

BS EN 62358:2012



BSI Standards Publication

Ferrite cores — Standard inductance factor for gapped cores and its tolerance

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National foreword

This British Standard is the UK implementation of EN 62358:2012. It is identical to IEC 62358:2012. It supersedes BS EN 62358:2004 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/51, Transformers, inductors, magnetic components and ferrite materials.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Amendments issued since publication

Date	Text affected
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English version

**Ferrite cores -
Standard inductance factor for gapped cores and its tolerance
(IEC 62358:2012)**

Noyaux de ferrite -
Inductance spécifique normalisée pour
noyaux à entrefer et tolérances associées
(CEI 62358:2012)

Ferritkerne -
Standard-Induktivitätsfaktor für Kerne mit
Luftspalt und dessen Toleranz
(IEC 62358:2012)

This European Standard was approved by CENELEC on 2012-11-16. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 51/1005/FDIS, future edition 2 of IEC 62358, prepared by IEC TC 51, "Magnetic components and ferrite materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62358:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-08-16
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-11-16

This document supersedes EN 62358:2004.

EN 62358:2012 includes the following significant technical changes with respect to EN 62358:2004:

- a) addition of AL value (inductance factor) and its tolerance for PQ-cores;
- b) addition of AL value (inductance factor) and its tolerance for EFD-cores;
- c) addition of AL value (inductance factor) and its tolerance for Low-profile ER-I-cores;
- d) addition of AL value (inductance factor) and its tolerance for Low-profile ER-cores (ER9,5 × 2,5 × 5, ER11 × 2,5 × 6, ER14,5 × 3 × 7 ferrite cores are same as in EN 62358:2004);
- e) addition of AL value (inductance factor) and its tolerance for Low-profile PQ-I-cores.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 62358:2012 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)
**Normative references to international publications
with their corresponding European publications**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61185	-	Ferrite cores (ETD-cores) intended for use in power supply applications - Dimensions	EN 61185	-
IEC 61596	-	Magnetic oxide EP-cores and associated parts for use in inductors and transformers - Dimensions	EN 61596	-
IEC 62044-2	-	Cores made of soft magnetic materials - Measuring methods - Part 2: Magnetic properties at low excitation level	EN 62044-2	-
IEC 62317-2	-	Ferrite cores - Dimensions - Part 2: Pot-cores for use in telecommunications, power supply, and filter applications	EN 62317-2	-
IEC 62317-4	-	Ferrite cores - Dimensions - Part 4: RM-cores and associated parts	EN 62317-4	-
IEC 62317-7	-	Ferrite cores - Dimensions - Part 7: EER-cores	EN 62317-7	-
IEC 62317-8	-	Ferrite cores - Dimensions - Part 8: E-cores	EN 62317-8	-
IEC 62317-9	-	Ferrite cores - Dimensions - Part 9: Planar cores	EN 62317-9	-
IEC 62317-13	-	Ferrite cores - Dimensions - Part 13: PQ-cores for use in power supply applications	EN 62317-13	-
ISO 497	-	Guide to the choice of series of preferred numbers and series containing more rounded values of preferred numbers	-	-

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INTRODUCTION

The A_L value (inductance factor) and its tolerance have been specified by the users before. When manufacturers wish to have an inventory for short delivery, they have to hold the products before gapping since there is no standard for the A_L value. Because of electronic commerce and the increased demand for rapid delivery of products, it will be more convenient for customers and suppliers to refer to established A_L values and tolerances. This standard has been developed to meet this demand.

As a result of the implementation of this standard, it will be easier for core suppliers and users to develop electronic components using gapped soft ferrite cores. Conventional businesses will benefit, as will new companies working in new fields such as e-commerce.

It is recommended that users specify A_L values by selecting them from this standard. The tolerances in this standard are recommended, but for historical reasons a manufacturer's specification might differ for some components. Users should confirm tolerances from the manufacturer's literature. Manufacturers are encouraged to use the A_L values in this standard when building stocks of gapped cores for short delivery. In cases where users or manufacturers specify a gap length with tolerances the A_L value will only be approximate and without tolerance. Such cases will be outside the scope of this standard.

