

# DATA SHEET

**P18/11**

P cores and accessories

Supersedes data of February 2002

2004 Sep 01

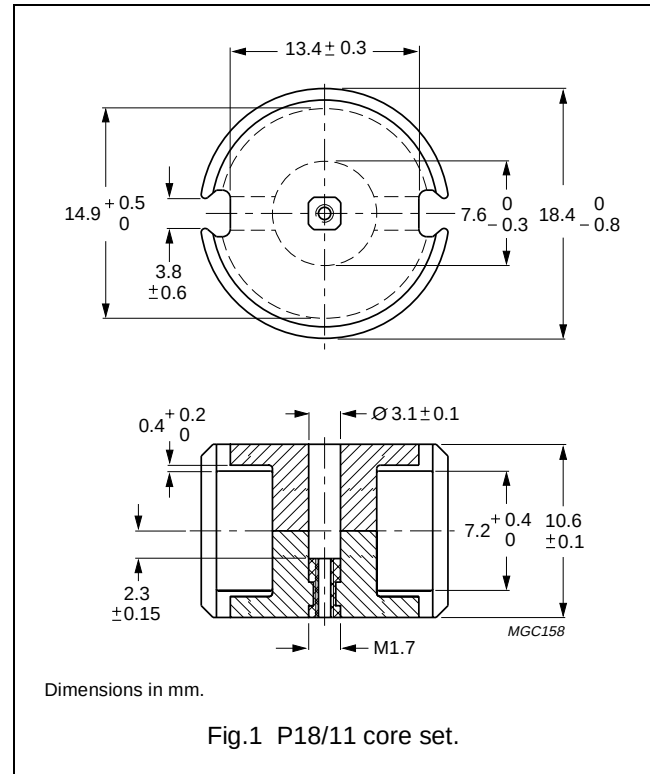
## P cores and accessories

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## CORE SETS

## Effective core parameters

| SYMBOL        | PARAMETER        | VALUE | UNIT             |
|---------------|------------------|-------|------------------|
| $\Sigma(l/A)$ | core factor (C1) | 0.597 | mm <sup>-1</sup> |
| $V_e$         | effective volume | 1120  | mm <sup>3</sup>  |
| $l_e$         | effective length | 25.8  | mm               |
| $A_e$         | effective area   | 43.3  | mm <sup>2</sup>  |
| $A_{min}$     | minimum area     | 36.0  | mm <sup>2</sup>  |
| m             | mass of set      | ≈6.0  | g                |



## Core sets for filter applications

Clamping force for  $A_L$  measurements, 80 ±20 N.

| GRADE              | $A_L$<br>(nH) | $\mu_e$ | AIR GAP<br>(μm) | TYPE NUMBER<br>(WITH NUT) | TYPE NUMBER<br>(WITHOUT NUT) |
|--------------------|---------------|---------|-----------------|---------------------------|------------------------------|
| 3D3 <sup>sup</sup> | 63 ±3%        | ≈ 30    | ≈ 1210          | P18/11-3D3-E63/N          | P18/11-3D3-E63               |
|                    | 100 ±3%       | ≈ 47    | ≈ 670           | P18/11-3D3-E100/N         | P18/11-3D3-E100              |
|                    | 160 ±3%       | ≈ 76    | ≈ 370           | P18/11-3D3-E160/N         | P18/11-3D3-E160              |
|                    | 1400 ±25%     | ≈ 665   | ≈ 0             | —                         | P18/11-3D3                   |
| 3H3 <sup>sup</sup> | 160 ±3%       | ≈ 76    | ≈ 400           | P18/11-3H3-E160/N         | P18/11-3H3-E160              |
|                    | 250 ±3%       | ≈ 119   | ≈ 240           | P18/11-3H3-A250/N         | P18/11-3H3-A250              |
|                    | 315 ±3%       | ≈ 149   | ≈ 180           | P18/11-3H3-A315/N         | P18/11-3H3-A315              |
|                    | 400 ±3%       | ≈ 190   | ≈ 140           | P18/11-3H3-A400/N         | P18/11-3H3-A400              |
|                    | 630 ±5%       | ≈ 299   | ≈ 80            | P18/11-3H3-A630/N         | P18/11-3H3-A630              |
|                    | 3100 ±25%     | ≈ 1470  | ≈ 0             | —                         | P18/11-3H3                   |

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**Core sets for general purpose transformers and power applications**Clamping force for  $A_L$  measurements,  $80 \pm 20$  N.

