the same box.

For the B14 this is - 221 ÷ 20 = - 11 (after rounding).

As there are good **PY** classes in the race (Laser II and Laser) with **NC**s equal or close to zero, these are taken as the 'Yardstick' and no adjustment is made to their Numbers (see 7.2 page 5 and above Note).

For all other classes, including **SY**s (see above Note) the club does adjust Numbers.

The (new) **N,** to be entered in column *s,* is the (old) **N** for this race in column *e*, with **NC** applied. If **NC** is positive then this should be added to the old **N**. If **NC** is negative it should be taken away from the old **N**

For the B14 this is 880 - 11 = 869 which will be applied to all boats in this class for the next four races.

After a periodic Number review ∑PC / ∑R in column *q* are cancelled (returned to zero) ready for the next race calculations.

SPECIMEN RACE ONE

A race with few classes each with several finishers in which it is assumed that the **CSF** will balance out

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*	*o*	*p*	*q*	*r*	*s*
Name	SailNo	Type/Class	Config'	N	Status	E	C	Place		Remarks	P	PI	CSF	PC	This race ∑PC/∑R	This+past ∑PC/∑R	NC	N
A		INT 14		884	RN	3760	4253	1	4253		847	-37		-37	-50 / 7	-107 / 30	-4	880
B		INT 14		884	RN	3790	4287	3	4287		854	-30		-30				
C		INT 14		884	RN	3850	4355	7	4355		867	-17		-17				
D		INT 14		884	RN	3910	4423	9	4423		881	-3		-3				
E		LASER 4000		906	RN	3929	4337	5	4337		885	-21		-21	35 / 6	80 / 12		
F		INT 14		884	RN	3940	4457	13	4457		888	4		4				
G		ISO		926	SY	3964	4281	2	4281		893	-33		-33	-6 / 6	-3 / 11		
H		INT 14		884	RN	3984	4507	18			898	14		14				
I		INT 14		884	RN	4010	4536	21			903	19		19				
J		ISO		926	SY	4020	4341	6	4341		906	-20		-20				
K		LASER 4000		906	RN	4020	4437	10	4437		906	0		0				
L		LASER 4000		906	RN	4050	4470	15	4470		912	6		6				
M		LASER 4000		906	RN	4064	4486	16	4486		916	10		10				
N		LASER 4000		906	RN	4084	4508	19			920	14		14				
O		ISO		926	SY	4110	4438	11	4438		926	0		0				
P		ISO		926	SY	4130	4460	14	4460		930	4		4				
Q		LASER 4000		906	RN	4135	4564	24			932	26		26				
R		RS 400		966	RN	4145	4291	4	4291		934	-32		-32	28 / 6	150 / 26	6	972
S		ISO		926	SY	4189	4524	20			944	18		18				
T		ISO		926	SY	4220	4557	23			951	25		25				
U		RS 400		966	RN	4230	4379	8	4379		953	-13		-13				
V		RS 400		966	RN	4295	4446	12	4446		968	2		2				
W		ISO		926	SY	4299	(4643)	26			(968)	(42)		(42)				
X		RS 400		966	RN	4345	4498	17	4498		979	13		13				
Y		RS 400		966	RN	4385	4539	22			988	22		22				
Z		RS 400		966	RN	4446	4602	25			1002	36		36				
									74639									
									÷17									
								ACT = 4391										
							ACT X 1.05 = 4611											
						110976												
						÷25												
						S = 4439												

SPECIMEN RACE ONE

A race with few classes each with several finishers in which it may be assumed that the range of Crew Skill Factors (**CSF**) within a class will balance out and so can be ignored. Specimen Race Two illustrates a race with many classes each with few boats in which **CSF** should not be ignored.

Steps 1 to 5 produce the race results

1 Enter the boats in the order in which they finish in columns *a, b, c, d,* and their Elapsed Times (**E**), in seconds, in column *g*.

2 Enter in column *e* for each boat the Portsmouth Number (**N**), which is to be used for calculating the race results. (This Number can be an RYA published Number, or a Club or Trial Number allocated by the race organiser in accordance with the Sailing Instructions.)

3 Enter in column *f* each boat's status as Primary Yardstick (**PY**), Secondary Yardstick (**SY**), Recorded Number (**RN**), Club Number (**CN**) or Trial Number (**TN**).

4 Using the formula (6.2 page 5): $\mathbf{C = \frac{E \times 1000}{N}}$

Where **C** = Corrected Time
E = Elapsed Time
N = Portsmouth Number

calculate a Corrected Time (**C**), in seconds, for each boat and enter in column *h*.