FERRITE CORES – STANDARD INDUCTANCE FACTOR FOR GAPPED CORES AND ITS TOLERANCE

1 Scope

This International Standard provides standard A_L values (inductance factors) and their tolerances of Pot, RM, ETD, E, EER, EP, PQ and low-profile gapped ferrite cores.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61185, *Ferrite cores (ETD-cores) intended for use in power supply applications – Dimensions*

IEC 61596, *Magnetic oxide EP-cores and associated parts for use in inductors and transformers – Dimensions*

IEC 62044-2, *Cores made of soft magnetic materials – Measuring methods – Part 2: Magnetic properties at low excitation level*

IEC 62317-2, *Ferrite cores – Dimensions – Part 2: Pot-cores for use in telecommunications, power supply, and filter applications*

IEC 62317-4, *Ferrite cores – Dimensions – Part 4: RM-cores and associated parts*

IEC 62317-7, *Ferrite cores – Dimensions – Part 7: EER-cores*

IEC 62317-8, *Ferrite cores – Dimensions – Part 8: E-cores*

IEC 62317-9, *Ferrite cores – Dimensions – Part 9: Planar cores*

IEC 62317-13, *Ferrite cores – Dimensions – Part 13: PQ-cores for use in power supply applications*

ISO 497, *Guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers*

3 Measuring method

The method for measuring the inductance factor shall be in accordance with IEC 62044-2.

4 A_L value and its tolerance

4.1 General

The series of preferred numbers of the A_L value shall be selected from the R10 series of ISO 497.

4.2 Tolerance

The tolerance shall be selected from Table 1, which specifies letter codes for the tolerances.

Table 1 – Tolerance versus letter code

Tolerance %	± 3	± 5	± 7	± 10	± 12	± 15	± 20
Letter code	A	J	E	K	H	L	M

4.3 E-core

The A_L value and its tolerance for E-cores shall be selected from Table 2.

NOTE The E-core is a pair of an E shape core.

4.4 ETD-core and EER-core

The A_L value and its tolerance for ETD-cores and EER-cores shall be selected from Table 3.

4.5 EP-core

The A_L value and its tolerance for EP-cores shall be selected from Table 4.

4.6 RM-core

The A_L value and its tolerance for RM-cores shall be selected from Table 5.

4.7 Pot-core

The A_L value and its tolerance for Pot-cores shall be selected from Table 6.

4.8 PQ-core

The A_L value and its tolerance for PQ-cores shall be selected from Table 7.

4.9 Low-profile core

- The A_L value and its tolerance for EL-cores shall be selected from Tables 8 and 9.
- The A_L value and its tolerance for low-profile ER-cores shall be selected from Tables 10 and 11.
- The A_L value and its tolerance for low-profile E-cores shall be selected from Tables 12 and 13.
- The A_L value and its tolerance for low-profile RM-cores shall be selected from Table 14.
- The A_L value and its tolerance for low-profile PQ-I (plate)-cores shall be selected from Table 15.

Table 2 (2 of 2)

IEC references Core size	Industrial references	A_L (nH/N ²) tolerance in ± %																		
		A12,5	A16	A20	A25	A31,5	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800
E32/9	FEE32,1 EF32									3	3	3	5	7	7	7	10	12		
E33/13	FEE33A EE33									3	3	3	3	5	5	7	10	10	10	
E34,6/9	EE375 EE35 x 28B										3	5	7	7	7	10	10	10		
E35/10	FEE35A EE35										3	5	5	5	7	7	10	10	15	
E40/11	FEE40A EE40										3	3	5	7	7	10	10	10	10	
E41/13	EE21 EE41 x 33C										3	3	3	3	5	5	7	10	10	
E42/15	FEE42A										3	3	3	3	3	5	7	7	10	
E42/20	FEE42B										3	3	3	3	3	3	7	7	10	
E47/16	EE625 EE47 x 39										5	5	5	5	5	7	7	10	12	
E50/15	EE50A EE50										5	5	5	5	5	7	10	10	15	
E55/21	FEE55,2A										3	5	5	5	5	5	5	7	10	
E55/25	FEE55,2B										5	5	5	5	5	5	5	7	7	
E60/16	FEE60A EE60											3	5	5	5	7	7	10	12	
E65/27	FEE65,2												3	5	5	5	5	5	5	7

NOTE To guarantee the tolerances in this table, 0,25 AQL (acceptable quality level) is applied.

