



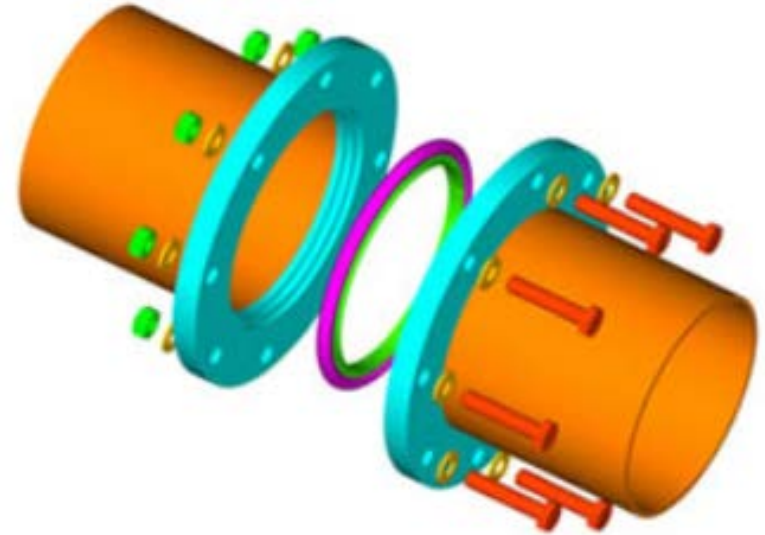
TT GASKETS

MODERN SEALING TO IMPROVE YOUR VALUE CHAIN



What is a static gasket?

- Smallest, cheapest but the **most critical** part of the flange connection, that directly influences reliability, safety and environmental issues in the engine.
- There are no ideal flanges, that is why we need to have gasket in place to correct all imperfection of the flange surface.



How do we choose gasket materials?

Main factors that influence our choice:

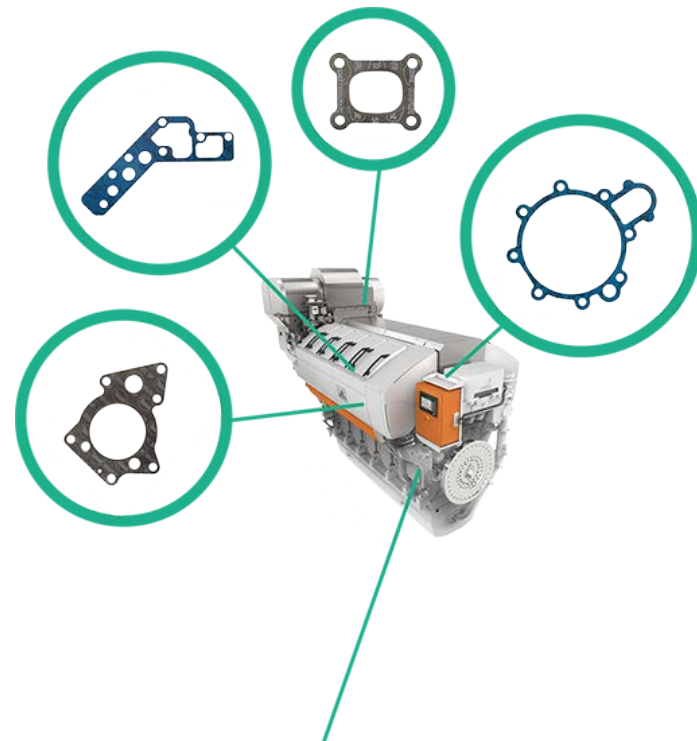
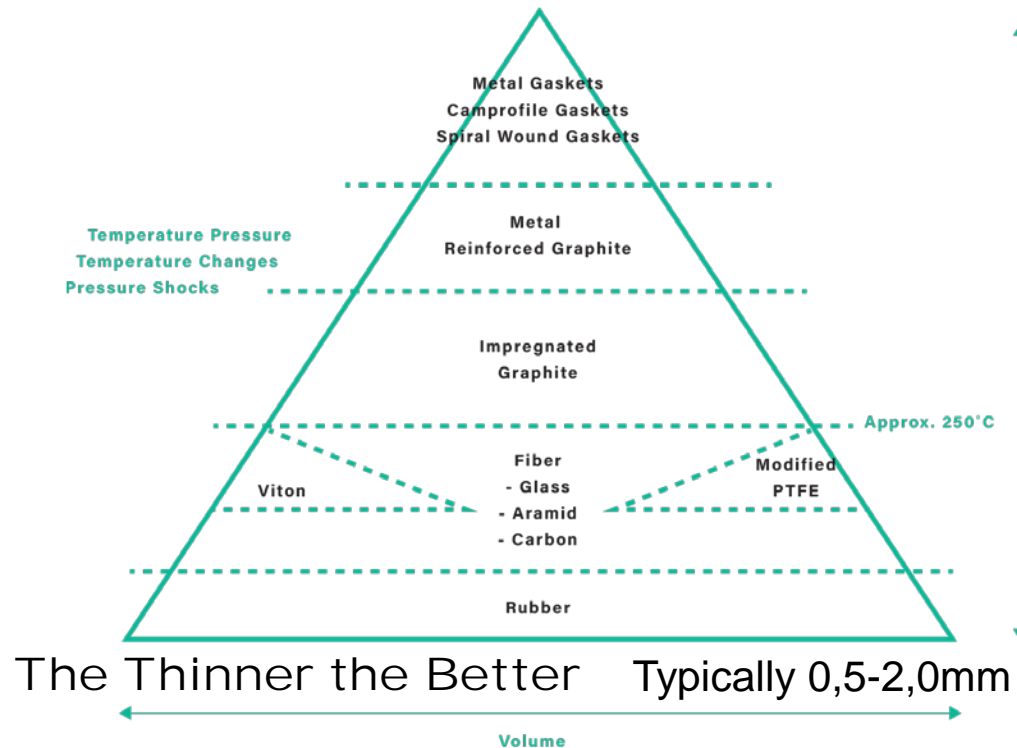
- Temperature
- Pressure
- Media

