

Twin City Fan & Blower

SOUND POWER LEVELS

FOR MODULAR PLENUM FANS, TYPE MPQN



Twin City Fan & Blower certifies that the Type MPQN Plenum Fans shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Air performance ratings can be found in Bulletin 490.



These sound power levels have been determined by laboratory tests in accordance with AMCA Standard 300-96. The sound power levels shown are decibel (dB) levels referred to 10⁻¹² watts calculated per AMCA Standard 301. We have listed inlet and outlet values for eight octave bands with frequency ranges as shown below.

OCTAVE BAND	1	2	3	4	5	6	7	8
FREQUENCY CENTER	45 to 90	90 to 180	180 to 355	355 to 710	710 to 1400	1400 to 2800	2800 to 5600	5600 to 11200
CENTER FREQUENCY	63	125	250	500	1000	2000	4000	8000

Sound power levels (SPL) for the fans can be easily obtained using the Twin City Fan Selector Program. The SPL can also be obtained using the specific sound power level method described below:

**Sound Power Level of a fan =
Specific Sound Power Level (L_{wk}) + Capacity Fraction (M)**

Use of this method will be illustrated by the following example using MPQN performance:

Calculate sound power levels for:

Size..... 245 MPQN	Outlet Velocity..... 1,202 ft./min
CFM..... 11,270	Temp..... 70°F
SP..... 5.63" w.g.	Elevation..... 0 ft.
RPM..... 2000 RPM	

1. How to determine L_{wk}

We have published values for L_{wk} at various speeds and operating points on pages 3 and 4 for both the inlet and outlet of the fan.

The operating point is found by using a ratio of design CFM to the wide open volume (WOV) for a given RPM. The WOVS can be calculated by multiplying fan RPM by the factors (Rf) shown in the table.

SIZE	Rf	SIZE	Rf
122	0.822	270	10.774
150	1.189	300	14.780
165	1.693	330	19.672
182	3.121	365	25.896
200	4.108	402	34.726
222	5.656	445	46.928
245	8.050	490	62.653

Thus, WOVS for 2000 RPM = 8.05 x 2000 = 16,100 CFM.

Therefore, the operating point falls at 70% WOVS (11,270 ÷ 16,100 x 100%). Referring to the table on page 4 for Size 245 MPQN, the **specific** sound power levels can be read as follows:

L _{wk} inlet =	34	28	30	34	28	26	22	17
L _{wk} outlet =	42	31	27	26	23	21	19	13

2. How to determine M

The value of M can be taken from the table on page 5 once Total Pressure (TP) is calculated.

Total Pressure (TP) = Static Pressure (SP) + Velocity Pressure (VP) (All pressure at operating density.)

VP = (Outlet Velocity / 4005)² x density factor

In our example, VP = (1202 / 4005)² x 1.00 = 0.09

Therefore TP = 5.63 + 0.09 = 5.72

Thus, for 11,270 CFM and 5.72" w.g. TP, M works out to be 56.

M can also be calculated using the formula, M = 10 log₁₀ CFM + 20 log₁₀ TP

3. Combining L_{wk} and M gives sound power levels.

Octave Band	1	2	3	4	5	6	7	8
L _{wk} =	34	28	30	34	28	26	22	17
M =	56	56	56	56	56	56	56	56
SPL at inlet =	90	84	86	90	84	82	76	73
L _{wk} =	42	31	27	26	23	21	19	13
M =	56	56	56	56	56	56	56	56
SPL at outlet =	98	87	83	82	79	77	75	69

