



IMTEC® Moulded inserts

Thread inserts for in-moulding

BÖLLHOFF

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IMTEC® Moulded inserts – Thread inserts for in-moulding

The continuous further development in the field of technology has led to constantly increasing requirements for components and respective applications. In many cases, those requirements are so high, that they cannot be fulfilled with one material. Therefore, combining specific advantages of different materials is of particular interest. If used appropriately, combinations of metal and plastics provide for advantages such as reduced weight, improved corrosion resistance and component cleanliness. Hence, in many fields of application, in-moulding of metal fasteners with plastics is the solution.

As an expert in the field of joining technology, Böllhoff has detected the advantageous synergy effect of high-strength metals in combination with plastics and has included thread inserts for in-moulding in its product portfolio. These innovative IMTEC® moulded inserts are particularly suitable for thermoset and thermoplastic materials.

Technology

IMTEC® is used for forming, particularly in injection moulding (here in-moulding technology).

For the manufacture of plastics-metal components (hybrid parts), a system composed of injection moulding machine, injection mould and optionally automation technology is required.

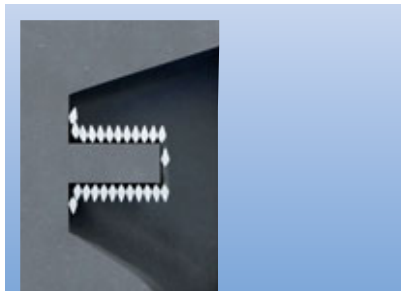
The injection mould preferably made of steel consists of several components and different single parts. Only the core pins of the injection moulds have to be geometrically adapted to the IMTEC® moulded inserts to achieve great accuracy and reproducibility.

The thread inserts are placed into the mould manually or by means of a handling system (figure 1, example of a plastic handle). Due to the forming process, the thread inserts are also sufficiently magnetised and can therefore be securely placed on magnetic core pins.

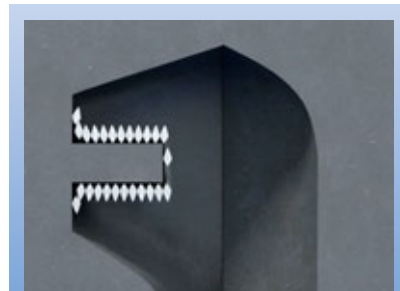
In the next step, the mould is closed (figure 2) and a precisely measured amount of the plasticised plastic material is injected into the cavities of the injection mould under high pressure and at high speed (figure 3). Until the liquid core of the moulding material has cooled down and become solid, the component remains in the mould. After the end of the residual cooling time, the clamping unit opens the mould and the component is ejected (figure 4).

IMTEC® CO installation – Example of a plastic handle

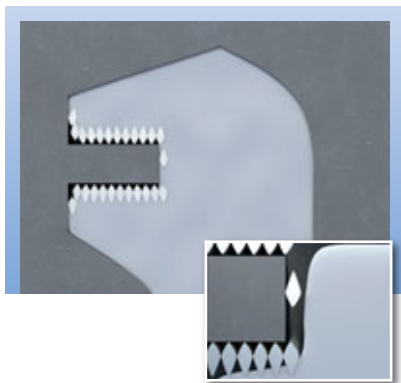
1) Placing on core pin of the injection mould



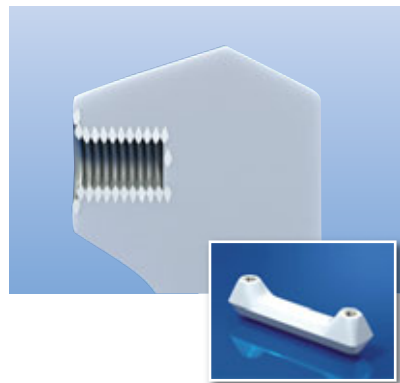
2) Mould closing



3) Injection of plasticised material into the mould



4) Component after ejection



IMTEC® Moulded inserts – Product types

Böllhoff offers with the IMTEC® moulded inserts two innovative product developments for in-moulding of metal threads in plastic components:

- IMTEC® CO – Particularly for generation of blind hole threads
- IMTEC® CF – Particularly for generation of through hole threads

IMTEC® CO



The IMTEC® CO thread insert for in-moulding is an asymmetric rolled stainless steel A2 (option A4) wire which is mainly used for customer components with blind hole threads. That wire is coiled to form a fixed bushing with at least one flange-type extension.

In the forming process, the fasteners are also sufficiently magnetised and can be placed on magnetic core pins manually or by means of handling systems.