| GRADE                   | $A_L$<br>(nH)   | $\mu_e$        | AIR GAP<br>( $\mu\text{m}$ ) | TYPE NUMBER      |
|-------------------------|-----------------|----------------|------------------------------|------------------|
| 3C81                    | $100 \pm 3\%$   | $\approx 47$   | $\approx 710$                | P18/11-3C81-E100 |
|                         | $160 \pm 3\%$   | $\approx 76$   | $\approx 400$                | P18/11-3C81-A160 |
|                         | $250 \pm 3\%$   | $\approx 119$  | $\approx 240$                | P18/11-3C81-A250 |
|                         | $315 \pm 3\%$   | $\approx 149$  | $\approx 180$                | P18/11-3C81-A315 |
|                         | $400 \pm 3\%$   | $\approx 190$  | $\approx 140$                | P18/11-3C81-A400 |
|                         | $4000 \pm 25\%$ | $\approx 1900$ | $\approx 0$                  | P18/11-3C81      |
| 3C91 <small>des</small> | $4000 \pm 25\%$ | $\approx 1900$ | $\approx 0$                  | P18/11-3C91      |
| 3F3                     | $100 \pm 3\%$   | $\approx 47$   | $\approx 710$                | P18/11-3F3-E100  |
|                         | $160 \pm 3\%$   | $\approx 76$   | $\approx 400$                | P18/11-3F3-A160  |
|                         | $250 \pm 3\%$   | $\approx 119$  | $\approx 240$                | P18/11-3F3-A250  |
|                         | $315 \pm 3\%$   | $\approx 149$  | $\approx 180$                | P18/11-3F3-A315  |
|                         | $400 \pm 3\%$   | $\approx 190$  | $\approx 140$                | P18/11-3F3-A400  |
|                         | $2850 \pm 25\%$ | $\approx 1350$ | $\approx 0$                  | P18/11-3F3       |

**Core sets of high permeability grades**Clamping force for  $A_L$  measurements,  $60 \pm 20$  N.

| GRADE | $A_L$<br>(nH)   | $\mu_e$        | AIR GAP<br>( $\mu\text{m}$ ) | TYPE NUMBER |
|-------|-----------------|----------------|------------------------------|-------------|
| 3E27  | $7500 \pm 25\%$ | $\approx 3560$ | $\approx 0$                  | P18/11-3E27 |

**Properties of core sets under power conditions**

| GRADE | B (mT) at                                 | CORE LOSS (W) at                         |                                           |                                           |                                          |
|-------|-------------------------------------------|------------------------------------------|-------------------------------------------|-------------------------------------------|------------------------------------------|
|       | H = 250 A/m;<br>f = 25 kHz;<br>T = 100 °C | f = 25 kHz;<br>B = 200 mT;<br>T = 100 °C | f = 100 kHz;<br>B = 100 mT;<br>T = 100 °C | f = 100 kHz;<br>B = 200 mT;<br>T = 100 °C | f = 400 kHz;<br>B = 50 mT;<br>T = 100 °C |
| 3C81  | $\geq 320$                                | $\leq 0.26$                              | –                                         | –                                         | –                                        |
| 3C91  | $\geq 315$                                | –                                        | $\leq 0.07^{(1)}$                         | $\leq 0.45^{(1)}$                         | –                                        |
| 3F3   | $\geq 315$                                | –                                        | $\leq 0.13$                               | –                                         | $\leq 0.22$                              |

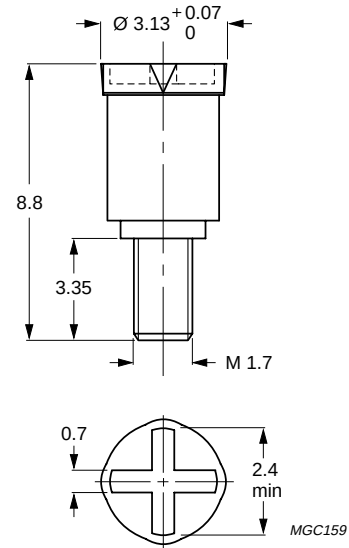
**Note**

1. Measured at 60 °C.

## INDUCTANCE ADJUSTERS

## General data

| ITEM                          | SPECIFICATION                              |
|-------------------------------|--------------------------------------------|
| Material of head and thread   | polypropylene (PP), glass fibre reinforced |
| Maximum operating temperature | 125 °C                                     |



Dimensions in mm.

Fig.2 P18/11 inductance adjuster.

