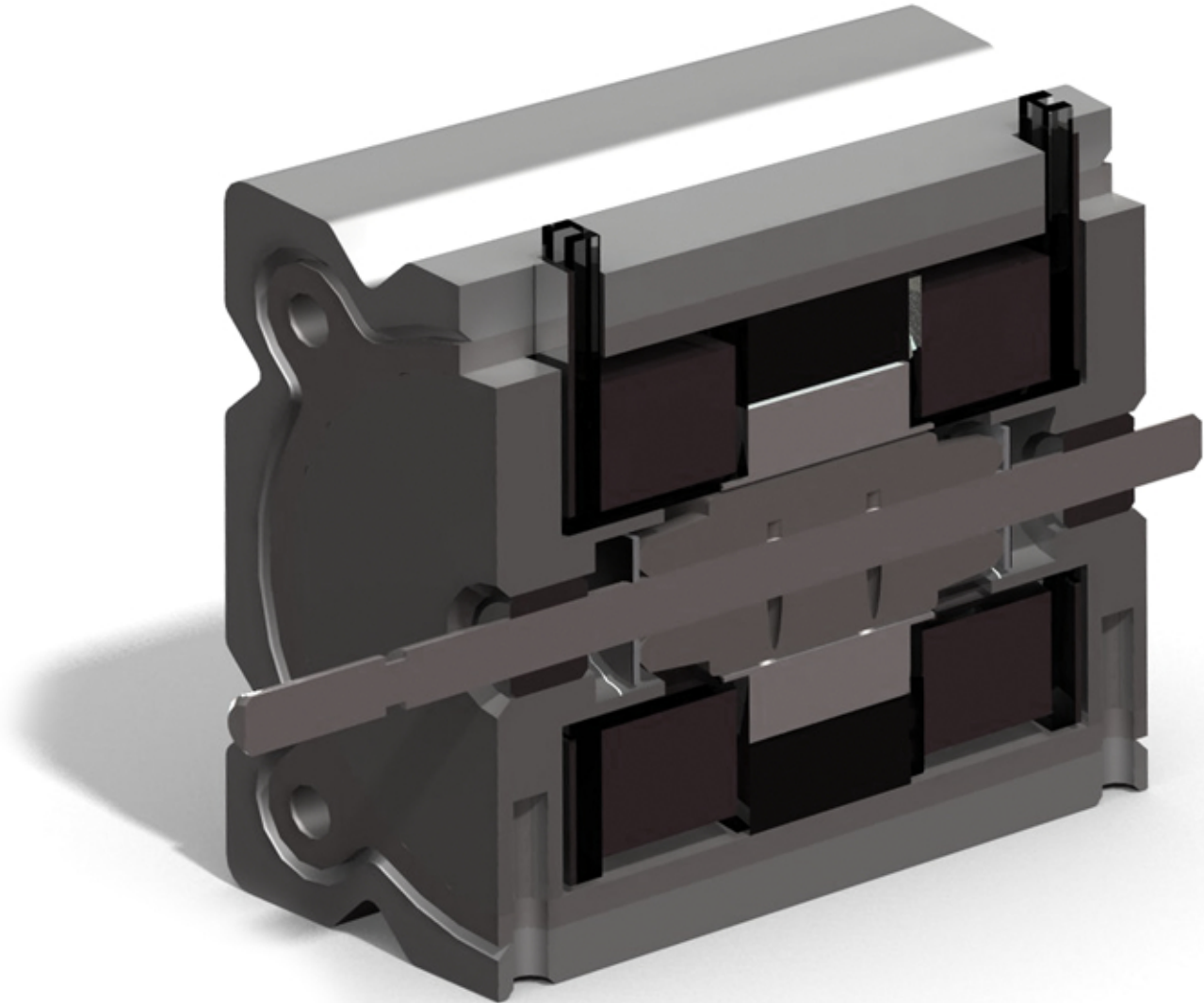


Assembly & Design



Technology at work for you



Goudsmit UK is part of the Goudsmit Group of companies based in Eindhoven, the Netherlands. Founded in 1960 the group manufactures and supplies a range of products from components through to capital equipment. The group has subsidiary companies across Europe and into Asia.

Goudsmit UK was founded in 1998 and specialises in the design, industrialisation and manufacture of custom industrial components. The company can also design and sub-contract manufacture entire products and offers a comprehensive and global logistics service.

TS16949 and ISO9001 qualified, the company works in a wide range of market segments including Automotive, Oil and Gas, Aerospace, Medical Devices and Green Technology.

