

## Basic technical information for NeoTAG® HF Transponders, Document 3 of 4

Our product range of NeoTAG® HF RFID transponders/ RFID chips is constantly being expanded and new transponder versions are regularly added. In connection with the use of our transponders, we have compiled a large amount of background information on mounting, function, design, operating behaviour, etc. due to the many applications in which the products are used. As a supplement to our [Product Information HF RFID Transponder](#) data sheet, this document contains further technical explanations and application-supporting information.

### 1. Recommended drill hole diameters for Inlay and Plug transponder versions

The transponder types *Inlay* and *Plug* are inserted into cavities in objects. These cavities are made before marking the objects, e.g. by means of mechanical processing such as drilling or milling.



The following drill hole dimensions are recommended for the corresponding transponders:

Transponder version	Application	Drill hole-Ø/mm	Drill hole depth/mm
NeoTAG® Inlay F2626	Non-Metal	min. Ø 2.7	min. 2.7
NeoTAG® Inlay MF2626	Metal	min. Ø 3.5	min. 2.7
NeoTAG® Inlay F2659	Non-Metal	min. Ø 2.7	min. 6.2
NeoTAG® Inlay MF2659	Metal	min. Ø 10.0	min. 6.2
NeoTAG® Plug G/MG3326	Non-Metal Metal	Ø 3.0 ± 0.05	min. 2.7
NeoTAG® Plug FG/MFG4335	Non-Metal Metal	Ø 4.0 ± 0.05	min. 3.7
NeoTAG® Plug FG/MFG8336	Non-Metal Metal	Ø 8.0 ± 0.05	min. 3.7
NeoTAG® Plug FG/MFG10340	Non-Metal Metal	Ø 10.0 ± 0.05	min. 4.1
NeoTAG® Plug FG4670	Non-Metal	Ø 4.3 ± 0.05	min. 7.1

## 2. Assembling of NeoTAG® Plug transponders

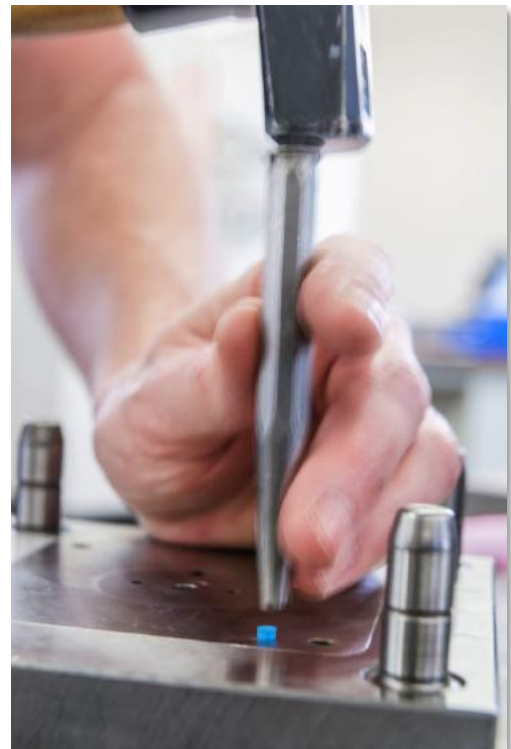
The NeoTAG® Plug transponders are inserted into a suitable cavity, e.g. a drilled hole, in the object to be marked. The following installation procedure is recommended:

- ① Create a drilled hole/blind hole with the dimensions specified for the respective transponder type. These can be found in the previous section of this Technical Recommendation. Please take into account the tolerances mentioned in order to ensure optimum press-fit fastening of the plug transponder in the hole.
- ② Make sure that the mounting hole is free of any residue. Dust, drilling chips and grease reduce the fixing force of the press-fit mounting for the transponder in the drill hole. We recommend cleaning, degreasing and drying the drill hole.

- ③ Insert the NeoTAG® Plug Transponder into the drilled hole in a centred position. This can be done in a manual process or automated with suitable fixtures.



- ④ Press the NeoTAG® Plug transponder vertically into the drilled hole using a suitable tool. Use e.g. a punch tool with a flat front. Make sure that the press-in tool completely covers the transponder surface. This ensures flush insertion. Punctual mechanical stress of the transponder can lead to damage! The **recommended force** for pressing the transponder into the hole is  **$F = 40 \text{ N}$** . Avoid press-in forces above 300 Newton (the maximum permissible forces can be found under point 7 of this document). Higher forces can damage the transponder.



- ⑤ Check the function of the NeoTAG® Plug transponder with a suitable RFID reader.



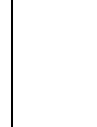




Alle Angaben ohne Gewähr. Irrtümer und Änderungen vorbehalten. No responsibility is taken for the correctness. Errors and modifications are subject to change.

### 3. Push-out forces for NeoTAG® Plug transponders at room temperature(RT)

The NeoTAG® plug transponders have a special design on the outside of the housing. This creates very good holding forces that fix the transponder in the drilled hole. Extensive tests were carried out to determine the holding forces in the marking object.

