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INTERSTATE COUNCIL FOR STANDARDIZATION, METROLOGY AND CERTIFICATION
(ISC)

IEC 60034-30-1- 2016

30*1

(IE)

(IEC 60034-30*1:2014,)

IEC 60034-30.1—2016

1.0—2015 «

1.2—2015 «

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27 2016 .N991-)

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(3166) 004—97	(3166)004- 97	
	AM BY KZ KG RU TJ UA	

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2017 . 532- IEC 60034-30-1—2016

1 2018 .

5 IEC 60034-30-1:2014 «

30-1.

(IE)» [«Rotating electrical machines — Part 30-1: Efficiency classes of line operated AC motors (IE code)», IDT].

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» (IEC).

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(www.gost.ru)

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2	2
3	3
3.1	3
3.2	3
4	3
5	5
5.1	5
5.2	6
5.3	6
5.4	6
()	IE5.....	16
()	17
	18

TM

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(IEC 60034-30-2)

8

IEC 60034-30

0.12 1000

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IE4.

IE4.

IEC/TS 60034-31:2010.

IE5

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20 %

50 60

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50 60

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20 %

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1 60072-1.

20 %

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50 60

0,75 375

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60

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2.5% 0.5%

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IEC/TS 60034-31.

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(EN 50347, JIS 4212, N8R 7094, NEMA MG1, SANS 1804-1),

IEC.

TM

IE	IE1.	IE5.			
(()			
IE.	IEC.	50	60		
3 —			60		
4 —		50		0.75	

375

30-1

(IE)

Rotating electrical machines. Part 30-1. Efficiency classes of line operated AC motors (IE code)

—2018—03—01

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	IEC 60034*1	IEC 60079*0.	-
•	0.12	1000 ;	
•	50	1 ;	
•	2.4.6 8;		
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1 —	S1 (,)		-
•			
60° .			20 °
25°			
2 —	IEC 60034-2-1.		-
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4 —		400 *	-
•			
5 —	4000		-
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(60072-1.

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a) (,), (,)

b)

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IEC 60034-1 Rotating electrical machines — Part 1: Rating and performance (1.)

IEC 60034-2-1 Rotating electrical machines. Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles) (2-1.)

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IEC/TS 60034-2-3 Rotating electrical machines — Part 2-3: Specific test methods for determining losses and efficiency of converter-fed AC induction motors (2-3.)

IEC 60034-6 Rotating electrical machines — Part 6: Methods of cooling (IC code) (6. (1C) -

IEC/TS 60034-25 Rotating electrical machines — Part 25: Guidance for the design and performance of a.c. motors specifically designed for converter supply (25. -

IEC 60038 IEC standard voltages ()
 IEC 60079-0 Explosive atmospheres — Part 0: Equipment — General requirements (0.). -

3

3.1

IEC 60034-1.

3.1.1 (single-speed motor):
 50 / 60
 1 — -

3.1.2 (multi-speed motor):
 50 / 60 -

3.1.3 (variable speed motor): -

3.1.4 (brake motor): -

3.1.5 (geared motor): (-

3.1.6 (pump motor): (-

3.1.7 (average efficiency): -

3.1.8 (nominal efficiency): -

3.1.9 () (rated efficiency): -

3.2

- — .%;
- — ,%;
- f_N — ;
- — ,¹⁾;
- P_N — (), ;
- T_N — ;
- U_N — .

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8 1 -

« » 1.

(IEC/TS 60034*25).

IEC/TS 60034-2-3.

(IE3).

ICOAx. IC1 , IC2Ax. IC3Ax. IC4Ax (IEC 60034-6).

(60079-0

(.).

60034 ().

* IEC 60034 ().

300° .

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		IE1	IE2	IE3	IE4	1ES
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	: 1 2 ()					
	: 1 4					
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(LSPM)

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(,

IE. « »

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N IEC 60034-12

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NBR 17094 2—
EN 50347) 3—
4—

IE3

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1 5.

IE5

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5.1

5.1.1

(IEC 60034-25).