Table 3 – A_L and its tolerance for ETD-cores (IEC 61185) and EER-cores (IEC 62317-7)

IEC references Core size	A_L (nH/N ²) tolerance in ± %												
	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	
ETD19	3	3	5	7	7	10							
ETD24		3	3	5	7	7	10	10					
ETD29			3	3	5	7	7	10	10	12			
ETD34			3	3	5	7	7	10	10	12			
ETD39					3	3	5	5	7	10	10		
ETD44					3	5	5	7	10	10	15		
ETD49						3	5	5	7	10	12	15	
ETD54						5	5	5	7	10	10	10	
ETD59						5	5	5	5	5	7	10	
EER25,5		3	3	7	7	10	10	10					
EER28			3	3	5	5	7	10	10	10			
EER28L			3	3	5	5	7	10	10	10			
EER35				3	3	5	5	7	10	10	10		
EER39					3	3	5	5	7	10	10		
EER40					3	3	3	5	7	7	10		
EER42					3	5	5	7	10	10	15		
EER49					3	5	5	5	7	10	10	12	

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 4 – A_L and its tolerance for EP-cores (IEC 61596)

IEC references Core size	A_L (nH/N ²) tolerance in ± %														
	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000
EP7	3	3	3	3	5	5	7	10	10						
EP10	3	3	3	3	5	5	7	10	10						
EP13		3	3	3	3	3	5	5	7	7	10				
EP17			3	3	3	3	3	3	5	5	7	7	10		
EP20						3	3	3	3	3	3	5	5	7	7

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 5 – A_L and its tolerance for RM-cores (IEC 62317-4)

IEC references Core size	A_L (nH/N ²) tolerance in ± %																				
	A25	A31,5	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000	A1 250	A1 600	A2 000	
RM4	3	3	3	5	5	5	7	7	10												
RM5			3	3	3	3	3	5	5	5	7										
RM6S			3	3	3	3	3	3	5	5	5										
RM6R			3	3	3	3	3	3	3	5	5										
RM7					3	3	3	3	3	5	5	5	7	10							
RM8							3	3	3	3	3	3	5	5	7	10					
RM10							3	3	3	3	3	3	3	3	5	5	7	10			
RM12							3	3	3	3	3	3	3	5	5	7	10	10			
RM14									3	3	3	3	3	5	5	7	10	10	10	12	
RM14A									3	3	3	3	3	3	5	5	7	7	10	10	12

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 6 – A_L and its tolerance for Pot-cores (IEC 62317-2)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %																				
	A25	A31,5	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000	A1 250	A1 600	A2 000	
P5,8 × 3,3	3	5	5	7	10	12															
P7,4 × 4,0		3	3	5	5	7	7	10													
P9 × 5			3	3	3	5	5	7	10												
P11 × 7					3	3	3	5	5	7	10										
P14 × 8							3	3	5	5	5	7	10								
P18 × 11							3	3	3	3	3	5	5	7	10						
P22 × 13							3	3	3	3	3	3	3	5	5	7	10				
P26 × 16							3	3	3	3	3	3	3	3	5	5	7				
P30 × 19									3	3	3	3	3	3	3	3	5	5			
P36 × 22											3	3	3	3	3	3	3	5	5		
P42 × 29												3	3	3	3	3	3	3	5	5	

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 7 – A_L and its tolerance for PQ-cores (IEC 62317-13)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %												
	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000	
PQ20/16	3	3	5	5	5	7	10	10	12				
PQ20/20	3	3	5	5	5	7	10	10	12				
PQ26/20		3	3	3	3	5	5	5	7	10			
PQ26/25		3	3	3	3	5	5	5	7	10			
PQ32/20		3	3	3	3	3	5	5	7	7	10		
PQ32/30		3	3	3	3	3	5	5	7	7	10		
PQ35/35		3	3	3	3	3	3	5	5	7	7	10	
PQ40/40		3	3	3	3	3	3	5	5	7	7	10	
PQ50/50		3	3	3	3	3	5	5	7	7	10	12	