5 From the **C**s give the position of each boat in the race in column *i*, (1 to 26 in the example).

This is the race result

Normally steps 1 to 5 would be completed by the Race Officer, with steps 6 to 19 being completed by the Yardstick Officer.

Steps 6 to 8 avoid 'poor performers' influencing the Standard Corrected Time

6 From the **C**s of **PY**, **SY** and **RN** boats select and enter in column *j* the best performing two-thirds of the fleet (seventeen boats in the example).

7 From column *j* calculate an Average Corrected Time (ACT):74639 ÷ 17 = 4391.

8 Multiply the ACT by 1.05 = 4611

All boats with **C**s exceeding this figure, in other words more than 5% slower than ACT, are regarded as 'poor performers' and their **C**s bracketed in column *h* (boat W in the example). The times of bracketed boats are not included in the calculation of the Standard Corrected Time (**S**).

Steps 9 to 17 produce data for the review of Numbers

9 In the specimen race there are no **PY** boats and few **SY** boats and therefore the **S** has been calculated using the **C**s of un-bracketed **SY** and **RN** boats. It is preferable for **S** to be calculated from the **C**s of **PY** and **SY** boats with the **C**s of **RN** boats only used where there are insufficient Yardsticks.

From the un-bracketed times of **SY** and **RN** boats (**PY** and **SY** if there are sufficient) in column *h*, calculate **S** by averaging the **C**s: 110976 ÷ 25 = 4439.

10 Using the formula (6.3 page 5) $\mathbf{P = \frac{E \times 1000}{S}}$

Where **P** = Performance Number
E = Elapsed Time
S = Standard Corrected Time

calculate and in column *l* enter a **P** for each boat to the nearest whole number.

The **P** is the Number to which the boat has performed in this race. **P**s of boats with bracketed **C**s are also bracketed and are not used for adjustment. If steps 1 to 10 have been carried out correctly, the **P**s in column *l* will always be in ascending order.

11 The difference between **P** in column *l* and **N** in column *e* is called the Performance Indicator (**PI**) and is entered in column *m* for each boat. **PI**s for boats with bracketed **C**s are also bracketed.

12 If there is a sufficient number of boats in a class racing for the effects of different Crew Skill Factors (**CSF**) to balance out, then steps 13 and 14 may be omitted for that class. In this example this is assumed to be the case, so column *n* is ignored and the **PC**, entered in column *o*, is equal to the **PI** entered in column *m*. However it would never be wrong to include steps 13 and 14 (see Specimen Race Two).

Steps 13 and 14 are omitted in this race

15 Enter in column *p*, on the first line of each class, the sum of the **PC**s (∑PC) and the number of boats (∑R) of the class in this race. ∑PC should be entered in the top left hand side of the box and ∑R in the bottom right hand side. 'Poor performers' should not be included in these totals. For one-off boats or if there's only one boat of a class the ∑PC will equal the **PC** in column *o* and the ∑R will equal 1.

e.g. for the International 14,

∑PC = - 37- 30 - 17 - 3 + 4 + 14 + 19 = - 50 and ∑R = 7. This is entered as - 50/7 in the column *p* box of boat A, the first International 14 in the race.

16 Except for boats with Trial Numbers (**TN** in column *f*), enter in column *q*, on the first line of each class the sum of the **PC**s (∑PC) and the number of boats (∑R) of the class in this race and the previous races since the last Number review.

This will be the sum of the figures entered in column *p* for this race and in column *q* for the previous race for this class.

e.g. for the International 14, ∑PC = - 50 (from this race) -57 (from the previous race) = - 107 and ∑R = 7 (from this race) + 23 (from the previous race) = 30.This is entered as - 107/30 in the column *q* box of boat A, the first International14 in the race.

For **TN** boats the ∑PC/∑R in column *q* should be the same as the ∑PC/∑R in column p, i.e. it should not include data from the previous races.

17 Details of classes and boats which, although not finishers in this race, did finish in previous races are added at the bottom in columns *c*, *d*, *e*, *f* & *q* to be ready for the next race calculations.

Steps 18 and 19 are the review of Numbers

A review and adjustment of **TN** boats should be undertaken after every race. A periodic review and, if appropriate, adjustment of **PY**, **SY**, **RN** and **CN** boats should be undertaken at periods determined by the club and as specified in Sailing Instructions (7.4 page 5).In this specimen race it is assumed that the club undertakes a periodic review of Numbers after every fourth race in which a class is adequately represented.