Inlet L_{wk} Values — MPQN 122–165

RPM	% WOV	OCTAVE BAND								L _{wk} iA
		1	2	3	4	5	6	7	8	
4000	90	39	38	39	50	47	42	42	37	52
	80	37	35	34	45	43	36	36	31	47
	70	36	32	31	42	39	32	32	27	43
	60	35	31	29	39	36	30	29	25	40
	50	35	31	29	39	36	30	29	25	40
3500	90	39	38	40	50	44	42	42	35	51
	80	37	34	35	45	39	37	36	30	46
	70	36	32	31	42	35	33	32	26	42
	60	35	30	29	39	32	30	29	24	39
	50	35	30	29	39	32	30	29	24	39
3000	90	39	39	41	50	42	42	41	34	50
	80	37	34	36	45	37	37	36	28	45
	70	35	31	33	42	33	33	31	25	42
	60	34	30	30	39	30	30	28	23	39
	50	34	30	30	39	30	30	28	23	39
2500	90	41	40	45	51	45	42	40	32	51
	80	38	35	40	46	40	37	34	27	46
	70	35	32	36	42	36	33	29	24	42
	60	33	30	34	39	33	30	27	22	39
	50	33	30	34	39	33	30	27	22	39
2000	90	43	39	46	52	43	43	40	30	52
	80	39	35	41	46	38	37	33	25	46
	70	36	32	36	42	34	33	28	23	42
	60	34	30	33	39	31	30	25	22	39
	50	34	30	33	39	31	30	25	22	39
1500	90	41	42	51	52	43	42	36	26	52
	80	37	38	45	46	37	35	30	22	45
	70	34	34	41	42	33	31	26	21	41
	60	32	31	38	39	30	28	24	21	39
	50	32	31	38	39	30	28	24	21	39
1000	90	39	46	52	43	43	40	30	20	48
	80	35	41	46	38	37	33	25	18	42
	70	32	36	42	34	33	28	23	18	38
	60	30	33	39	31	30	25	22	19	35
	50	30	33	39	31	30	25	22	19	35

Outlet L_{wk} Values — MPQN 122–165

RPM	% WOV	OCTAVE BAND								L _{wk} oA
		1	2	3	4	5	6	7	8	
4000	90	44	43	39	45	44	41	38	32	48
	80	41	39	35	40	40	37	34	27	44
	70	39	37	32	37	36	34	30	24	41
	60	38	35	30	35	34	31	28	22	38
	50	38	35	30	35	34	31	28	22	38
3500	90	44	43	39	45	43	40	37	30	48
	80	41	39	34	40	38	37	33	26	43
	70	39	36	31	37	35	34	30	23	40
	60	38	34	30	35	33	31	27	21	38
	50	38	34	30	35	33	31	27	21	38
3000	90	44	42	40	45	43	40	37	29	48
	80	41	38	35	41	38	37	32	25	43
	70	38	35	32	37	35	34	28	22	40
	60	37	33	30	35	32	31	26	20	37
	50	37	33	30	35	32	31	26	20	37
2500	90	45	43	44	47	44	41	36	29	49
	80	41	39	39	41	40	37	31	25	44
	70	38	35	35	37	36	33	28	22	40
	60	36	33	33	35	33	30	25	21	38
	50	36	33	33	35	33	30	25	21	38
2000	90	46	44	45	48	44	43	36	30	50
	80	41	40	39	42	40	36	31	26	44
	70	38	36	35	38	36	32	27	23	40
	60	36	32	33	35	32	30	25	22	37
	50	36	32	33	35	32	30	25	22	37
1500	90	45	44	47	48	43	40	33	27	49
	80	41	39	41	42	38	34	29	24	43
	70	37	35	37	38	34	30	25	22	39
	60	34	32	34	35	31	28	24	21	36
	50	34	32	34	35	31	28	24	21	36
1000	90	44	45	48	44	43	36	30	24	47
	80	40	39	42	40	36	31	26	21	41
	70	36	35	38	36	32	27	23	20	37
	60	32	33	35	32	30	25	22	19	35
	50	32	33	35	32	30	25	22	19	35