Benefits

- Maximum usable thread length
- Corrosion and acid resistance
- Increased technical cleanliness (residual dirt minimisation)
- High extraction force due to an optimisation of flank covering in plastics
- Weight reduction of the component

IMTEC® CF



The IMTEC® CF thread inserts with „double flange“ are produced from steel by cold forming. The in-moulding technology requires particularly accurate thread inserts. The deformation area on the IMTEC® CF allows precisely adjusting the length of the thread insert according to the mould dimension. Upon closing, the parts of the mould compress the IMTEC® CF and precisely adjust the length of the component ($L \pm 0.15$ mm). IMTEC® CF is primarily intended for components with through hole threads.



Benefits

- Very large flange diameters possible
- Deformation area for length adjustment of the insert; close length tolerances $< L \pm 0.05$ mm
- Torque resistance by hexagonal design or knurls
- Pull out resistance by providing significant under cuts
- No metal-cutting operation
- Also feasible as compression limiter



IMTEC® Moulded inserts – Selection guide

Decide with the following selection guide, which innovative principle of the IMTEC® moulded inserts is particularly suitable for your requirements.

Selection criteria		IMTEC® CO	IMTEC® CF
			
Application	Open end		++
	Close end	++	+
	Minimum remaining wall thickness	++	+
	Large through hole in the screwed on parts; very soft counter parts	+	++
	Functionality as compression limiter		++
Shaping of thread inserts	Big flange Ø	+	++
	Flange as sort key	++	++
Mechanical properties	Axial tensile force	++	++
	Push-out force	++	++
	Torque resistance	++	++
	Corrosion resistance	++	
	Automotive surface treatment		++
	Magnetism	+	++
Process quality	Non-cutting guarantee	++	
	100% control	++	++
	Automatic feeding process	+	++

+ = well suited ++ = very well suited

Fields of application

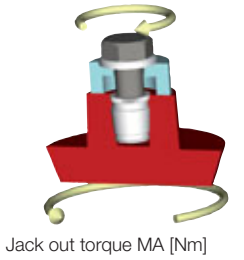
The IMTEC® moulded inserts are used in many fields of applications:

- Medical technology
- Automotive industry
- Plastics technology
- Electrics, electronics
- Fluid technology
- and many more

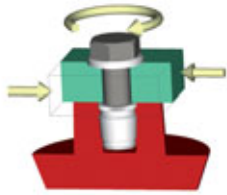


We are pleased to develop and produce your customised thread inserts and applications.

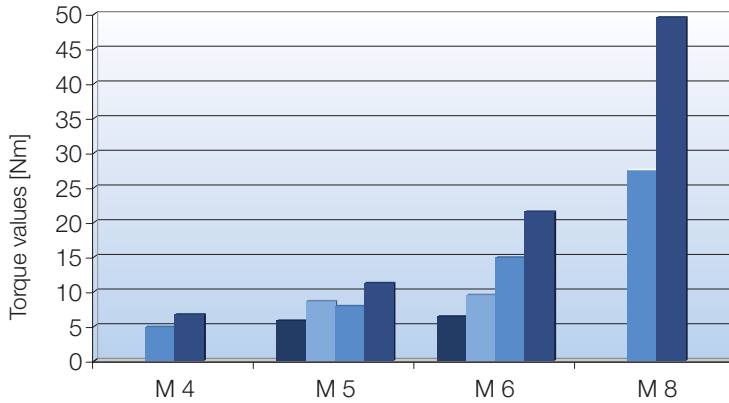
Torque values M 4 to M 8



Jack out torque MA [Nm]

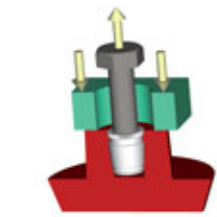


Torque MR [Nm]

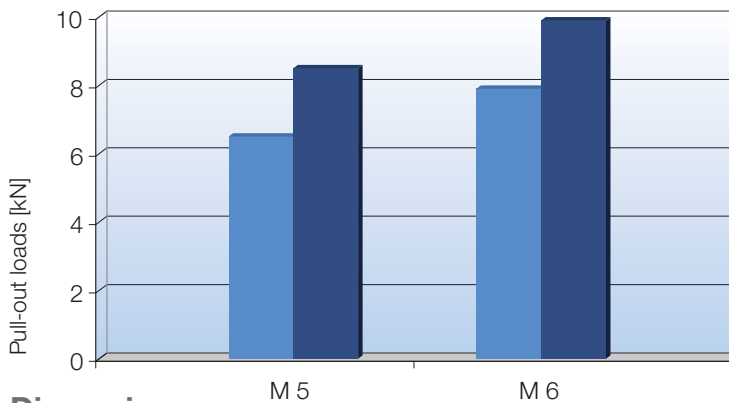


	M 4	M 5	M 6	M 8
PP MA [Nm]	–	5.8	6.4	–
PA MA [Nm]	–	8.6	9.5	–
PP MR [Nm]	4.9	7.9	14.9	27.5
PA MR [Nm]	6.7	11.2	21.5	49.5

Pull-out values M 5 and M 6

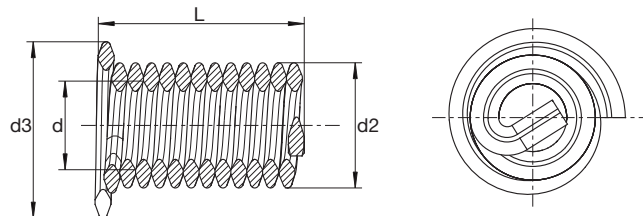


Pull-out loads FA [kN]