Note: When adjusting any Portsmouth Numbers, great care should be exercised. The proposed change should only, and truly, reflect the performance of that design of boat on your club's sailing waters and not be because the class has better (or worse) sailors than the club average. Additionally, Primary Yardsticks are Portsmouth Numbers well attested over many years and should not require adjustment. However it is possible that, in your club on your sailing waters, small changes may be necessary to a Primary Yardstick in order to maintain fair relationships between classes. Secondary Yardsticks are also well attested though not as well as Primary Yardsticks, so the same recommendation applies though changes may be made with less reluctance.

18 Review of **TN** boats undertaken boat by boat. There are no **TN** boats in this specimen race so no review is undertaken

19 Periodic Review undertaken class by class.

International 14 - Seven boats with an RN of 884

As this is the twelfth race in which the class has been adequately represented a Number Change (**NC**) for the class should be calculated and entered in column *r* in the first line for the class. The **NC** is the sum of the **PC**s for all boats of the class in the last four races (the number of races since the last periodic review) divided by the total number of races completed by these boats i.e. the ∑PC as entered in the top left hand side of boxes in column *q* divided by the ∑R as entered in the bottom right hand side of the same box. -107/30 = - 4 after rounding.

As this is an **RN** class the adjustment is made (see above Note).The (new) **N,** entered in column *s,* is the **N** for this race in column *e*, with **NC** applied. If **NC** is positive then this should be added to the old **N**. If **NC** is negative it should be taken away from the old **N**. For the International 14 this is 884 - 4 = 880.As the club has opted to review Numbers after every fourth race the new **N** is used for the class in the next four races and the ∑PC / ∑R in column *q* are cancelled (returned to zero) ready for the next race calculations.

ISO - Seven boats (one a 'poor performer') with an SY of 926 As there are no **PY** boats in the fleet and only one **SY** class, this **SY** class is taken as the 'Yardstick' and no adjustment is made to its Number (see 7.2 page 5 and above Note).

Laser 4000 - Six boats with an RN of 906

As this is the tenth race in which the class has been adequately represented and as the club undertakes a periodic review of Numbers every fourth race, no further action is necessary.

RS 400 - Six boats with an RN of 966

As this is the eighth race in which the class has been adequately represented a Number Change (**NC**) for the class should be calculated and entered in column *r* in the first line for the class. The **NC** is 150 ÷ 26 = 6 after rounding.

As this is an **RN** class adjustment is made (see above Note) with the (new) **N**

entered in column *s* = 966 + 6 = 972.As the club has opted to review Numbers after every fourth race the new **N** is used for the class in the next four races and the ∑PC / ∑R in column *q* are cancelled (returned to zero) ready for the next race calculations.

SPECIMEN RACE TWO

A race with several classes and individual boats in which it cannot be assumed that the **CSF** will balance out

a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*	*o*	*p*	*q*	*r*	*s*
Name	SailNo	Type/Class	Config'	N	Status	E	C	Place		Remarks	P	PI	CSF	PC	This race PC/R	This+pastPC/ R	NC	N
A		LASER		1078	PY	3769	3496	2	3496		1031	-47	10	-57	-62 / 3	-72 / 9		
B		ENTERPRISE		1116	PY	3825	3427	1	3427		1046	-70	6	-76	-43 / 5	-20 / 13		
C		LASER		1078	PY	3894	3612	4	3612		1065	-13	-23	10				
D		LASER		1078	PY	3929	3645	8	3645		1075	-3	12	-15				
E		WAYFARER		1099	PY	3973	3615	5	3615		1087	-12	21	-33	-6 / 2	2 / 7		
F		A.B.C		1098	CN	4023	3664	9		10th Race	1100	2	10	-8	-8 / 1	2 / -4		
G		ENTERPRISE		1116	PY	4059	3637	7	3637		1110	-6	32	-38				
H		WAYFARER		1099	PY	4074	3707	12	3707		1114	15	-12	27				
I		ENTERPRISE		1116	PY	4098	3672	10	3672		1121	5	-4	9				
J		ENTERPRISE		1116	PY	4144	3713	13	3713		1133	17	6	11				
K		Q.P.R		1173	TN	4169	3554	3		1st Race	1140	-33	0	-33	-33 / 1	-33 / 1	-33	1140
L		WANDERER		1131	RN	4179	3695	11	3695		1143	12	8	4	84 / 3	-120 / 13	-9	1122
M		ENTERPRISE		1116	PY	4214	3776	16	3776		1153	37	-14	51				
N		420 NO SPINN'		1126	TN	4258	3782	17		2nd Race	1165	39	19	20	20 / 1	20 / 1	20	1146
O		WANDERER		1131	RN	4281	3785	18	3785		1171	40	34	6				
P		GP 14		1126	PY	4302	3821	19	3821		1177	51	-43	94	94 / 1	23 / 3		
Q		WANDERER		1131	RN	4323	3822	20			1182	51	-23	74				
R		WANDERER		1131	RN	4384	(3876)	21			(1199)	(68)	-36	(104)				
S		GP 14		1126	PY	4450	(3952)	22			(1217)	(91)	-52	(143)				
T		GP 14		1126	PY	4524	(4018)	24			(1237)	(111)	-24	(135)				
U		WANDERER		1131	RN	4590	(4058)	25			(1255)	(124)	-53	(177)				
V		GP 14		1126	PY	4648	(4128)	26			(1271)	(145)	-36	(181)				
W		BOSUN		1198	RN	4748	(3963)	23			(1299)	(101)	-24	(125)				
X		X.Y.Z		1325	TN	4935	3725	14		3rd Race	1350	25	-10	35	35 / 1	35 / 1	35	1360
Y		MIRROR		1386	PY	5038	3635	6	3635		1378	-8	8	-16	26 / 2	15 / 6		
Z		MIRROR		1386	PY	5219	3766	15	3766		1428	42	0	42				
									55002									
									÷15									
								ACT = 3667										
							ACT X 1.05 = 3850											
							47522											
							÷13											
							S = 3656											