Inlet L_{wk} Values — MPQN 182–222

RPM	% WOV	OCTAVE BAND								L _{wk} iA
		1	2	3	4	5	6	7	8	
4000	90	44	44	43	44	45	37	40	39	49
	80	39	39	37	38	39	31	33	31	42
	70	36	36	33	33	35	27	28	24	38
	60	34	33	31	31	33	24	24	19	36
	50	34	33	31	31	33	24	24	19	36
3500	90	44	43	42	45	45	37	41	37	49
	80	39	39	37	39	39	32	33	29	43
	70	36	35	33	35	35	27	27	23	38
	60	34	33	30	33	33	25	23	19	36
	50	34	33	30	33	33	25	23	19	36
3000	90	44	43	42	45	41	38	42	35	48
	80	39	38	36	39	35	32	33	28	41
	70	36	35	32	35	31	28	27	22	37
	60	34	33	28	33	29	25	22	18	34
	50	34	33	28	33	29	25	22	18	34
2500	90	44	43	42	45	35	39	42	32	47
	80	39	38	36	39	30	33	33	26	40
	70	36	35	30	35	26	29	26	20	36
	60	34	33	27	33	24	26	21	17	33
	50	34	33	27	33	24	26	21	17	33
2000	90	43	42	44	44	37	39	38	29	46
	80	38	37	38	38	32	33	31	23	40
	70	35	33	34	34	28	28	25	19	36
	60	33	30	31	32	26	25	21	16	33
	50	33	30	31	32	26	25	21	16	33
1500	90	42	42	43	42	36	40	35	26	45
	80	37	36	38	36	30	34	29	20	39
	70	34	31	34	31	27	29	23	16	34
	60	32	28	32	29	26	26	18	14	32
	50	32	28	32	29	26	26	18	14	32
1000	90	42	43	43	38	39	37	29	20	43
	80	36	38	37	32	33	31	23	14	37
	70	32	34	33	28	29	26	19	12	33
	60	29	32	31	27	26	22	16	12	31
	50	29	32	31	27	26	22	16	12	31

Outlet L_{wk} Values — MPQN 182–222

RPM	% WOV	OCTAVE BAND								L _{wk} oA
		1	2	3	4	5	6	7	8	
4000	90	49	47	41	40	42	35	36	34	45
	80	44	42	37	34	36	29	29	26	39
	70	40	39	34	30	32	25	24	21	35
	60	38	37	33	28	29	23	21	19	33
	50	38	37	33	28	29	23	21	19	33
3500	90	49	46	40	42	42	35	36	32	46
	80	44	42	35	36	36	29	29	24	40
	70	40	38	32	32	32	25	24	20	36
	60	38	37	31	29	29	23	21	19	33
	50	38	37	31	29	29	23	21	19	33
3000	90	49	45	38	42	39	35	37	30	45
	80	44	41	33	36	33	29	29	23	38
	70	40	38	30	32	29	25	23	19	34
	60	38	37	29	29	26	23	20	19	32
	50	38	37	29	29	26	23	20	19	32
2500	90	49	44	36	42	34	35	37	27	44
	80	44	40	31	36	29	29	29	21	37
	70	40	37	28	32	25	25	22	18	33
	60	38	36	27	29	24	23	19	19	31
	50	38	36	27	29	24	23	19	19	31
2000	90	47	42	40	40	34	36	32	27	42
	80	43	37	35	35	29	29	26	21	37
	70	39	35	31	30	25	25	21	19	32
	60	37	34	28	28	23	22	19	19	30
	50	37	34	28	28	23	22	19	19	30
1500	90	47	41	40	35	33	36	28	29	41
	80	43	35	35	30	29	30	23	25	36
	70	39	33	31	26	25	25	20	22	32
	60	36	32	28	24	23	22	18	20	29
	50	36	32	28	24	23	22	18	20	29
1000	90	43	40	39	34	35	31	29	30	40
	80	38	35	33	29	30	25	24	26	34
	70	35	31	29	25	26	22	21	23	31
	60	34	28	27	23	23	20	19	21	29
	50	34	28	27	23	23	20	19	21	29

NOTES:

- Values shown are for inlet L_{wi} and L_{wi}A or outlet L_wo and L_woA sound power levels for Installation Type A: free inlet, free outlet.
- Ratings do not include the effects of duct end correction.
- The sound power level ratings shown are in decibels, referred to as 10⁻¹² watts, calculated per AMCA International Standard 301.
- The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