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IEC 60034-2-1

5.1.2

P_{Np}

U_N

f_N

(400 ± 10 %
TM,

IEC 60038).

230 /400

(/)

230 /460 8 (*

/)

(IE)

200 /60 — 220 /60 : 380 /50 — 400 / 50 — 415 / 50 , 460 /60 : 220 /50 —

5.1.3

5.2

(IE).

IEC 60034-1.
50 % 75 % 100 %

5.3

5.3.1

«International Energy efficiency Class», — « IE () », 2

5.3.2

2— IE

IE1	5.4.1 () ,
IE2	5.4.2 () ,
IE3	5.4.3 () ,
IE4	5.4.4 () ,
IE5	(.)

5.3.3

IE1

3 4.

5.3.4

IE

«IE2—84.0%».

5.4

5.4.1

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IE1

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P _w «B,	/			
	2/3000	4/1S00	6/1000	8/7S0
0.12	45,0	50.0	38.3	31.0
0.10	52.8	57.0	45.5	38.0
0,20	54,6	58.5	47.6	39.7
0.25	58.2	61.5	52,1	43.4
0.37	63.9	66.0	59.7	49.7
0.40	64.9	66.8	51.1	50.9
0.55	69.0	70.0	65.8	56.161.2
0.75	72.1	72.1	70.0	66.5
1.1	75.0	75.0	72.9	70.2
1.5	77.2	77.2	75.2	74.2
2.2	79.7	79.7	77.7	77.0
3	81,5	81.5	79.7	79.2
4	83.1	83.1	81.4	81.4
5.5	84.7	84.7	83.1	83.1
7.5	86.0	86.0	84.7	85.0
11	87.6	87.6	86.4	86.2
15	88.7	88.7	87.7	86.9
18.5	89.3	89.3	88.6	87.4
22	89.9	89.9	89.2	88.3
30	90.7	90.7	90.2	88.8
37	91.2	91.2	90.8	89.2
45	91.7	91.7	91.4	89.7
55	92.1	92.1	91.9	90,3
75	92.7	92.7	92.6	90.7
90	93.0	93.0	92.9	91.1
110	93.3	93.3	93.3	91.5
132	93.5	93.5	93.5	91.9
160	93.8	93.8	93.8	92.5
200	94.0	94.0	94.0	92.5
250	94,0	94.0	94.0	92.5
315	94.0	94.0	94.0	92.5
355	94.0	94.0	94.0	92.5
400	94,0	94.0	94.0	92.5
450	94,0	94.0	94.0	92,5
500 1000	94.0	94.0	94.0	92.5

IEC 60034-30.1—2016

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IE1

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	/			
	2/3000	4/1600	6/1000	6/750
0.12	57.5	62.0	48.0	36,0
0,18	62.0	66.0	52.5	40,0
0,25	64.0	68.0	57.5	50,5
0,37	70.0	70.0	62.0	57.5
0,55	72.0	74.0	66.0	59.5
0,75	74.0	77.0	72.0	64,0
1.1	78.5	79.0	75.0	73,5
1.5	81.0	81.5	77.0	77,0
2.2	81.5	83.0	78.5	78,0
3.7	84.5	85.0	83.5	.
5.5	86.0	87.0	85.0	84,0
7.5	87.5	87,5	86.0	85,0
11	87.5	88.5	89.0	87,5
15	88.5	89.5	89.5	88,5
18.5	89.5	90.5	90.2	8.5
22	89.5	91.0	91.0	90,2
30	90.2	91.7	91.7	90,2
37	91.5	92.4	91.7	91,0
45	91.7	93.0	91.7	91,0
55	92.4	93.0	92.1	91,5
75	93.0	93.2	93.0	92,0
90	93.0	93.2	93.0	92,5
110	93.0	93.5	94.1	92,5
150 1000	94.1	94.5	94.1	92,5

5.4.2

IE2 (5 6)

