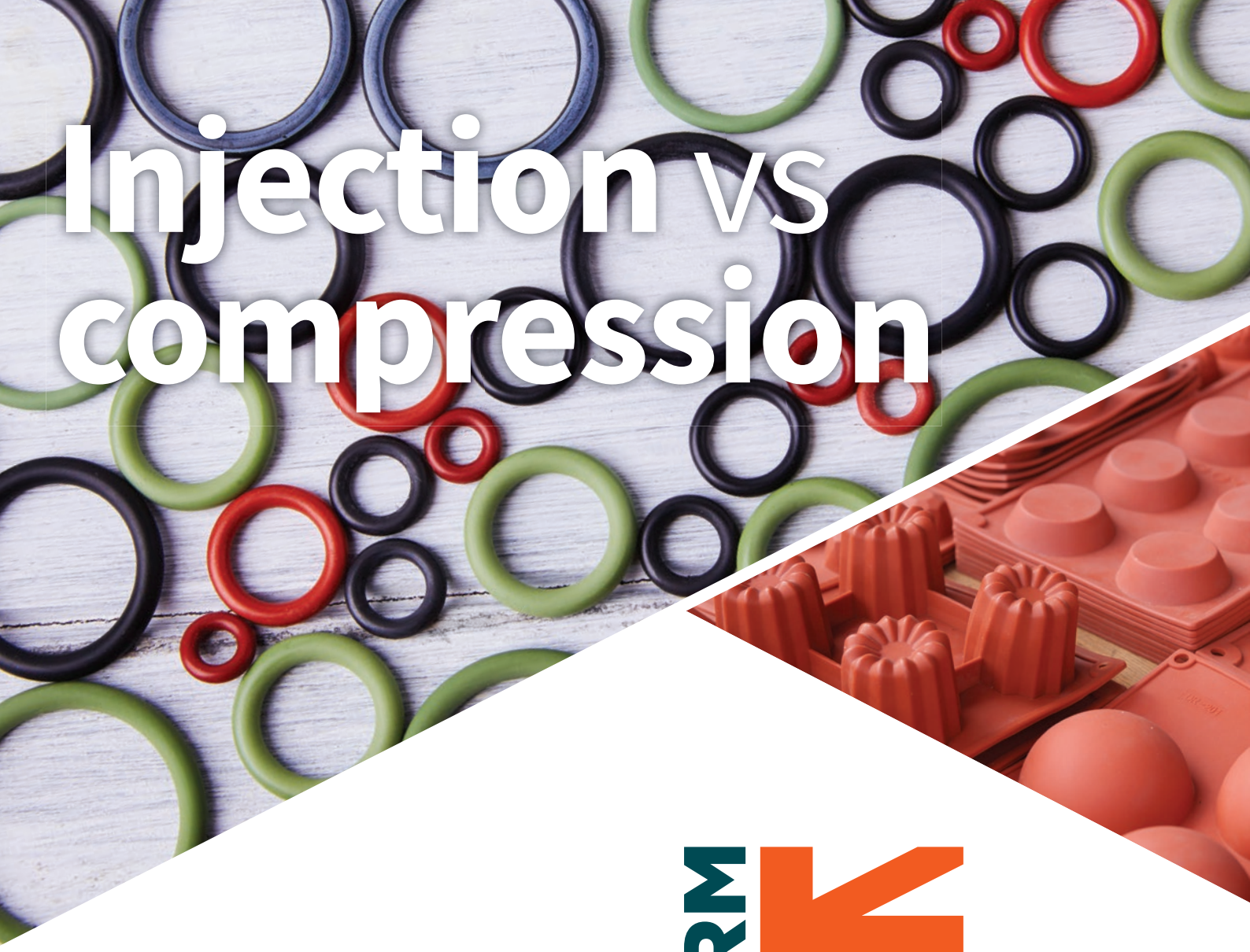
Injection vs compression



SRM

Innovate | Engineer | Deliver

t: +44(0)1283 814411 | e: sales@srm-industries.com | www.srm-industries.com

What are the differences between **injection rubber moulding** and **compression rubber moulding?**

Compression and injection moulding are the main two processes by which rubber products are made. Compression moulding is an older (1850s) more simple process reliant on the user whilst injection rubber moulding (1960s) is a more high-tech automated approach.