Inductance adjuster selection chart <sup>sup</sup>( applies to all types)

| GRADE | A <sub>L</sub><br>(nH) | TYPES FOR LOW<br>ADJUSTMENT | ΔL/L <sup>(1)</sup> | types for medium<br>adjustment | ΔL/L <sup>(1)</sup> | TYPES FOR HIGH<br>ADJUSTMENT | ΔL/L <sup>(1)</sup> |
|-------|------------------------|-----------------------------|---------------------|--------------------------------|---------------------|------------------------------|---------------------|
| 3H3   | 63                     | –                           | –                   | ADJ-P18-YELLOW                 | 16                  | –                            | –                   |
|       | 100                    | –                           | –                   | –                              | –                   | ADJ-P18-BROWN                | 42                  |
|       | 160                    | ADJ-P18-YELLOW              | 9                   | ADJ-P18-RED                    | 18                  | ADJ-P18-BROWN                | 28                  |
|       | 250                    | ADJ-P18-RED                 | 11                  | ADJ-P18-WHITE                  | 14                  | ADJ-P18-BROWN                | 18                  |
|       | 315                    | ADJ-P18-RED                 | 8                   | ADJ-P18-BROWN                  | 14                  | ADJ-P18-VIOLET               | 20                  |
|       | 400                    | ADJ-P18-WHITE               | 8                   | ADJ-P18-VIOLET                 | 16                  | –                            | –                   |
|       | 630                    | ADJ-P18-VIOLET              | 8                   | –                              | –                   | –                            | –                   |
|       | 1000                   | ADJ-P18-VIOLET              | 5                   | –                              | –                   | –                            | –                   |
|       | 1250                   | –                           | –                   | –                              | –                   | –                            | –                   |
| 3D3   | 40                     | –                           | –                   | –                              | –                   | ADJ-P18-YELLOW               | 19                  |
|       | 63                     | –                           | –                   | ADJ-P18-YELLOW                 | 17                  | –                            | –                   |
|       | 100                    | –                           | –                   | –                              | –                   | ADJ-P18-RED                  | 26                  |
|       | 160                    | –                           | –                   | ADJ-P18-RED                    | 15                  | –                            | –                   |

## Note

1. Maximum adjustment range.

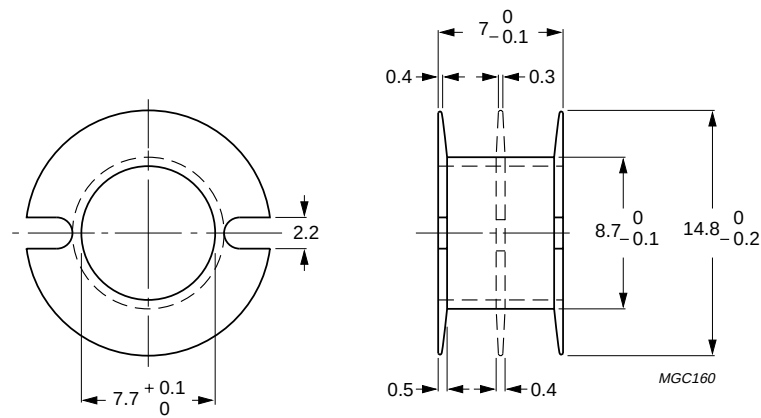
## P cores and accessories

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## COIL FORMERS

## General data CP-P18/11

| PARAMETER                     | SPECIFICATION                                                                                                               |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Coil former material          | polybutyleneterephthalate (PBT), glass reinforced, flame retardant in accordance with "UL 94V-0"; UL file number E45329 (R) |
| Maximum operating temperature | 155 °C, "IEC 60085", class F                                                                                                |



Dimensions in mm.

Fig.3 CP-P18/11 coil former.