Additional factors:

- Geometry of the flange
- Surface stress
- Pressure shocks
- Temperature changes
- Other factors



What materials are there on the market?



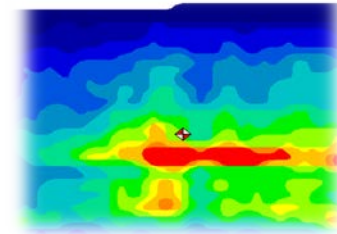
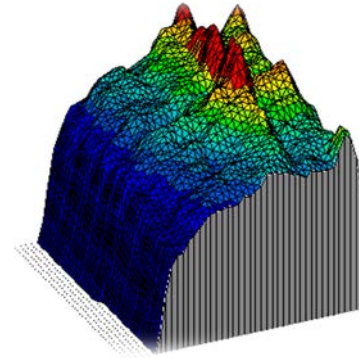
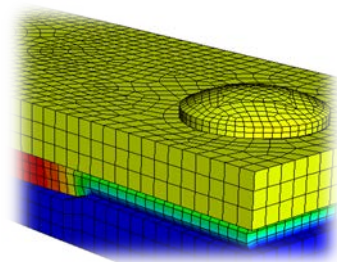
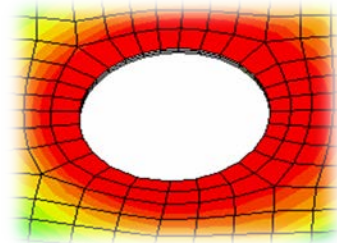
How do we design gaskets?

After we have the information about flange geometry, flange surface, media, pressure, temperature, bolts and their locations, some analysis can be conducted:

- Software simulation analysis
- Surface pressure tests

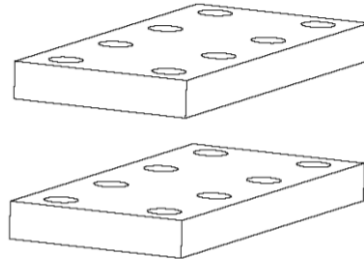
Gaskets are not meant to correct designing mistakes!

It is good to take the gasket into consideration in the very beginning of the design phase.



How do we design gaskets?

Most common gasket design mistakes

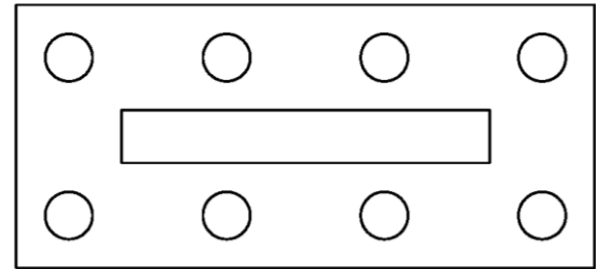


Design 1:

$$A_c = 17000 \text{ mm}^2$$

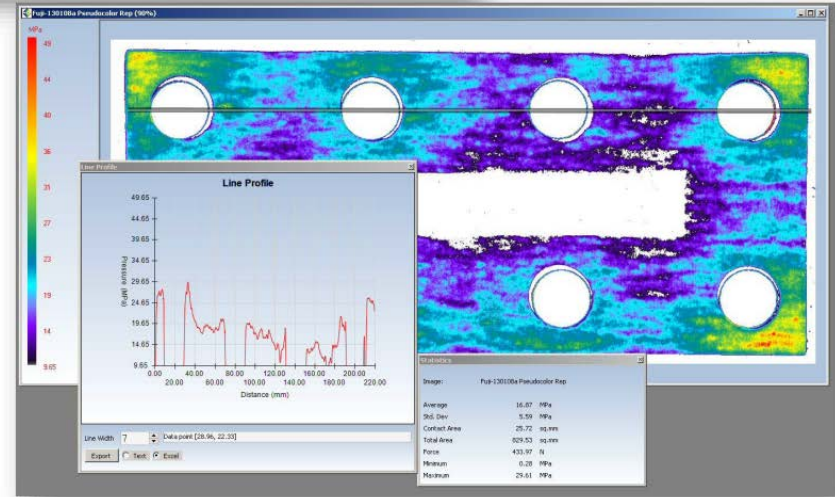
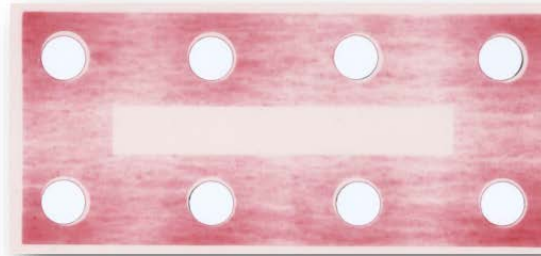
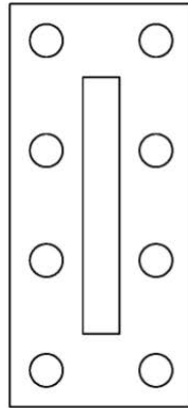
$$A_p = 2800 \text{ mm}^2$$

$$\sigma_v = 18 \text{ MPa}$$



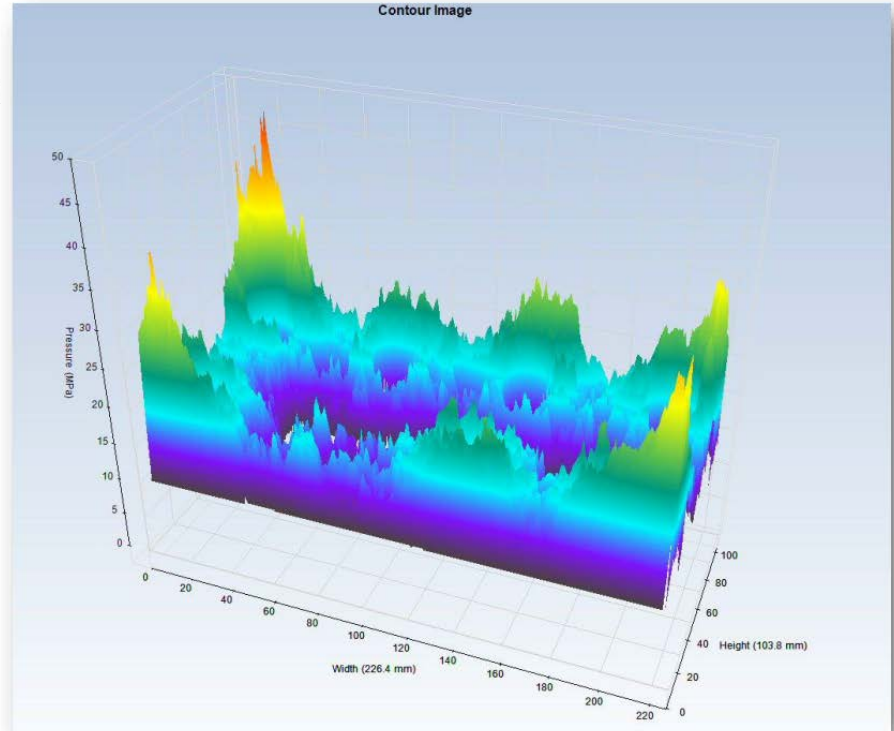
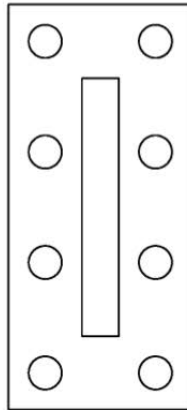
How do we design gaskets?