	M 5	M 6
PP FA [kN]	6.5	7.9
PA FA [kN]	8.5	9.9

Dimension

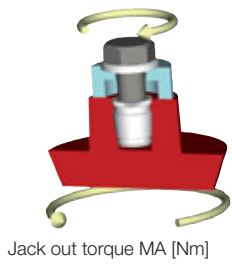


d	Type	L + 0,5 mm	d2 ± 0,2 mm	d3 - 0,5 mm	Core pin Ø mm guideline
M 4	4531 0040 008	8	5.82	7.8	3.35
M 5	4531 0050 010	10	7.08	9.2	4.25
M 6	4531 0060 012	12	8.70	12.3	5.10
M 8	4531 0080 016	16	11.30	15.5	6.80

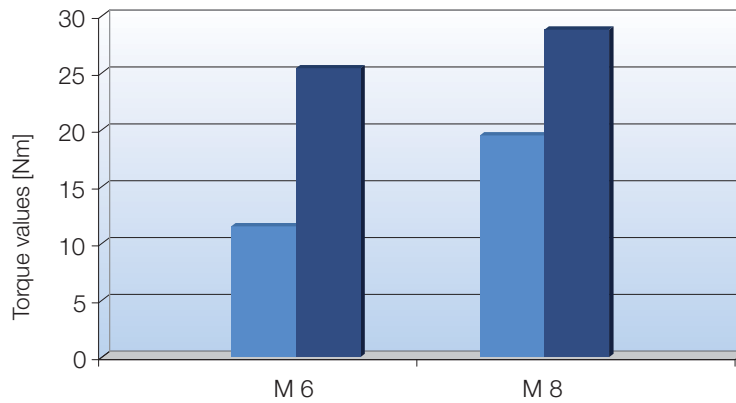
Remarks:

Dry film lubrication is recommended. Using stainless steel screws potentially cold shuts can occur as a result of the material of the IMTEC® CO inserts A2 (material specification 1.4301/1.4310; option A4 material specification 1.4375).

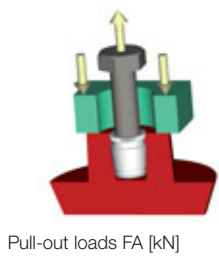
Magnetized core pins can be applied. Core pin: Modification according to the specific application.



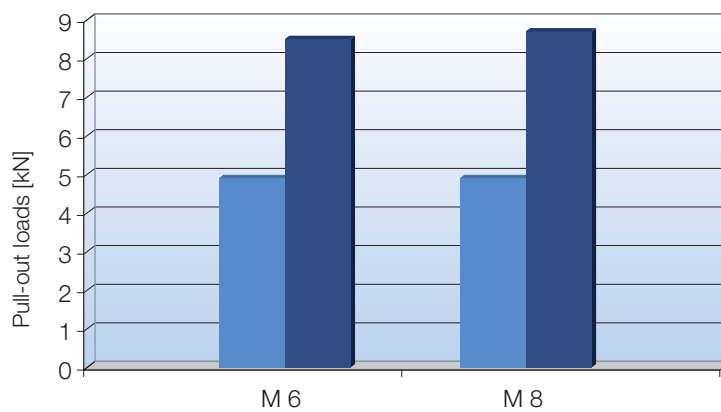
Torque values M 6 and M 8



	M 6	M 8
PP MA [Nm]	11.5	19.5
PA MA [Nm]	19.5	28.0

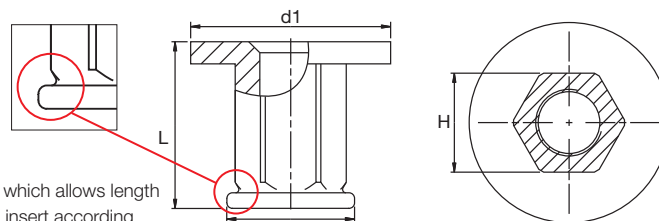


Pull-out values M 6 and M 8



	M 6	M 8
PP FA [kN]	4.9	4.9
PA FA [kN]	8.5	8.7

Dimension



Deformation area which allows length adjustment of the insert according the dimension of the mould.

Closed end versions and different diameters (M 4 to M 12) are available on request:

- Length of component: 10 to 25 mm for M 6 and 10 to 30 mm for M 8
- Tolerance concerning the length: ± 0.15 mm
- Head diameter: 12 to 20 mm

Tooling costs to be considered.

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