Both have their strengths and weaknesses depending on the required application. This is our complete guide to injection rubber moulding and compression rubber moulding including their pros and cons.

What is **injection rubber moulding** and how does it work?

The injection rubber moulding process involves injecting rubber compound into a mould. It works by significantly heating the rubber and using a very high pressure to inject the rubber compound into the mould.

From there it is injected through the runner system in the tool into the cavities of the closed hot mould. The combination of pressure, temperature and time facilitates the crosslinking of chemical bonds commonly referred to as vulcanization. Process parameters are usually programmed into the press to control temperature, volume and rate that compound is injected into the mould cavities.

THE PROS OF INJECTION RUBBER MOULDING INCLUDE:

- Lower unit costs.
- Increased accuracy
- Precision across large volumes
- Computer controlled
- Less wasted materials
- Faster cycling
- Low levels of flash (reducing the need for secondary trimming)

THE CONS OF INJECTION RUBBER MOULDING INCLUDE:

- High cost at initial set-up
- Longer set-up time
- Costly for small runs
- More expensive tooling

What is **compression rubber moulding** and how does it work?

Compression moulding is the original method of moulding rubber. It is generally used in low volume applications as the tooling cost is more economical. There is less set-up waste as there is no requirement to purge out the machine. This makes it ideal for niche industry replacements such as motorbikes and the vintage car market.

It also allows larger thicker products to be moulded in excess of 20kgs in weight and we can achieve larger sized mouldings up to 850mm square in size.

HOW IT WORK?

Compression Rubber Moulding an uncured rubber compound is formed to the proper shape and size based on the finished part configuration. This uncured rubber shape is termed a preform — it is prepared to be formed, or moulded. Every mould will have a different shape and size preform that works best. When the optimal preform has been determined, it is important to have a tolerance on both its size and shape to ensure the part forms correctly. Too much material is wasteful and can cause flash to become too thick, while too little material can cause voids in the part.

The preform is placed into the cavity of a heated mould. The mould is then closed. Heat and pressure are applied in a compression moulding press. Presses used in production utilise a programmable logic controller to monitor and control critical parameters like temperature, pressure and time to ensure moulding takes place within a prescribed tolerance window.

The mould is then opened. The cured rubber part is removed along with its flash. The part is then moved through the manufacturing operation to undergo post-moulding processing, which can include de-flashing, post-curing, inspection and packaging.

THE PROS OF COMPRESSION RUBBER MOULDING INCLUDE:

- No set-up costs
- Short set-up time
- No costly purging on machinery
- Large weight and size mould capacity
- Good for short runs
- Good for prototyping
- Low-cost tooling in comparison to injection rubber moulding

THE CONS OF COMPRESSION RUBBER MOULDING INCLUDE:

- Less consistent than injection
- Longer cure times
- Expensive on large runs
- Higher unit cost
- Higher labour costs
- More waste

Combine both processes by **working smart with SRM**

A great example of how these two processes can be used in unison is in product development and R&D.

Using compression rubber moulding, a prototype can be produced in the exact rubber compound that will be used in the final run. This can then be tested and if needed, produced in different materials to simulate multiple outcomes; speeding up and streamlining the process and saving costly re-makes further down the line.

Once the client is happy with the results of the prototype, we can convert the compression tooling to injection tooling for the final product run, saving time and money.

The same process can be used when running a small volume job that needs to be switched to larger volumes to meet demand.

The process of combining compression and injection rubber moulding optimises and streamlines the process of product development, making the whole process more viable from a cost perspective.

For more information and guidance about the best rubber moulding processes and correct rubber compounds, email sales@srm-industries.com or visit www.srm-industries.com