SPECIMEN RACE TWO

A race with many dinghy classes each with few boats in which **CSF** should not be ignored when adjusting Numbers.

Steps 1 to 5 produce the race results

1 Enter the boats in the order in which they finish in columns *a, b, c, d,* and their Elapsed Times (**E**), in seconds, in column *g* and any relevant information, e.g. how many races boats with Trial Numbers have completed, in column *k*.

2 Enter in column *e* for each boat the Portsmouth Number (**N**), which is to be used for calculating the race results. (This Number can be an RYA published Number, or a Club or Trial Number allocated by the race organiser in accordance with the Sailing Instructions.)

3 Enter in column *f* each boat's status as Primary Yardstick (**PY**), Secondary Yardstick (**SY**), Recorded Number (**RN**), Club Number (**CN**) or Trial Number (**TN**).

4 Using the formula (6.2 page 5): $\mathbf{C} = \frac{\mathbf{E \times 1000}}{\mathbf{N}}$

Where **C** = Corrected Time
E = Elapsed Time
N = Portsmouth Number

calculate a Corrected Time (**C**), in seconds, for each boat and enter in column *h*.

5 From the **C**s, give the position of each boat in the race in column *i* (1 to 26 in the example).

This is the race result

Normally steps 1 to 5 would be completed by the Race Officer, with steps 6 to 19 being completed by the Yardstick Officer.

Steps 6 to 8 avoid 'poor performers' influencing the Standard Corrected Time

6 From the **C**s of **PY**, **SY** and **RN** boats select and enter in column *j* the best performing two-thirds of the fleet (fifteen boats in the example).

7 From column *j* calculate an Average Corrected Time (ACT):55002 ÷ 15 = 3667

8 Multiply the ACT by 1.05 = 3850

All boats with **C**s exceeding this figure, in other words more than 5% slower than ACT, are regarded as 'poor performers' and their **C**s bracketed in column *h* (boats R, S, T, U, V and W in the example). The times of bracketed boats are not included in the calculation of the Standard Corrected Time (**S**).

Steps 9 to 17 produce data for the review of Numbers

9 In the specimen race there are many **PY** boats and therefore the **S** may be calculated from these. If only a few **PY** boats have been racing, then the **C**s of un-bracketed **SY** and **RN** boats also may need to be used. From the un-bracketed times of **PY** boats in column *h*, calculate **S** by averaging the **C**s of boats A,B, C,D, E, G,H,I,J,M,P,Y and Z i.e.47522 ÷ 13 = 3656.

10 Using the formula (6.3 page 5) $\mathbf{P} = \frac{\mathbf{E \times 1000}}{\mathbf{S}}$

Where **P** = Performance Number
E = Elapsed Time
S = Standard Corrected Time

calculate and in column *l* enter a **P** for each boat to the nearest whole number.

The **P** is the Number to which the boat has performed in this race. **P**s of boats with bracketed **C**s are also bracketed and are not used for adjustment.

If steps 1 to 10 have been carried out correctly, the **P**s in column *l* will always be in ascending order.