Logistics

Designing, industrialising and manufacturing components are only some of the issues which face us and our clients. Just as important is getting the correct number of components to the correct place at the right time. To do this we have a refined and complex logistics network which operates throughout the globe. Key capabilities of this network are:

- Demand planning system to predict and manufacture client requirements
- Frame contracts with multiple drops spanning up to 2 years
- Warehouses in Holland / USA / UK to allow ex stock delivery
- Buffer stock held locally to offer 3 day delivery
- Consignment stock capabilities
- JIT delivery for automotive volumes
- KANBAN delivery for regular use items
- Global tracking system to monitor orders and parts through production and shipping

We have adapted our logistics network to match the dispersed and global nature of our clients operations and can offer whatever service our clients require.

For further information please refer to our logistics brochure.

Quality Assurance

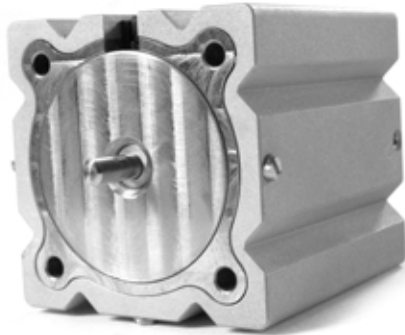
What our clients want are parts which are correct first time and every time. We endeavour to provide this and our QA aim is zero defects on deliveries and continual improvement in all our processes. In order to achieve this we have become TS16949 and ISO9001 certified and are constantly tightening our processes and QA controls to better control our final product. A short summary of the QA tools and documentation we use and can provide is shown below:

- Samples with ISIR submission
- Design and Process FMEA
- PPAP on pre-production parts
- APQP
- Inspection reports with all deliveries
- Environmental testing

We are happy to provide any custom QA structure our clients require right up to zero defect by measurement.

For further information please refer to our Quality Assurance brochure.

Design

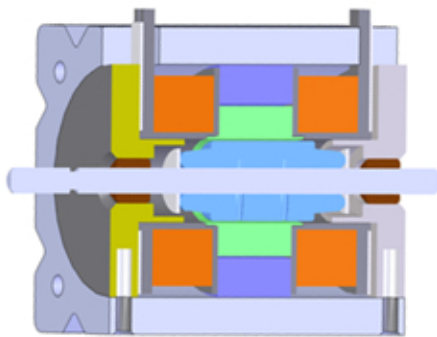


■ Solenoid prototype

Very often clients who approach us are looking not only for a pre-designed assembly but they also require some design work performed on their assembly, device or product. At Goudsmit UK our focus is mainly on engineering and design and so we are easily able to facilitate our clients with these requirements. Most often we are engaged to achieve one of the following goals:

- Cost reduction
- Enhanced performance
- Material reduction or change
- Miniaturisation

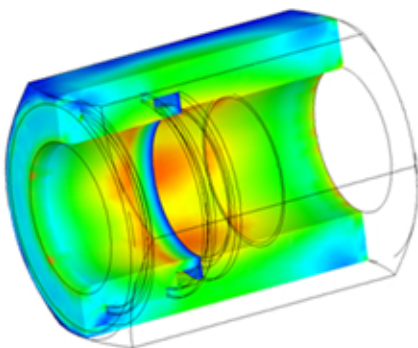
Whatever the brief we can normally achieve it. An outline of our design capabilities is as follows:



■ Solenoid CAD

MECHANICAL DESIGN

This is often an unappreciated discipline and one which is poorly practised on a wide scale. Good mechanical design, combined with knowledge of manufacturing techniques and costs is invaluable when it comes to assisting clients with the design of their assemblies. Knowing how to produce tolerance mating parts and how various assembly techniques are applied is key. Translating these into accurate 3D models and drawings is necessary to communicate the design to the manufacturing area. Finally, knowing how the materials behave mechanically within their environment will lead to better design, a better finished product and a more durable product in the field.



■ Hydraulic coupling under pressure

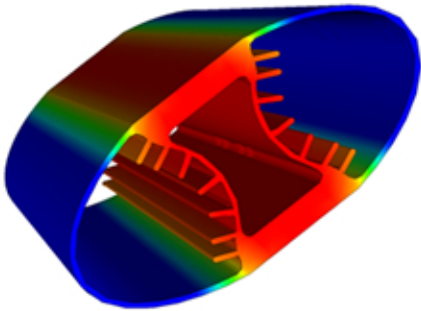
MECHANICAL ANALYSIS

There are many parameters we often need to investigate during the design process, and the most common is mechanical behaviour under load. Using FEA analysis we can load and fix a component in a multitude of different ways and look at how that component will perform, or more than often deform under that load. An illustration of this would be the high speed rotating machines we design at Goudsmit UK. Often how a machine behaves mechanically is more important and more difficult to predict than how it behaves magnetically. A good understanding of materials and manufacturing techniques is necessary to carry-out this type of work and combined with our expertise in component supply we can match up the design and production disciplines.