Depending on the size of the NeoTAG® Plug version, the following ejection forces can be determined at room temperature:

NeoTAG® Plug version	Picture	Push-out force $F$ without temperature load / N
Plug 3326		105
Plug 4335		110
Plug 8335		161
Plug 10340		195
Plug 4670		115

Push-out forces can be changed by varying the drill hole diameter.

The following values apply to the NeoTAG® Plug MFG/FG4335:

**Increasing the recommended drill hole diameter by 0.1 mm leads to a reduction of the push-out force of approx. 40 %, i.e. it is still approx.  $F = 65$  N.**

**Reducing the recommended drill hole diameter by 0.1 mm leads to an increase of the push-out force of 20 %, i.e. it is approx.  $F = 130$  N.**

**Reducing the recommended drill hole diameter by 0.2 mm leads to an increase of the push-out force of 40 %, i.e. it is approx.  $F = 155$  N.**

Alle Angaben ohne Gewähr. Irrtümer und Änderungen vorbehalten. No responsibility is taken for the correctness. Errors and modifications are subject to change.

## 4. Push-out forces of NeoTAG® plug versions after temperature changes

In addition, tests were carried out to determine how the push-out force behaves when the pressed-in transponder is exposed to temperature cycles. 1000 cycles with temperature changes between -40° C and +150° C were carried out.

After completion of **1000 temperature cycles between -40° C and +150° C**, the holding force of the plug transponder in the drill hole was reduced to approx.  **$F = 30 \text{ N}$** .

**This push-out force after temperature changes applies to all NeoTAG® Plug versions!**

## 5. Additional fixing of NeoTAG® Plug transponders

In the case of special application-specific requirements, it may be necessary to increase the holding or push-out forces of the NeoTAG Plug transponders in a drilled hole by using an adhesive. For this purpose, we recommend the adhesive **Vitralit® 1605 from Panacol**. This adhesive is suitable for bonding NeoTAG® Plug transponders in objects made of metal and plastic.

A suitable adhesive has to be tested and confirmed by the user in the final application!

## 6. Encapsulation of NeoTAG® Inlay transponders

NeoTAG® inlay transponders are delivered without a housing. They consist of the winding body, the antenna winding and the HF RFID IC.

The user has to ensure that the NeoTAG inlay transponder is fixed centrally and vertically in the drill hole. For direct potting of NeoTAG® inlay transponders in metallic or non-metallic objects, we recommend the potting compound **Vitralit® 1605 from Panacol**.

A suitable potting has to be tested and confirmed by the user in the application!

## 7. Mechanical load limits of NeoTAG® transponders





The two versions NeoTAG® Plug FG4335 and NeoTAG® Inlay F2626 were subjected to mechanical loads as examples. The load was applied to the transponders in a horizontal and vertical direction. The loading force  $F$  was increased until

- mechanical damage to the transponder is visible (e.g. crack of the ferrite core)

or

- the electrical function of the transponder is no longer given.

The following values result for  $F_{max}$ :

NeoTAG® version	Load direction	Description	Maximum force $F_{max}$ /N
NeoTAG® Plug FG4335	Horizontal	Force $F$ 	440
NeoTAG® Plug FG4335	Vertical	Force $F$ 	500
NeoTAG® Inlay F2626	Horizontal	Force $F$ 	200
NeoTAG® Inlay F2626	Vertical	Force $F$ 	350

Alle Angaben ohne Gewähr. Irrtümer und Änderungen vorbehalten. No responsibility is taken for the correctness. Errors and modifications are subject to change.

This product information is one of four documents summarising special features, design notes and mounting information for our HF transponders of the NeoTAG family. The following features are explained with the documents:

- |                             |   |                          |
|-----------------------------|---|--------------------------|
| Product info 1 of 4:        | - | Nomenclature             |
|                             | - | Weights and dimensions   |
| Product info 2 of 4:        | - | Reading ranges           |
|                             | - | Metallic environments    |
|                             | - | Read duration            |
|                             | - | TAG alignment            |
| <b>Product info 3 of 4:</b> | - | <b>Mounting</b>          |
|                             | - | <b>Mechanical stress</b> |
| Product info 4 von 4:       | - | Environmental tests      |
|                             | - | Temperature resistance   |

**Tell us your requirements - we will develop the right solution for you.**

Have we aroused your interest? Then contact us about RFID transponders for different frequency ranges. Customised solutions are our speciality. We will be happy to support you with our know-how to realise your product development.

NEOSID Pemetzrieder GmbH & Co. KG  
Langenscheid 26-30  
58553 Halver  
Deutschland  
Tel.: +49 (0) 2353 / 71 - 22  
[m.hoess@neosid.de](mailto:m.hoess@neosid.de)  
[www.neosid.de](http://www.neosid.de)

Alle Angaben ohne Gewähr. Irrtümer und Änderungen vorbehalten. No responsibility is taken for the correctness. Errors and modifications are subject to change.