11 The difference between **P** in column *l* and **N** in column *e* is called the Performance Indicator (**PI**) and is entered in column *m*, for each boat. **PI**s for boats with bracketed **C**s are also bracketed.

12 If there is a sufficient number of boats in a class racing for the effects of different Crew Skill Factors (**CSF**) to balance out, then steps 13 and 14 may be omitted for that class. This is NOT the case in this example and so steps 13 and 14 are included.

13 The assessed **CSF** for each boat is entered in column *n*. It is shown as negative if the crew would be expected normally to sail a boat faster than its Portsmouth Number.

14 As **CSF** should not be allowed to influence the assessment of adjusted Numbers, it needs to be subtracted from the **PI** to give the Provisional Change (**PC**) which is entered in column *o*. Remember that subtracting a negative **CSF** gives a greater **PC** than the **PI**.

15 Enter in column *p*, on the first line of each class, the sum of the **PC**s (∑PC) and the number of boats (∑R) of the class in this race. ∑PC should be entered in the top left hand side of the box and ∑R in the bottom right hand side. 'Poor performers' should not be included in these totals. For one-off boats or if there's only one boat of a class the ∑PC will equal the **PC** in column *o* and the ∑R will equal 1.

e.g. for the Wanderer, ∑PC = 4 + 6 + 74 = 84 and ∑R = 3. This is entered as 84/3 in the column *p* box of boat L, the first Wanderer in the race.

16 Except for boats with Trial Numbers (**TN** in column *f*), enter in column *q*, on the first line of each class the sum of the **PC**s (∑PC) and the number of boats (∑R)of the class in this race and the previous races since the last Number review. This will be the sum of the figures entered in column *p* for this race and in column *q* for the previous race for this class.

e.g. for the Wanderer, ∑PC = 84 (from this race) -204 (from the previous race) = -120 and ∑R = 3 (from this race) + 10 (from the previous race) = 13. This is entered as -120/13 in the column *q* box of boat L, the first Wanderer in the race.

For **TN** boats the ∑PC/∑R in column *q* should be the same as the ∑PC/∑R in column *p*, i.e. it should not include data from the previous races.

e.g. for the Q.P.R., -33/1.

17 Details of classes and boats which, although not finishers in this race, did finish in previous races are added at the bottom in columns *c*, *d*, *e*, & *q* to be ready for the next race calculations.

Steps 18 and 19 are the review of Numbers

A review and adjustment of **TN** boats should be undertaken after every race.

A periodic review and, if appropriate, adjustment of **PY**, **SY**, **RN** and **CN** boats should be undertaken at periods determined by the club and as specified in Sailing

Instructions (7.4 page 5).

In this specimen race it is assumed that the club undertakes a periodic review of Numbers after every fourth race in which a class is adequately represented.

Note: When adjusting any Portsmouth Numbers, great care should be exercised. The proposed change should only, and truly, reflect the performance of that design of boat on your club's sailing waters and not be because the class has better (or worse) sailors than the club average. Additionally, Primary Yardsticks are Portsmouth Numbers well attested over many years and should not require adjustment. However it is possible that, in your club on your sailing waters, small changes may be necessary to a Primary Yardstick in order to maintain fair relationships between classes. Secondary Yardsticks are also well attested though not as well as Primary Yardsticks, so the same recommendation applies though changes may be made with less reluctance.

18 Review of **TN** boats undertaken boat by boat

For **TN** boats a review and adjustment of Number, should be undertaken after every race. The Number Change (**NC**) for each boat should be calculated and entered in column *r*. The **NC** is the **PC** in this race divided by 1 i.e. the ∑PC as entered in the top left hand side of boxes in column *q* divided by the ∑R as entered in the bottom right hand side of the same box.

The (new) **N,** entered in column *s,* is the **N** for this race in column *e*, with **NC** applied. If **NC** is positive then this should be added to the old **N**. If **NC** is negative it should be taken away from the old **N**

Q.P.R. - One boat with a TN of 1173 in her first race

For this boat the **NC** is - 33/1 = - 33 so the new **N** is 1173 - 33 = 1140.

420 No Spinnaker - One boat with a TN of 1126 in her second race

The **NC** is 20/1 = 20 and the new **N** = 1126 + 20 = 1146.

X.Y.Z- One boat with a TN of 1325 in her third race

The **NC** is 35/1 = 35 and the new **N** = 1325 + 35 = 1360.

As this is the third race in which this boat has finished without being a 'poor performer', her new **N** should be sufficiently stable to warrant a status change to a **CN** with the ∑PC/∑R in column *q* cancelled (returned to zero) ready for the next race calculation. However, if a club considers appropriate, it would not be wrong to keep the Number as a **TN** and to continue review after every race.