Design

THERMAL ANALYSIS

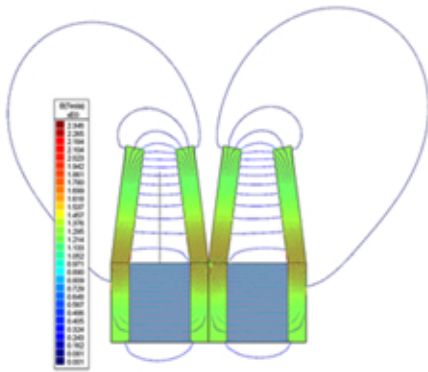
As with mechanical analysis we need to ensure that any design works thermally, whether that be in a high temperature environment or generating thermal energy which needs to be dissipated. Radiation and convection patterns need to be understood to allow the design to be optimised to provide the heating or cooling function required.



■ Radiator element

2D MAGNETIC DESIGN

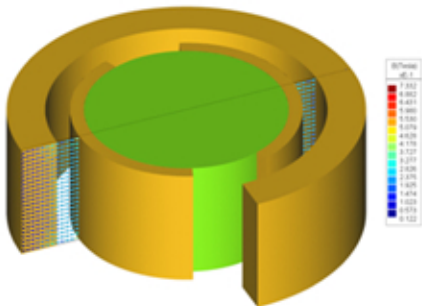
For products which can be analysed in a single plane or which are rotationally symmetric, we can use 2D software and of course our design experience. We can look at characteristics such as field strength, flux density, saturation and force between objects to allow us to ascertain the optimal design for an assembly. Parametric analysis can be used to look at the effect of changes in key dimensions or materials.



■ Magnetic Separator

3D MAGNETIC DESIGN

For more complicated products, which need to be modelled in three dimensions, we use a 3D software package. This is a slower process as it is data heavy and large matrices are required to find the numerical solution. However, when coupled with our design know-how we can often characterise and simulate an application without ever having to build a prototype. Again we can look at characteristics such as field strength, flux density, saturation and force between objects to fine tune the design we have been given.



■ Moving coil meter stator

Assembly Techniques

Goudsmit UK specialise in the assembly of multiple components, and over the last few years we have developed substantial know-how relating to this field. A brief outline is listed below:

MECHANICAL ASSEMBLY

Press fits, interference fits, fasteners, threads and clips are some of the lowest risk methods of assembling magnets available and have the added bonus of normally being easy to test and validate. We will often look at mechanical assembly as a first choice solution.

INSERT MOULDING

Commonly used to combine metals and plastics without gluing, this is a technically advanced solution which requires well designed moulds and precision components.

OVER MOULDING

When looking to combine two polymer parts we look to over moulding. Although requiring an extra mould tool, it is an excellent way to ensure parts remain firmly assembled. Often the polymers are quite different, with a rigid polymer being combined with an elastomer.

GLUING

This needs to be a well thought out and well tested solution. Gluing needs to be well controlled with proper dosing equipment, refrigerated storage, thorough application and curing instructions respected and complied to. Environmental and fatigue testing of samples is essential to ensure the correct functioning of the product over time. We do frequently use glue in our assembly products however, we do so with some caution and considerable testing cycles.

HEAT STAKING

This is when a polymer is heated to a temperature where it exhibits plastic behaviour and then is deformed to form a fastener. A powerful and repeatable technique, it is one we use with greater frequency at Goudsmit UK.

ULTRASONIC WELDING

As the name suggests sound waves are used to weld two polymers together. Another specialised technique, it requires tooling to hold the parts and direct the sound waves to the required area. Once perfected repeatability is good and it can be easily tested by sectioning the welds.

WELDING

For combining two metal parts which cannot be joined using a fastener, we will use metal welding. We employ a number of skilled welders who are capable of using most welding techniques/technologies to join parts. As it is a manual operation consisting of cosmetic finish it can be challenging to maintain, however when well executed welding is a good assembly technique.

BRAZING

Similar to welding, two parts can be brazed using a copper based alloy which melts and fills the gap between the two tightly fitting parts using capillary action. There are a number of different techniques, fillers and inert atmospheres used.

Application Focus

In order to illustrate the assembly techniques we use, we thought it best to show examples with some application backgrounds.

ULTRASONIC WELDING REPLACES GLUING

In this application the client used two mouldings to house a magnetic assembly. Normally assembled by gluing, the parts often separated due to thermal cycling. Goudsmit UK redesigned the assembly and substituted gluing with ultrasonic welding. The result is a better cosmetic finish and a more stable and durable assembly.



SIMPLE MECHANICAL ASSEMBLY

A series of components manufactured in our factory are assembled using some press fit pins. Nothing complex. Simple, straightforward and very effective.

FDA COMPLIANCE WITH INSET MOULDING

Tasked to combine a magnet and a shaft but not have the magnet come into contact with drinking water, we chose to avoid glue and encapsulate the magnet and shaft while mechanically coupling them using insert moulding. Cheap, very repeatable and very successful the assembly worked in the application with no issues at all.