Inlet L_{wk} Values — MPQN 245–330

RPM	% WOV	OCTAVE BAND								LwkiA
		1	2	3	4	5	6	7	8	
3000	90	47	44	41	44	44	40	41	35	49
	80	39	37	34	38	38	32	31	26	41
	70	34	32	29	33	34	27	24	20	37
	60	33	29	25	29	30	23	20	16	33
	50	33	29	25	29	30	23	20	16	33
2500	90	47	43	42	44	43	40	41	32	48
	80	39	36	35	38	36	32	31	24	41
	70	34	30	29	34	32	26	23	18	36
	60	33	27	25	30	28	23	18	16	32
	50	33	27	25	30	28	23	18	16	32
2000	90	47	41	42	44	40	40	41	27	47
	80	39	34	35	38	33	32	30	21	40
	70	34	28	30	34	28	26	22	17	34
	60	33	24	26	30	24	22	16	15	30
	50	33	24	26	30	24	22	16	15	30
1500	90	44	42	44	42	38	39	33	23	45
	80	38	35	38	36	31	31	26	18	38
	70	34	29	34	32	27	25	20	15	33
	60	32	26	31	29	24	21	16	14	30
	50	32	26	31	29	24	21	16	14	30
1000	90	43	43	44	38	37	36	27	20	43
	80	37	36	38	31	31	29	22	15	36
	70	32	32	34	27	26	23	17	13	31
	60	30	29	32	24	23	19	14	13	29
	50	30	29	32	24	23	19	14	13	29
500	90	43	44	38	37	36	27	20	13	40
	80	36	38	31	31	29	22	15	9	33
	70	32	34	27	26	23	17	13	8	28
	60	29	32	24	23	19	14	13	12	25
	50	29	32	24	23	19	14	13	12	25

Outlet L_{wk} Values — MPQN 245–330

RPM	% WOV	OCTAVE BAND								LwkoA
		1	2	3	4	5	6	7	8	
3000	90	52	47	39	36	36	33	34	30	42
	80	46	41	33	30	30	26	26	22	35
	70	42	38	30	26	26	22	20	16	31
	60	41	37	29	25	24	20	17	14	30
	50	41	37	29	25	24	20	17	14	30
2500	90	52	44	38	36	35	33	35	27	41
	80	46	38	32	30	28	26	26	19	34
	70	42	35	28	26	25	22	19	15	30
	60	41	34	28	24	23	19	16	13	28
	50	41	34	28	24	23	19	16	13	28
2000	90	52	41	36	36	32	33	36	22	41
	80	46	35	30	30	26	26	26	16	34
	70	42	31	27	26	23	21	19	13	29
	60	41	31	26	24	21	18	15	12	27
	50	41	31	26	24	21	18	15	12	27
1500	90	49	41	36	35	32	34	28	19	39
	80	43	35	30	29	26	26	22	15	33
	70	39	32	27	25	22	21	17	13	28
	60	39	31	25	23	20	18	16	13	27
	50	39	31	25	23	20	18	16	13	27
1000	90	46	37	36	32	33	31	23	17	37
	80	40	32	31	26	26	24	18	13	31
	70	37	28	27	22	21	19	16	11	27
	60	37	27	25	20	20	18	15	11	25
	50	37	27	25	20	20	18	15	11	25
500	90	37	36	32	33	31	23	17	11	35
	80	31	31	26	26	24	18	13	8	28
	70	28	27	22	21	19	16	11	6	24
	60	27	25	20	20	18	15	11	7	23
	50	27	25	20	20	18	15	11	7	23

Inlet L_{wk} Values — MPQN 365–490

RPM	% WOV	OCTAVE BAND								LwkiA
		1	2	3	4	5	6	7	8	
2000	90	47	47	44	47	36	36	34	26	46
	80	42	42	39	43	28	28	25	20	41
	70	39	39	37	39	23	22	19	16	37
	60	38	38	40	37	20	19	17	15	36
	50	38	38	40	37	20	19	17	15	36
1750	90	47	47	45	47	36	35	32	25	46
	80	42	42	40	43	28	27	24	19	41
	70	39	39	38	39	23	22	19	16	38
	60	38	39	39	37	19	18	16	14	36
	50	38	39	39	37	19	18	16	14	36
1500	90	47	46	46	47	36	35	30	24	46
	80	42	41	42	43	28	27	23	18	42
	70	39	38	39	39	23	21	18	15	38
	60	38	39	37	37	19	18	16	14	36
	50	38	39	37	37	19	18	16	14	36
1250	90	47	45	47	43	36	34	28	22	44
	80	42	40	43	38	28	26	21	17	39
	70	39	38	39	34	22	20	17	14	35
	60	38	40	37	31	19	17	15	14	33
	50	38	40	37	31	19	17	15	14	33
1000	90	47	44	47	36	36	34	26	21	42
	80	42	39	43	28	28	25	20	16	37
	70	39	37	39	23	22	19	16	14	32
	60	38	40	37	20	19	17	15	14	31
	50	38	40	37	20	19	17	15	14	31
750	90	44	54	42	33	33	31	23	18	42
	80	39	49	36	26	27	24	19	15	36
	70	36	44	31	21	22	19	16	13	31
	60	35	41	27	18	19	16	14	12	28
	50	35	41	27	18	19	16	14	12	28
500	90	54	50	36	33	32	26	20	15	39
	80	49	45	29	27	25	21	17	12	33
	70	44	40	24	22	20	17	14	11	28
	60	41	37	21	19	17	15	13	11	26
	50	41	37	21	19	17	15	13	11	26
250	90	50	36	33	32	26	20	15	10	33
	80	44	29	27	25	21	17	12	8	27
	70	40	24	22	20	17	14	11	8	23
	60	36	21	19	17	15	13	11	9	21
	50	36	21	19	17	15	13	11	9	21