## Winding data for CP-P18/11 coil former

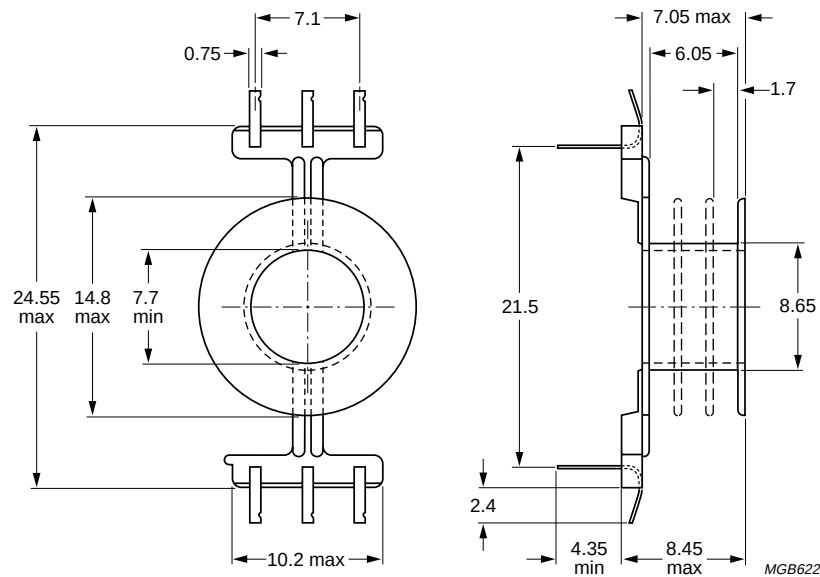
| NUMBER OF SECTIONS | WINDING AREA (mm <sup>2</sup> ) | MINIMUM WINDING WIDTH (mm) | AVERAGE LENGTH OF TURN (mm) | TYPE NUMBER  |
|--------------------|---------------------------------|----------------------------|-----------------------------|--------------|
| 1                  | 17.1                            | 5.7                        | 36.6                        | CP-P18/11-1S |
| 2                  | 2 × 7.95                        | 2 × 2.65                   | 36.6                        | CP-P18/11-2S |
| 3                  | 3 × 4.95                        | 3 × 1.6                    | 36.6                        | CP-P18/11-3S |

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## General data 6-pins P18/11 coil former for PCB mounting

| PARAMETER                     | SPECIFICATION                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------|
| Coil former material          | polyamide (PA6.6), glass reinforced, flame retardant in accordance with "UL 94V-0"; UL file number E41938(M) |
| Maximum operating temperature | 130 °C, "IEC 60085", class B                                                                                 |
| Pin material                  | copper-zinc alloy (CuZn), tin-lead alloy (SnPb) plated, transition to lead-free (Sn) ongoing                 |
| Resistance to soldering heat  | "IEC 60068-2-20", Part 2, Test Tb, method 1B, 350 °C, 3.5 s                                                  |
| Solderability                 | "IEC 60068-2-20", Part 2, Test Ta, method 1, 235 °C, 2 s                                                     |



Dimensions in mm.

Fig.4 P18/11 coil former for PCB mounting; 6-pins.

## Data for 6-pins P18/11 coil former for PCB mounting

| NUMBER OF SECTIONS | MINIMUM WINDING AREA (mm <sup>2</sup> ) | NOMINAL WINDING WIDTH (mm) | AVERAGE LENGTH OF TURN (mm) | LENGTH OF PINS (mm) | TYPE NUMBER        |
|--------------------|-----------------------------------------|----------------------------|-----------------------------|---------------------|--------------------|
| 1                  | 16.8                                    | 6.0                        | 36.7                        | 4.4                 | CPV-P18/11-1S-6PD  |
| 1                  | 16.8                                    | 6.0                        | 36.7                        | 6.8                 | CPV-P18/11-1S-6PDL |
| 2                  | 2 × 7.61                                | 2 × 2.8                    | 36.7                        | 4.4                 | CPV-P18/11-2S-6PD  |
| 2                  | 2 × 7.61                                | 2 × 2.8                    | 36.7                        | 6.8                 | CPV-P18/11-2S-6PDL |
| 3                  | 3 × 4.58                                | 3 × 1.7                    | 36.7                        | 4.4                 | CPV-P18/11-3S-6PD  |
| 3                  | 3 × 4.58                                | 3 × 1.7                    | 36.7                        | 6.8                 | CPV-P18/11-3S-6PDL |