19 Periodic Review undertaken class by class

Laser, Enterprise, Wayfarer, GP 14 and Mirror- all boats with a PY

As **PY** classes are taken as 'Yardsticks' no adjustment is made to their Numbers (see 7.2 page 5 and above Note).

A.B.C. - One boat with a CN of 1098

This is the tenth race the boat has completed and as the club undertakes a periodic review of Numbers after every fourth race, no further action is necessary.

Wanderer - Five boats with an RN of 1131

As this is the twelfth race in which the class has been adequately represented a Number Change (**NC**) for the class should be calculated and entered in column *r* in the first line for the class. The **NC** is the sum of the **PC**s for all boats of the class in the last four races (the number of races since the last periodic review) divided by the total number of races completed by these boats i.e. the ∑PC as entered in the top left hand side of boxes in column *q* divided by the ∑R as entered in the bottom right hand side of the same box. -120/13 = - 9 after rounding.

As this is an **RN** class adjustment is made (see above Note).

The (new) **N,** entered in column *s,* is the **N** for this race in column *e*, with **NC** applied. If **NC** is positive then this should be added to the old **N**. If **NC** is negative it should be taken away from the old **N**

For the Wanderer this is 1131 - 9 = 1122.

As the club has opted to review Numbers after every fourth race the new **N** is used for the class in the next four races and the ∑PC / ∑R in column *q* are cancelled (returned to zero) ready for the next race calculations.

Bosun - One boat with an RN of 1198

This is the eighth race for the boat but as she is a 'poor performer' this race is discounted as a review race and the ∑PC/∑R from her previous race is carried forward to the next race unchanged.

SPECIMEN RACE THREE

A cruiser race with many individual entries in which it cannot be assumed that **CSF** will balance out.

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
Name	SailNo.	Type/Class	Config'	N	Status	E	C	Place		Remarks	P	PI	CSF	PC	This race ∑PC/∑R	This+past ∑PC/∑R	NC	N
A		SIGMA 38	IBF 1	844	RN	11638	13789	20			863	19	-10	29	29/1	89/4	22	866
B		A.B.C	IB2 1	889	CN	12203	13727	19		5th Race	905	16	-18	34	34/1	34/1		
C		ONE-OFF	IBF 1	908	CN	12274	13518	11		8th Race	910	2	-10	12	12/1	25/4	6	914
D		SIGMA 33	IBF 1	926	PY	12337	13323	4	13323		915	-11	-8	-3				
E		FEELING 850	IBF 1	950	RN	12349	12999	1	12999	5th Race	915	-35	-16	-19	-19/1	-19/1		
F		CONTENTION 30	IB2 1	927	CN	12403	13380	7		7th Race	919	-8	-23	15	15/1	26/3		
G		ACHILLES 9M	IBF 1	965	RN	12918	13387	8	13387		958	-7	-38	31	31/1	31/1		
H		BALLAD 30	IBF 1	1001	SY	13513	13500	10	13500		1002	1	0	1				
I		Q.P.R	IBF 1	993	TN	13575	13671	17		1st Race	1006	13	-10	23	23/1	23/1	23	1016
J		TRAPPER 28	IB2 1	1030	RN	13697	13298	3	13298	5th Race	1015	-15	5	-20	-20/1	-20/1		
K		ETAP 30	IB2 1	1069	TN	14085	13176	2		2nd Race	1044	-25	36	-61	-61/1	-61/1	-61	1008
L		RIVAL 34	IB2 1	1041	CN	14236	13675	18		5th Race	1055	14	-5	19	19/1	19/1		
M		CLUB 19	OB 1	1058	RN	14375	13587	12	13587	8th Race	1066	8	20	-12	-12/1	-48/4	-12	1046
N		ACHILLES 24	OB 1	1078	PY	14388	13347	5	13347	3rd Race	1067	-11	-6	-5				
O		X.Y.Z	IB2 2	1079	CN	14536	13472	9		6th Race	1078	-1	-11	10	10/1	15/2		
P		CHANCE 24	IB2 2	1079	TN	14666	13592	14		3rd Race	1087	8	29	-21	-21/1	-21/1	-21	1058
Q		TRINTELLA	IB2 1	1087	RN	14796	13612	15	13612	5th Race	1097	10	-34	44	44/1	44/1		
R		TRAPPER TS 240	OB 1	1003	RN	14948	(14903)	24		5th Race	(1108)	(105)	11					
S		ONE-OFF	IB2 1	1069	TN	14976	14009	22		2nd Race	1110	41	0	41	41/1	41/1	41	1110
T		WESTERLY KONSORT	IB2 2	1102	SY	14977	13591	13	13591		1110	8	-4	12				
U		ACHILLES 24	OB 1	1078	PY	15436	(14319)	23			(1144)	(66)						
V		FOLKBOAT	IB2 1	1174	SY	15704	13376	6	13376		1164	-10	-4	-6				
W		WESTERLY BERWICK	IB3 2	1130	RN	15705	13898	21		5th Race	1164	34	-13	47	47/1	47/1		
X		WESTERLY CENTAUR	IB3 2	1206	PY	16484	13668	16			1222	16	12	4				
									134020									
									÷10									
								ACT = 13402										
							ACT x 1.05 = 14072											
						175375												
						÷13												
						S = 13490												