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 8 – A_L and its tolerance for EL-cores (IEC 62317-9)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %												
	A31,5	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	
EL-EL11 × 4,0	3	3	3	5	5	7	7	10					
EL-EL13 × 4,4	3	3	3	3	3	5	5	7	10				
EL-EL15,5 × 5,8		3	3	3	3	3	5	5	7	7			
EL-EL18 × 7,3		3	3	3	3	3	3	5	5	5	7		
EL-EL20 × 7,7		3	3	3	3	3	3	3	5	5	5		
EL-EL22 × 8,0				3	3	3	3	3	3	5	5	7	
EL-EL25 × 8,6				3	3	3	3	3	3	3	5	5	

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 9 – A_L and its tolerance for EL-I (plate)-cores (IEC 62317-9)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %											
	A31,5	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400
EL-PLT11 × 4,0	3	3	3	5	5	7	7	10				
EL-PLT13 × 4,4	3	3	3	3	3	5	5	7	10			
EL-PLT15,5 × 5,8		3	3	3	3	3	5	5	7	7		
EL-PLT18 × 7,3		3	3	3	3	3	3	5	5	5	7	
EL-PLT20 × 7,7		3	3	3	3	3	3	3	5	5	5	
EL-PLT22 × 8,0				3	3	3	3	3	3	5	5	7
EL-PLT25 × 8,6				3	3	3	3	3	3	3	5	5
EL-PLT11 × 3,0	3	3	3	3	3	5	5	7	10			
EL-PLT13 × 3,4	3	3	3	3	3	5	5	7	10			
EL-PLT15,5 × 4,3		3	3	3	3	3	5	5	7	7		
EL-PLT18 × 5,3		3	3	3	3	3	3	5	5	5	7	
EL-PLT20 × 5,7		3	3	3	3	3	3	3	5	5	5	
EL-PLT22 × 6,0				3	3	3	3	3	3	5	5	7
EL-PLT25 × 6,6				3	3	3	3	3	3	3	5	5

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 10 – A_L and its tolerance for low-profile ER-I (plate)-cores (IEC 62317-9)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %															
	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000	A1 250
ER9,5 x 2,5 x 5 / PLT9,5 x 1 x 5	3	5	5	7	7	10	12									
ER11 x 2,5 x 6 / PLT11 x 1 x 6	3	3	3	5	5	7	10	12	15							
ER13 x 3 x 9 / PLT13 x 1 x 9	3	3	3	3	5	5	7	7	10							
ER14,5 x 3 x 7 / PLT14,5 x 1 x 7	3	3	3	3	5	5	7	7	10							
ER18 x 3 x 10 / PLT18 x 1,5 x 10			3	3	3	3	5	5	7	10	10					
ER20 x 6 x 14 / PLT20 x 2 x 14					3	3	3	3	3	5	5	7	10			
ER23 x 3,6 x 13 / PLT23 x 2 x 13					3	3	3	3	5	5	7	7	10			
ER23 x 5 x 13 / PLT23 x 2 x 13					3	3	3	3	5	5	7	7	10			
ER25 x 6 x 15 / PLT25 x 2,4 x 15						3	3	3	3	3	5	7	7	10		
ER25 x 6 x 18 / PLT25 x 2 x 18						3	3	3	3	5	5	7	7	10		
ER30 x 8 x 20 / PLT30 x 3 x 20						3	3	3	3	5	5	7	7	10		
ER32 x 5 x 21 / PLT32 x 2 x 21						3	3	3	3	5	5	7	7	10		
ER32 x 6 x 25 / PLT32 x 3 x 25							3	3	3	3	5	5	7	7	10	
ER35 x 10 x 26 / PLT35 x 5 x 26								3	3	3	3	3	5	5	7	10
ER40 x 10 x 28 / PLT40 x 5 x 28									3	3	3	3	5	5	7	10