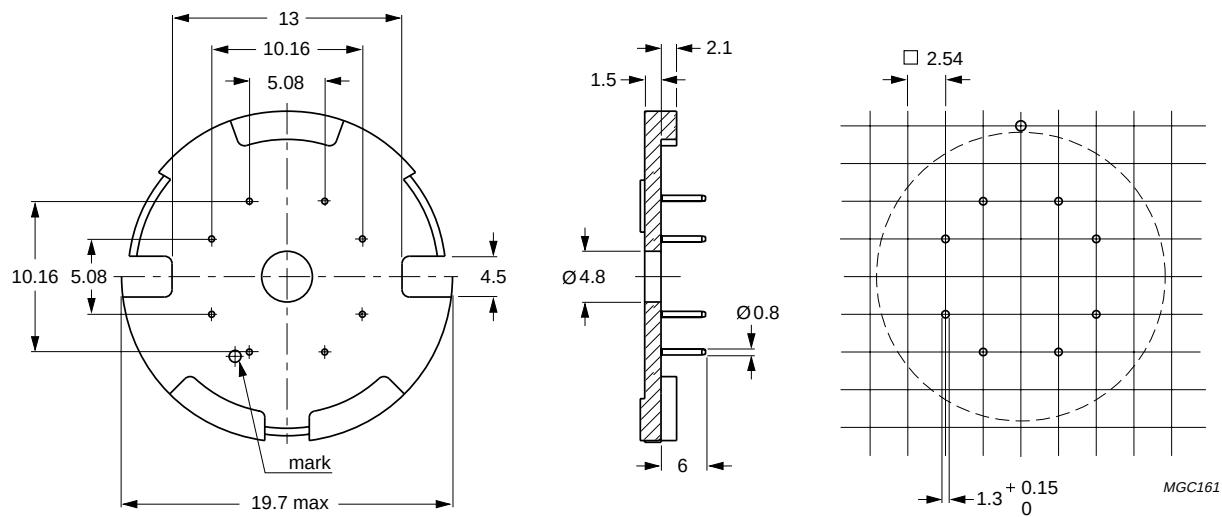
## P cores and accessories

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## MOUNTING PARTS

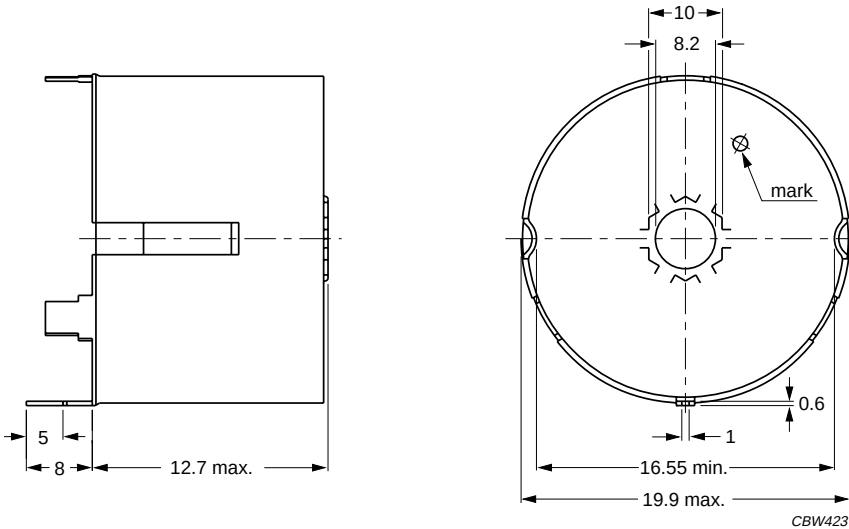
## General data for mounting parts

| ITEM      | REMARKS                                                                                                        | FIGURE | TYPE NUMBER       |
|-----------|----------------------------------------------------------------------------------------------------------------|--------|-------------------|
| Tag plate | material: phenolformaldehyde (PF), glass reinforced                                                            | 5      | TGP-P18/11-8P     |
|           | flame retardant: in accordance with "UL 94V-0";<br>UL file number E167521 (M)                                  |        |                   |
|           | maximum operating temperature: 180 °C, "IEC 60085", class H                                                    |        |                   |
|           | pins: copper-tin alloy (CuSn), tin-lead alloy (SnPb) plated                                                    |        |                   |
|           | resistance to soldering heat in accordance with<br>"IEC 60068-2-20", Part 2, Test Tb, method 1B: 350 °C, 3.5 s |        |                   |
|           | solderability in accordance with "IEC 60068-2-20", Part 2,<br>Test Ta, method 1: 235 °C, 2 s                   |        |                   |
| Container | copper-zinc alloy (CuZn), SnPb-plated, transition to lead-free<br>(Sn) ongoing                                 | 6      | CON-P18/11        |
|           | earth pins: presoldered                                                                                        |        |                   |
| Spring    | CrNi-steel                                                                                                     | 7      | SPR-P18/11        |
|           | spring force: $\approx 100$ N when mounted                                                                     |        |                   |
| Nut       | copper-zinc alloy, nickel-plated                                                                               | 8      | NUT               |
| Bush      | nickel-plated copper-zinc alloy                                                                                | 9      | FIB               |
| Clamp     | spring steel, tin-plated                                                                                       | 10     | CLM/TP-P18/11     |
| Washer    | phenolformaldehyde (PF)                                                                                        | 11     | WAS-CLM/TP-P18/11 |