SPECIMEN RACE THREE

A race with many cruiser classes each with few boats in which **CSF** should not be ignored when adjusting Numbers.

Steps 1 to 5 produce the race results

Steps 6 to 8 avoid poor performers influencing the Standard Corrected Time

Steps 1 to 8 should be undertaken using the same method as shown in Specimen Race Two. The ACT =13402. ACTx1.05 = 14072.

Steps 9 to 19 produce data for the review of Numbers

9 In the specimen race there are few **PY** boats and **SY** boats and therefore the **S** has been calculated using the **C**s of un-bracketed **PY**, **SY** and **RN** boats. It is preferable for **S** to be calculated from the **C**s of **PY** and **SY** boats with the **C**s of **RN** boats only used where there are insufficient Yardsticks. From the un-bracketed times of **PY**, **SY** and **RN** boats in column *h*, calculate **S** by averaging the **C**s of boats A,D,E,G,H,J,M,N,Q,T,V,W and X i.e. 175375 ÷ 13 = 13490.

Steps 10 to 14 - should be undertaken using the same method as illustrated in Specimen Race Two.

15 Enter in column *p*, on the first line of each class, the sum of the **PC**s (∑PC) and the number of boats (∑R) of the class in this race. ∑PC should be entered in the top left hand side of the box and ∑R in the bottom right hand side. 'Poor performers' should not be included in these totals. For one-off boats or if there is only one boat of a class the ∑PC will equal the **PC** in column *o* and the ∑R will equal 1.

e.g. for the Sigma 38, ∑PC = 29 and ∑R = 1. This is entered as 29/1 in the column *p* box of boat A, the first, and in this example, the only Sigma 38 in the race.

16 Except for boats with Trial Numbers (**TN** in column *f*), enter in column *q*, on the first line of each class the sum of the **PC**s (∑PC) and the number of boats (∑R)of the class in this race and the previous races since the last Number review. This will be the sum of the figures entered in column *p* for this race and in column *q* for the previous race for this class.

e.g. for the Sigma 38, ∑PC =29 (from this race) +60 (from the previous race) =89 and ∑R = 1 (from this race) + 3 (from the previous race) = 4. This is entered as 89/4 in the column *q* box of boat A, the first, and in this example, the only Sigma 38 in the race.

For **TN** boats the ∑PC/∑R in column *q* should be the same as the ∑PC/∑R in column *p*, i.e. it should not include data from the previous races.

e.g. for the Q.P.R., 23/1.

17 Details of classes and boats which, although not finishers in this race, did finish in previous races are added at the bottom in columns *c*, *d*, *e*, *f* & *q* to be ready for the next race calculations.

Steps 18 and 19 are the review of Numbers

A review and adjustment of **TN** boats should be undertaken after every race.

A periodic review and, if appropriate, adjustment of **PY**, **SY**, **RN** and **CN** boats should be undertaken at periods determined by the club and as specified in Sailing Instructions (7.4 page 5).

In this specimen race it is assumed that the club undertakes a periodic review of Numbers after every fourth race in which a class is adequately represented.

Note: When adjusting any Portsmouth Numbers, great care should be exercised. The proposed change should only, and truly, reflect the performance of that design of boat on your club's sailing waters and not be because the class has better (or worse) sailors than the club average. Additionally, Primary Yardsticks are Portsmouth Numbers well attested over many years and should not require adjustment. However it is possible that, in your club on your sailing waters, small changes may be necessary to a Primary Yardstick in order to maintain fair relationships between classes. Secondary Yardsticks are also well attested though not as well as Primary Yardsticks, so the same recommendation applies though changes may be made with less reluctance.

18 Review of **TN** boats undertaken boat by boat

For **TN** boats a review and adjustment of Number, should be undertaken after every race.