Outlet L_{wk} Values — MPQN 365–490

RPM	% WOV	OCTAVE BAND								LwkoA
		1	2	3	4	5	6	7	8	
2000	90	47	47	43	40	32	31	28	20	41
	80	43	43	37	32	26	23	19	14	35
	70	40	40	34	27	22	19	14	11	31
	60	39	39	35	25	21	18	12	11	30
	50	39	39	35	25	21	18	12	11	30
1750	90	47	47	42	40	31	30	26	19	41
	80	43	42	35	32	25	23	18	14	34
	70	40	39	32	27	22	18	13	11	30
	60	39	39	31	25	20	17	11	10	29
	50	39	39	31	25	20	17	11	10	29
1500	90	47	46	40	40	31	29	24	18	40
	80	43	41	33	32	25	22	17	13	33
	70	40	38	28	27	21	17	13	10	29
	60	39	38	27	25	19	15	11	10	28
	50	39	38	27	25	19	15	11	10	28
1250	90	47	44	40	37	31	29	22	18	39
	80	43	39	32	30	24	20	16	12	32
	70	40	36	27	25	20	15	12	10	27
	60	39	36	25	23	19	14	11	10	26
	50	39	36	25	23	19	14	11	10	26
1000	90	47	43	40	32	31	28	20	17	37
	80	43	37	32	26	23	19	14	11	30
	70	40	34	27	22	19	14	11	9	26
	60	39	35	25	21	18	12	11	10	25
	50	39	35	25	21	18	12	11	10	25
750	90	48	43	36	30	29	26	19	13	35
	80	43	37	29	24	22	18	13	7	28
	70	39	34	25	20	18	13	10	4	25
	60	37	34	23	18	16	11	10	5	23
	50	37	34	23	18	16	11	10	5	23
500	90	43	41	32	29	28	22	15	9	33
	80	37	35	26	23	20	15	9	3	26
	70	34	31	22	19	15	11	7	1	22
	60	34	31	20	17	13	11	7	2	21
	50	34	31	20	17	13	11	7	2	21
250	90	40	32	29	28	22	15	9	3	29
	80	34	26	23	20	15	9	3	-3	21
	70	31	22	19	15	11	7	1	-5	17
	60	30	20	17	13	11	7	2	-3	16
	50	30	20	17	13	11	7	2	-3	16

NOTES:

1. Values shown are for inlet L_{wi} and L_{wiA} or outlet L_{wo} and L_{woA} sound power levels for Installation Type A: free inlet, free outlet.
2. Ratings do not include the effects of duct end correction.