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IE2

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	/			
	2/3000	4/1600	6/1000	8/750
0.12	53.6	59.1	50.6	39,8
0,18	60.4	64.7	56.6	45,9
0,20	61.9	65.9	58.2	47,4
0,25	64.8	68.5	61.6	50,6
0,37	69.5	72.7	67.6	56,1

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„К .	/ . /			
	2/3000	4/1500	/1000	/750
0.40	70.4	73.5	68.8	57.2
0.55	74.1	77.1	73.1	61.7
0.75	77.4	79.6	75.9	66.2
1.1	79.6	81.4	78.1	70.8
1.5	81.3	82.8	79.8	74.1
2.2	83.2	84.3	81.8	77.6
3	84.6	85.5	83.3	80.0
4	85.8	86.6	84.6	81.9
5.5	87.0	87.7	86.0	83.8
7.5	88.1	88.7	87.2	85.3
11	89.4	89.8	88.7	86.9
15	90.3	90.6	89.7	88.0
18.5	90.9	91.2	90.4	88.6
22	91.3	91.6	90.9	89.1
30	92.0	92.3	91.7	89.8
37	92.5	92.7	92.2	90.3
45	92.9	93.1	92.7	90.7
55	93.2	93.5	93.1	91.0
75	93.8	94.0	93.7	91.6
90	94.1	94.2	94.0	91.9
110	94.3	94.5	94.3	92.3
132	94.6	94.7	94.6	92.6
160	94.8	94.9	94.8	93.0
200 1000	95.0	95.1	95.0	93.5

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	2/3000	4/1500	000	8/750
0.12	59.5	64.0	50.5	40.0
0.18	64,0	68.0	55.0	46.0
0.25	68.0	70.0	59.5	52,0
0.37	72,0	72.0	64.0	58.0
0.55	74,0	75.5	68.0	62,0
0.75	75.5	78.0	73.0	66.0
1.1	82.5	84.0	85.5	75,5

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	2/3000	4/1500	/	6/750
1.5	84.0	84.0	86.5	82.5
2.2	85.5	87.5	87.5	84.0
3.7	87.5	87.5	87.5	85.5
5.5	88.5	89.5	89.5	85.5
7.5	89.5	89.5	89.5	88.5
11	90.2	91.0	90.2	88.5
15	90.2	91.0	90.2	89.5
15	91.0	92.4	91.7	89.5
22	91.0	92.4	91.7	91.0
30	91.7	93.0	93.0	91.0
37	92.4	93.0	93.0	91.7
45	93.0	93.6	93.6	91.7
55	93.0	94.1	93.6	93.0
75	93.6	94.5	94.1	93.0
90	94.5	94.5	94.1	93.6
110	94.5	95.0	95.0	93.6
150	95.0	95.0	95.0	93.6
185	95.4	95.0	95.0	93.6
220 355	95.4	95.4	95.0	93.6
375 1000	95.4	95.8	95.0	94.1

5.4.3

IE3 (7 8)

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	2/3000	4/(500	6/	/750
0.12	60.8	64.8	57.7	50.7
0.18	65.9	69.9	63.9	58.7
0.20	67.2	71.1	65.4	60,6
0,25	69.7	73.5	68.6	64.1
0.37	73,8	77.3	73.5	69.3
0.40	74.6	78.0	74.4	70.1
0.55	77.8	80.8	77.2	73,0
0.75	80.7	82.5	78.9	75.0
1.1	82.7	84.1	81.0	77.7

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	/ , /			
	2 / 3000	4/1600	6/1000	8/750
1.5	84.2	85.3	82.5	79.7
22	85.9	86.7	84.3	81.9
3	87.1	87.7	85.6	83.5
4	88.1	88.6	86.8	84.8
5.5	89.2	89.6	88.0	86.2
7.5	90.1	90.4	89.1	87.3
11	91.2	91.4	90.3	88.6
15	91.9	92.1	91.2	89.6
18.5	92.4	92.6	91.7	90.1
22	92.7	93.0	92.2	90.6
30	93.3	93.6	92.9	91.3
37	93.7	93.9	93.3	91.8
45	94.0	94.2	93.7	92.2
55	94.3	94.6	94.1	92.5
75	94.7	95.0	94.6	93.1
90	95.0	95.2	94.9	93.4
110	95.2	95.4	95.1	93.7
132	95.4	95.6	95.4	94.0
160	95.6	95.8	95.6	94.3
200 1000	95.8	96.0	95.8	94.6

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. %.