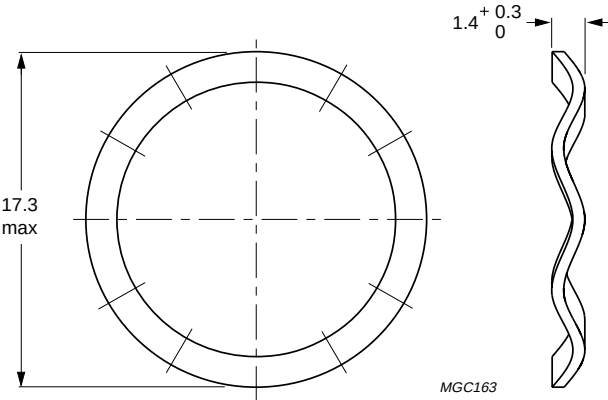
Dimensions in mm.

Fig.5 Tag plate: TGP-P18/11-8P.



Dimensions in mm.

Fig.6 Container: CON-P18/11.



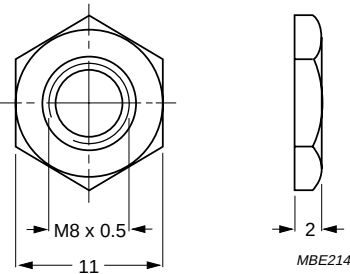
Dimensions in mm.

Fig.7 Spring: SPR-P18/11.



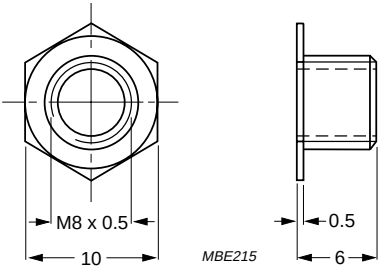
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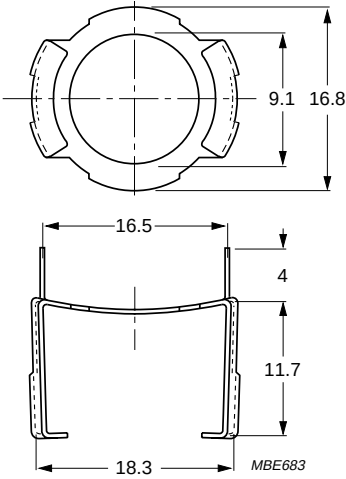
Dimensions in mm.

Fig.8 Fixing nut: NUT.



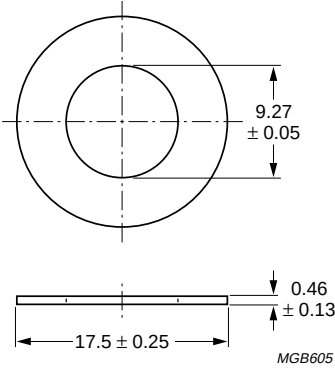
Dimensions in mm.

Fig.9 Fixing bush: FIB.



Dimensions in mm.

Fig.10 Clamp: CLM/TP-P18/11.



Dimensions in mm.

Fig.11 Washer: WAS-CLM/TP-P18/11.

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## DATA SHEET STATUS DEFINITIONS

| DATA SHEET STATUS         | PRODUCT STATUS | DEFINITIONS                                                                                                                                                                              |
|---------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Preliminary specification | Development    | This data sheet contains preliminary data. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.     |
| Product specification     | Production     | This data sheet contains final specifications. Ferroxcube reserves the right to make changes at any time without notice in order to improve design and supply the best possible product. |

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## PRODUCT STATUS DEFINITIONS

| STATUS           | INDICATION                                                                          | DEFINITION                                                                                                                                                                     |
|------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prototype</b> |   | These are products that have been made as development samples for the purposes of technical evaluation only. The data for these types is provisional and is subject to change. |
| <b>Design-in</b> |  | These products are recommended for new designs.                                                                                                                                |
| <b>Preferred</b> |                                                                                     | These products are recommended for use in current designs and are available via our sales channels.                                                                            |
| <b>Support</b>   |  | These products are <b>not</b> recommended for new designs and may not be available through all of our sales channels. Customers are advised to check for availability.         |