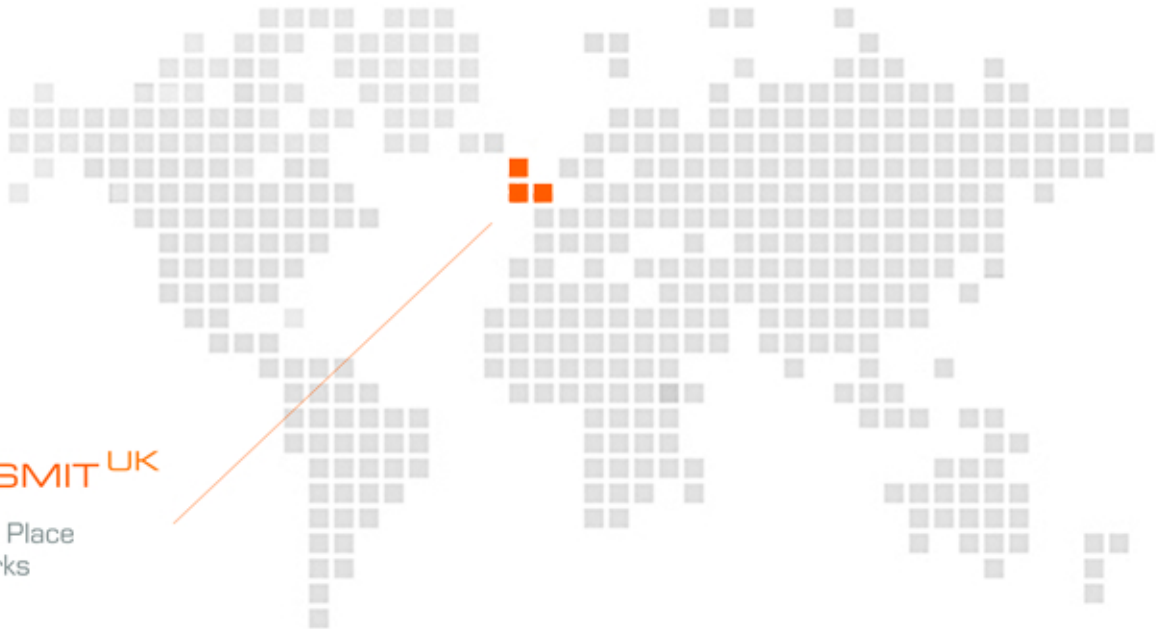


WELDED ASSEMBLY

A combination of pressed aluminium and formed plates are welded together to form a sub-assembly, which is then anodised.

Worldwide Service

- Goudsmit UK is part of the Goudsmit Group of companies. With two production facilities in China, one in the Czech Republic and two in Holland, the company has the reach to supply from Asia to Europe and on into the USA.



GOUDSMIT UK

10 Cromac Place
The Gasworks
Belfast
BT7 2DH

Tel: +44 (0)2890 271001
Fax: +44 (0)2890 271002
E-mail: info@goudsmit.co.uk

Goudsmit Magnetic Supplies BV
Prunellalaan 14/5582 HB Waalre
P.O. Box 7/5580 AA Waalre
The Netherlands

Tel: +31 (0)40 2219015
Fax: +31 (0)40 2220256
E-mail: supplies@goudsmit-magnetics.nl

Goudsmit Magnetic Systems BV
Petunialaan 19/5582 HA Waalre
P.O. Box 18/5580 AA Waalre
The Netherlands

Tel.: +31 (0)40 2213283
Fax: +31 (0)40 2217325
E-mail: systems@goudsmit-magnetics.nl

Goudsmit Magnetic Design BV
Prunellalaan 3/5582 HB Waalre
P.O. Box 65/5580 AB Waalre
The Netherlands

Tel: +31 (0)40 2212475
Fax: +31 (0)40 2212479
E-mail: design@goudsmit-magnetics.nl

Goudsmit China Magnetic & Plastic
HengJie Industrial Zone
YinZhou District, Ningbo
315181 P. R. China

Tel: +86 (0)574 8827 1206
Fax: +86 (0)574 8827 1205
E-mail: tz@goudsmit.cn

Aimants Goudsmit France s.a.r.l.
Siège social
Z.I. - 3, Rue du Vert Bois
59535 Neuville en Ferrain Cedex

Tel: +33 03.20.28.40.00
Fax: +33 03.20.28.40.01
E-mail: goudsmit.france@wanadoo.fr

Goudsmit Büro Deutschland
Schöllinger Feld 34
D-58300 Wetter
Deutschland

Tel: +49 (0)2335 681906
Fax: +49 (0)2335 681908
E-mail: info@goudsmit-deutschland.de