IE3

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	2/3000	4/1500	6/1000	6/750
0.12	62.0	66.0	64.0	59.5
0.18	65.6	69.5	67.5	64.0
0,25	69.5	73,4	71.4	68.0
0,37	73.4	78.2	75.3	72.0
0.55	76.8	81.1	81.7	74.0
0.75	77.0	83.5	82.5	75.5
1.1	84.0	66.5	87.5	78.5
1.5	65.5	66.5	88.5	84.0
22	86.5	89.5	89.5	85.5
3.7	88.5	89.5	89.5	86.5
5.5	89.5	91.7	91.0	86.5

IEC 60034-30.1—2016

Pn>*	/ , /			
	2/3000	4/1500	/	8/750
7.5	90.2	91.7	91.0	89.5
11	91.0	92.4	91.7	89.5
15	91.0	93.0	91.7	90,2
18.5	91.7	93.6	93.0	90.2
22	91.7	93.6	93.0	91.7
30	92.4	94.1	94.1	91,7
37	93.0	94.5	94.1	92.4
45	93.6	95.0	94.5	92.4
55	93.6	95.4	94.5	93.6
75	94.1	95.4	95.0	93.6
90	95.0	95.4	95.0	94.1
110	95.0	95.8	95.8	94.1
150	95.4	96.2	95.8	94.5
185 1000	95.8	96.2	95.8	95.0

5.4.4 IE4 (9 10)

9— .%. IE4 50

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	2/3000	4/1500	6/1000	/750
0.12	66.5	69.8	64.9	62.3
0.18	70.8	74.7	70.1	67.2
0.20	71.9	75.8	71.4	68.4
0,25	74.3	77.9	74.1	70.8
0.37	78.1	81.1	78.0	74.3
0.40	78.9	81.7	78.7	74.9
0,55	81.5	83.9	80.9	77.0
0.75	83.5	85.7	82.7	78.4
1.1	85.2	87,2	84.5	80.8
1.5	86.5	88.2	85.9	82.6
2.2	88.0	89.5	87.4	84.5
3	89.1	90.4	88.6	85.9
4	90.0	91.1	89.5	87,1
5.5	90.9	91.9	90.5	88.3
7.5	91.7	92.6	91.3	89.3

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P _w «Bi	/ , /			
	2/3000	4/1600	6/1000	8/750
11	92.6	93.3	92.3	90.4
15	93.3	93.9	92.9	91.2
18.5	93.7	94.2	93.4	91.7
22	94.0	94.5	93.7	92.1
30	94.5	94.9	94.2	92.7
37	94.8	95.2	94.5	93.1
45	95.0	95.4	94.8	93.4
55	95.3	95.7	95.1	93.7
75	95.6	96.0	95.4	94.2
90	95.8	96.1	95.6	94.4
110	96.0	96.3	95.8	94.7
132	96.2	96.4	96.0	94.9
160	96.3	96.6	96.2	95.1
200	96.5	96.7	96.3	95.4
250	96.5	96.7	96.5	95.4
315 1000	96.5	96.7	96.6	95.4

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IE4

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	2/3000	4/1500	8/1000	8/750
0.12	66.0	70.0	68.0	64.0
0.18	70.0	74.0	72.0	68.0
0.25	74.0	77.0	75.5	72.0
0.37	77.0	81.5	78.5	75.5
0.55	80.0	84.0	82.5	77.0
0.75	82.5	85.5	84.0	78.5
1.1	85.5	87.5	88.5	81.5
1.5	86.5	88.5	89.5	85.5
22	88.5	91.0	90.2	87.5
3.7	89.5	91.0	90.2	88.5
5.5	90.2	92.4	91.7	88.5
7.5	91.7	92.4	92.4	91.0
11	92.4	93.6	93.0	91.0
15	92.4	94.1	93.0	91.7