3. The sound power level ratings shown are in decibels, referred to as 10⁻¹² watts, calculated per AMCA International Standard 301.
4. The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

M Capacity Fraction

CFM	TOTAL PRESSURE AT DENSITY																		
	1/4	3/8	1/2	5/8	3/4	7/8	1	1¼	1½	2	2½	3	3½	4	4½	5	5½	6	6½
100	8	11	14	16	18	19	20	22	24	26	28	30	31	32	33	34	35	36	36
150	10	13	16	18	19	21	22	24	25	28	30	31	33	34	35	36	37	37	38
200	11	14	17	19	21	22	23	25	27	29	31	33	34	35	36	37	38	39	39
300	13	16	19	21	22	24	25	27	28	31	33	34	36	37	38	39	40	40	41
500	15	18	21	23	24	26	27	29	31	33	35	37	38	39	40	41	42	43	43
750	17	20	23	25	26	28	29	31	32	35	37	38	40	41	42	43	44	44	45
1000	18	21	24	26	28	29	30	32	34	36	38	40	41	42	43	44	45	46	46
1500	20	23	26	28	29	31	32	34	35	38	40	41	43	44	45	46	47	47	48
2000	21	24	27	29	31	32	33	35	37	39	41	43	44	45	46	47	48	49	49
3000	23	26	29	31	32	34	35	37	38	41	43	44	46	47	48	49	50	50	51
5000	25	28	31	33	34	36	37	39	41	43	45	47	48	49	50	51	52	53	53
7500	27	30	33	35	36	38	39	41	42	45	47	48	50	51	52	53	54	54	55
10000	28	31	34	36	38	39	40	42	44	46	48	50	51	52	53	54	55	56	56
15000	30	33	36	38	39	41	42	44	45	48	50	51	53	54	55	56	57	57	58
20000	31	34	37	39	41	42	43	45	47	49	51	53	54	55	56	57	58	59	59
30000	33	36	39	41	42	44	45	47	48	51	53	54	56	57	58	59	60	60	61
50000	35	38	41	43	44	46	47	49	51	53	55	57	58	59	60	61	62	63	63
75000	37	40	43	45	46	48	49	51	52	55	57	58	60	61	62	63	64	64	65
100000	38	41	44	46	48	49	50	52	54	56	58	60	61	62	63	64	65	66	66
150000	40	43	46	48	49	51	52	54	55	58	60	61	63	64	65	66	67	67	68
200000	41	44	47	49	51	52	53	55	57	59	61	63	64	65	66	67	68	69	69

CFM	TOTAL PRESSURE AT DENSITY																			
	7	8	9	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	
100	37	38	39	40	42	43	44	45	46	47	48	48	49	50	50	51	51	52	52	
150	39	40	41	42	43	45	46	47	48	49	49	50	51	51	52	52	53	53	54	
200	40	41	42	43	45	46	47	48	49	50	51	51	52	53	53	54	54	55	55	
300	42	43	44	45	46	48	49	50	51	52	52	53	54	54	55	55	56	56	57	
500	44	45	46	47	49	50	51	52	53	54	55	55	56	57	57	58	58	59	59	
750	46	47	48	49	50	52	53	54	55	56	56	57	58	58	59	59	60	60	61	
1000	47	48	49	50	52	53	54	55	56	57	58	58	59	60	60	61	61	62	62	
1500	49	50	51	52	53	55	56	57	58	59	59	60	61	61	62	62	63	63	64	
2000	50	51	52	53	55	56	57	58	59	60	61	61	62	63	63	64	64	65	65	
3000	52	53	54	55	56	58	59	60	61	62	62	63	64	64	65	65	66	66	67	
5000	54	55	56	57	59	60	61	62	63	64	65	65	66	67	67	68	68	69	69	
7500	56	57	58	59	60	62	63	64	65	66	66	67	68	68	69	69	70	70	71	
10000	57	58	59	60	62	63	64	65	66	67	68	68	69	70	70	71	71	72	72	
15000	59	60	61	62	63	65	66	67	68	69	69	70	71	71	72	72	73	73	74	
20000	60	61	62	63	65	66	67	68	69	70	71	71	72	73	73	74	74	75	75	
30000	62	63	64	65	66	68	69	70	71	72	72	73	74	74	75	75	76	76	77	
50000	64	65	66	67	69	70	71	72	73	74	75	75	76	77	77	78	78	79	79	
75000	66	67	68	69	70	72	73	74	75	76	76	77	78	78	79	79	80	80	81	
100000	67	68	69	70	72	73	74	75	76	77	78	78	79	80	80	81	81	82	82	
150000	69	70	71	72	73	75	76	77	78	79	79	80	81	81	82	82	83	83	84	
200000	70	71	72	73	75	76	77	78	79	80	81	81	82	83	83	84	84	85	85	



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