The Number Change (**NC**) for each boat should be calculated and entered in column *r.* The **NC** is the **PC** in this race divided by 1 i.e. the∑PC as entered in the top left hand side of boxes in column *q* divided by the ∑R as entered in the bottom right hand side of the same box.

The (new) **N,** to be entered in column *s,* is the (old) **N** for this race in column *e*, with **NC** applied. If **NC** is positive then this should be added to the old **N.** If **NC** is negative it should be taken away from the old **N**

Q.P.R. - One boat with a TN of 993 in her first race

For this boat the **NC** is 23/1 = 23 so the new **N** is 993 + 23 = 1016.

Etap 30 - One boat with a TN of 1069 in her second race

The **NC** is - 61/1 = - 61 and the new **N** = 1069 - 61 = 1008.

Chance 24 - One boat with a TN of 1079 in her third race

The **NC** is - 21/1 = - 21 and the new **N** = 1079 - 21 = 1058.As this is the third race in which this boat has finished without being a 'poor performer', her new **N** should be sufficiently stable to warrant a status change to a **CN** with the ∑PC/∑R in column *q* cancelled (returned to zero) ready for the next race calculation. However, if a club considers appropriate, it would not be wrong to keep the Number as a **TN** and to continue to review after every race.

One-Off (boat S) - One boat with a TN of 1069 in her second race

The **NC** is 41/1 = 41 and the new **N** = 1069 + 41 = 1110.

19 Periodic Review undertaken class by class

This club has few **PY** classes and so has chosen to treat both **PY** and **SY** classes as 'Yardsticks' making no adjustment to their Numbers unless the race analysis indicates inequitably between them (see 7.2 page 5 and above Note).

Sigma 33, Achilles 24 and Westerly Centaur - all boats with a PY

Ballard 30, Westerly Konsort and Folkboat - all boats with a SY

As, at this club **PY** and **SY** classes are taken as 'Yardsticks' no adjustment is made to their Numbers (see 7.2 page 5 and above Note).

Sigma 38 - One boat with an RN of 844

As this is the eighth race the boat has completed without being a 'poor performer' a Number Change (**NC**) should be calculated and entered in column *r.* The **NC** is the sum of the **PC**s for the boat in the last four races (the number of races since the last periodic review) divided by the total number of races completed by the boat i.e. the ∑PC as entered in the top left hand side of boxes in column *q* divided by the ∑R as entered in the bottom right hand side of the same box. 89 ÷ 4 = 22 after rounding.

As this is a **RN** class the adjustment is made (see above Note).

The (new) **N**, in column *s,* is the (old) **N** in column *e*, with **NC** applied = 844 +22 = 866.

As the club has opted to review Numbers after every fourth race the new **N** is used for the class in the next four races and the ∑PC/∑R in column *q* are cancelled (returned to zero) ready for the next race calculations.

Club 19 - One boat with an RN of 1058

This is the eighth race the boat has completed without being a 'poor performer' so an **NC** of -12 is calculated and entered in column *r.* As this is a **RN** class the adjustment is made (see above Note). The (new) **N** to be entered in column *s* is 1058 - 12 = 1046.

The new **N** is used for the class in the next four races and the ∑P /∑R in column *q* are cancelled (returned to zero) ready for the next race calculations.

Feeling 850, Achilles 9m, Trintella, Trapper 28, Trapper TS 240 and Westerly Berwick - All RN boats

As this is the fifth race which all of these boats have completed without being 'poor performers' and as the club undertakes a periodic review of Numbers every fourth race, no further action is necessary.

A.B.C. - One boat with a CN of 1098

This is the fifth race the boat has completed without being a 'poor performer' and so no further action is necessary.

One-Off (boat C) - One boat with a CN of 908

As this is the eighth race the boat has completed without being a 'poor performer' an **NC** of 6 is calculated and entered in column *r.*

As this is a **CN** class the adjustment is made (see above Note).

The (new) **N,** in column *s,* is 908 + 6 = 914 which is used for the class in the next four races and the ∑PC/∑R in column *q* are cancelled (returned to zero) ready for the next race calculations.

Contention 30 - One boat with a CN of 1098

As this is the seventh race the boat has completed without being a 'poor performer' and as the club undertakes a periodic review of Numbers every fourth race, no further action is necessary.

Rival 34 - One boat with a CN of 1041

This is the fifth race the boat has completed without being a 'poor performer' so no further action is necessary.

X.Y.Z. - One boat with a CN of 1079

This is the sixth race the boat has completed without being a 'poor performer' so no further action is necessary.