Pn> *	/ , /			
	2/3000	4/1500		8/7 S0
18.5	93.0	94.5	94.1	91.7
22	93.0	94.5	94.1	93.0
30	93.8	95.0	95.0	93.0
37	94.1	95.4	95.0	93,6
45	94.5	95.4	95.4	93.6
55	94.5	95.8	95.4	94.5
75	95.0	96.2	95.8	94.5
90	95.4	96.2	95.8	95.0
110	95.4	96.2	96.2	95.0
150	95.8	96.5	96.2	95.4
185	96.2	96.5	96.2	95.4
220	96.2	96.8	96.5	95.4
250 1000	96.2	98.8	96.5	95.8

5.4.5

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$$1 + \left[\dots \right] + C \cdot \log_{10} \left(\frac{P_N}{1 \text{ kBT}} \right) + 0.$$

%, \dots , $D - P_N - \dots$, $11 \ 12;$

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0,12 — 0.74

!		8-750 /	-1000 /	4-1500 /	.3000 /
IE1	D	5.9466	-45.9652	16.7271	11.924
		7.9458	-87.1474	12.7136	6.3699
		40.441	-8,2383	25.947	30.0509
		66.146	68.7303	76.174	76.6136
IE2	D	6.4855	-15.9218	17.2751	22.4864
		9.4748	-30.258	23.978	27.7603
		36.852	16.6861	35.5822	37.8091
		70.762	79.1838	84.9935	82.458
IE3		-0.5896	-17.361	7.6356	6,8532
		-25.526	-44.538	4.8236	6.2006
		4.2884	-3.0554	21.0903	25.1317
		75.831	79.1318	86.0998	84.0392

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IE		5- « 750 /	- *000 /	4- 1500 /	2- 3000 /
IE4	<i>D</i>	-4.9735 -21.453 2.6653 79.055	-13.0355 -36.9497 -4.3621 82.0009	8.432 2.6888 14.6236 87.6153	-8.8538 -20.3352 8.9002 85.0641

12 —

0.75 — 200

IE		5- « 750 /	- 1000 /	4- 1500 /	2- 3000 /
IE1	<i>D</i>	2.4433 -13.8 30.656 65.238	0.0786 -3.5838 17.2918 72.2383	0.5234 -5.0499 17.4180 74.3171	0.5234 -5.0499 17.4180 74.3171
1 2	<i>D</i>	2.1311 -12.029 26.719 69.735	0.0148 -2.4978 13.2470 77.5603	0.0278 -1.9247 10.4395 80.9761	0.2972 -3.3454 13.0651 79.077
IE3	<i>D</i>	0.7189 -5.1678 15.705 77.074	0.1252 -2.613 11.9963 80.4769	0.0773 -1.8951 9.2984 83.7025	0.3569 3.3076 11.6108 82.2503
IE4	<i>D</i>	0.6556 -4.7229 13.977 ,247	0.3598 -3.2107 10.7933 84.107	0.2412 -2.3608 8.446 86.8321	0.34 -3,0479 10.293 84.8208

5.4.6

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IEC 60034-1		1 60034-1—2014 « 1. »	- -
IEC 60034-2-1		60034-2—2006*) « 2. ()*	- -
IEOTS 60034-2-3		IEC7TS 60034-2-3—2015 « 2-3. *	- -
IEC 60034-6		60034-6—2007 ^{2*} « 6. (IC)»	-
IEC/TS 60034-25	—	.3)	
IEC 60036	MOD	29322—2014 (IEC 60038:2009) « »	-
IEC 60079-0	MOD	31610.0—2014 (IEC 60079-0:2011) « 0. *	-
* — - — - MOD—			- - -

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60034-2-1—2009.

60034-6—2012.

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55136—2012/IEOTS 60034-25:2007.

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