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 11 – A_L and its tolerance for low-profile ER-cores (IEC 62317-9)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %															
	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000	A1 250
ER9,5 × 2,5 × 5	3	5	5	7	7	10	12									
ER11 × 2,5 × 6	3	3	3	5	5	7	10	12	15							
ER13 × 3 × 9	3	3	3	3	5	5	7	7	10							
ER14,5 × 3 × 7	3	3	3	3	5	5	7	7	10							
ER18 × 3 × 10			3	3	3	3	5	5	7	10	10					
ER20 × 6 × 14					3	3	3	3	3	5	5	7	10			
ER23 × 3,6 × 13					3	3	3	3	5	5	7	7	10			
ER23 × 5 × 13					3	3	3	3	5	5	7	7	10			
ER25 × 6 × 15						3	3	3	3	3	5	7	7	10		
ER25 × 6 × 18						3	3	3	3	5	5	7	7	10		
ER30 × 8 × 20						3	3	3	3	5	5	7	7	10		
ER32 × 5 × 21						3	3	3	3	5	5	7	7	10		
ER32 × 6 × 25							3	3	3	3	5	5	7	7	10	
ER35 × 10 × 27								3	3	3	3	3	5	5	7	10
ER40 × 10 × 32								3	3	3	3	3	5	5	7	10

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 12 – A_L and its tolerance for low-profile E-I (plate)-cores (IEC 62317-9)

IEC references Core size	A_L (nH/N ²) tolerance in ± %														
	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000
E-PLT14	3	5	5	7	10	12	15								
E-PLT18		3	3	3	3	5	5	7	10						
E-PLT22			3	3	3	3	3	3	5	5	7				
E-PLT32					3	3	3	3	5	5	7				
E-PLT38					3	3	3	3	3	3	5	5	7		
E-PLT43						3	3	3	3	3	3	5	7		
E-PLT58							3	3	3	3	3	5	7	7	
E-PLT64							3	3	3	3	3	3	5	5	
E-PLT102									3	3	3	3	3	5	5

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 13 – A_L and its tolerance for low-profile E-cores (IEC 62317-9)

IEC references Core size	A_L (nH/N ²) tolerance in ± %														
	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000
E-E14	3	5	5	7	10	12									
E-E18		3	3	3	3	5	5	7	10						
E-E22			3	3	3	3	3	3	5	5	7				
E-E32					3	3	3	3	5	5	7				
E-E38					3	3	3	3	3	3	5	5	7		
E-E43						3	3	3	3	3	3	5	5		
E-E58							3	3	3	3	3	5	7	10	
E-E64							3	3	3	3	3	3	5	5	
E-E102									3	3	3	3	3	5	5

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.,

Table 14 – A_L and its tolerance for low-profile RM cores (IEC 62317-4)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %																				
	A25	A31,5	A40	A50	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500	A630	A800	A1 000	A1 250	A1 600	A2 000	
RM4/8	3	3	3	3	5	5	7	7	10												
RM5/8		3	3	3	3	3	3	5	5	7	10										
RM6/9			3	3	3	3	3	3	3	5	5										
RM7/10				3	3	3	3	3	3	3	5	5	7	7							
RM8/11					3	3	3	3	3	3	3	5	5	7	7	10					
RM10/13						3	3	3	3	3	3	3	3	5	5	7	10				
RM12/17							3	3	3	3	3	3	3	3	3	5	5	7	7		
RM14/20									3	3	3	3	3	3	3	3	3	5	5	7	7

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

Table 15 – A_L and its tolerance for low-profile PQ-I (plate)-cores (IEC 62317-13)

IEC references Core size mm	A_L (nH/N ²) tolerance in ± %									
	A63	A80	A100	A125	A160	A200	A250	A315	A400	A500
PQ-I (plate) 16/7,8	3	5	5	7	7	10	10	12		
PQ-I (plate) 20/9		3	3	3	5	7	7	7	10	
PQ-I (plate) 26/12			3	3	3	3	5	5	5	7

NOTE To guarantee the tolerances in this table, 0,25 AQL is applied.

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