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 $\sigma_v = 18 \text{ MPa}$

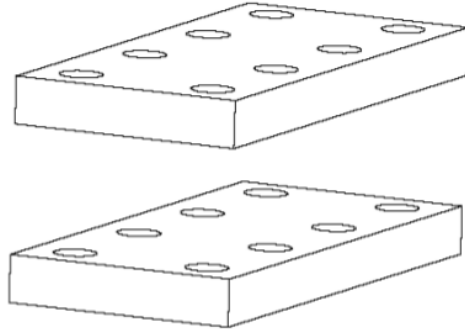


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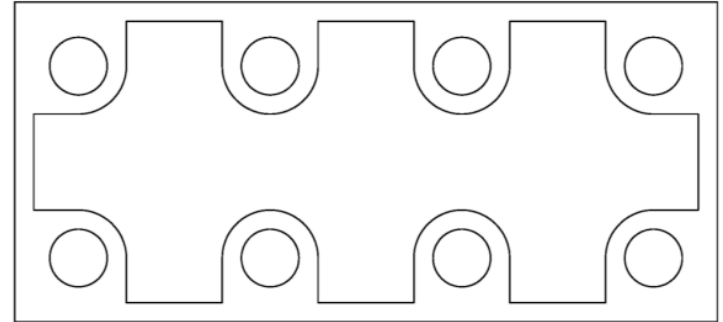
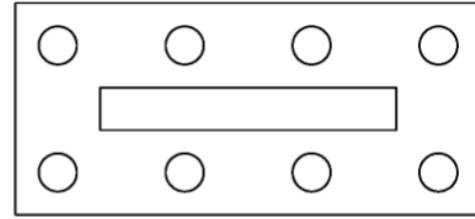


Design 2:

$$A_c = 7888 \text{ mm}^2$$

$$A_p = 11439 \text{ mm}^2$$

$$\sigma_v = 40 \text{ MPa}$$



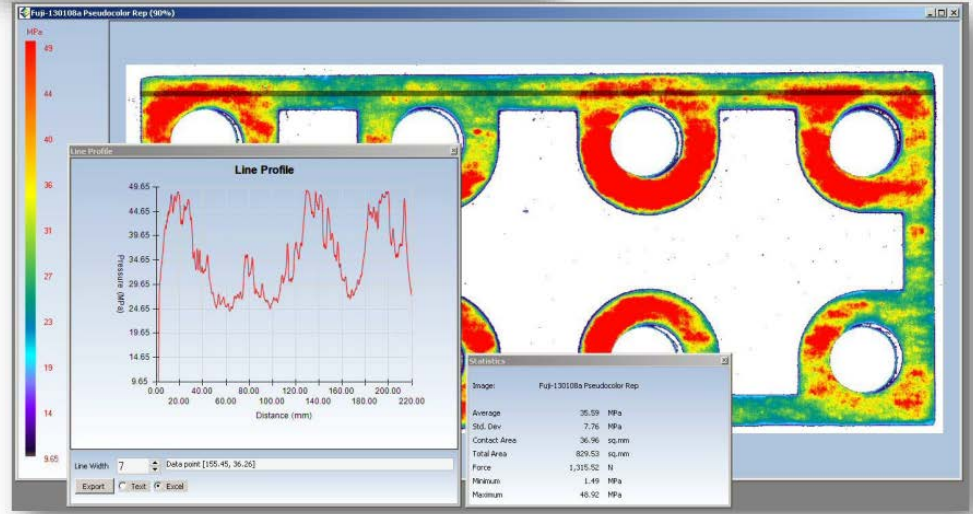
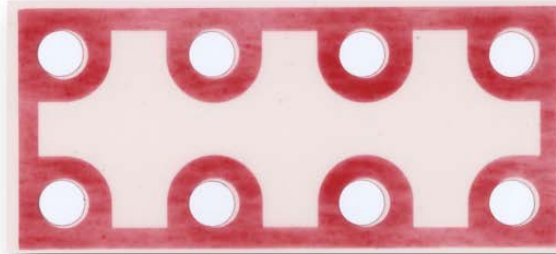
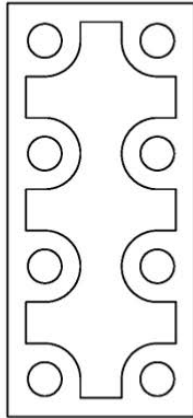
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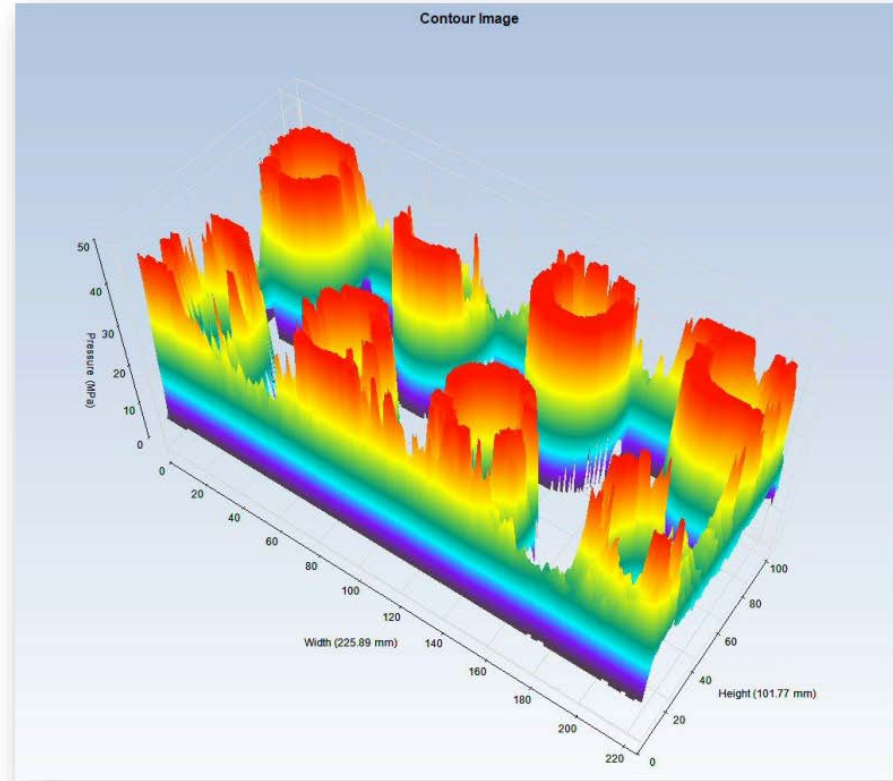
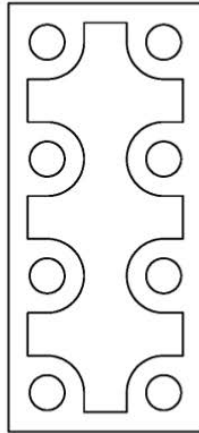
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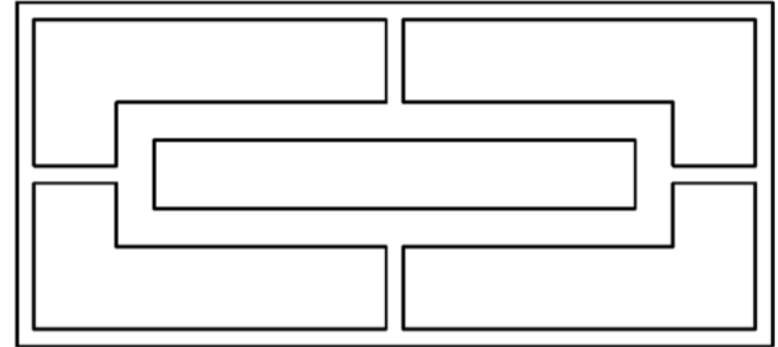
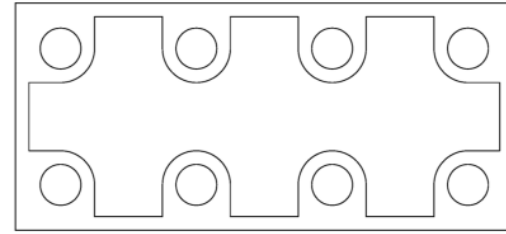
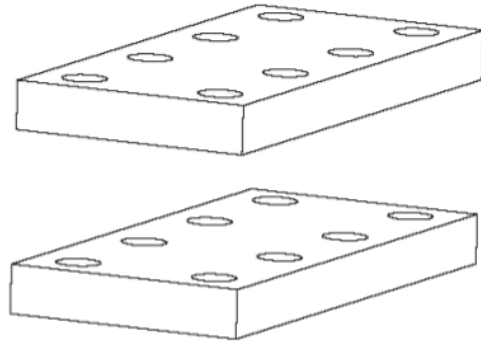
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How do we design gaskets?



Design 3:

$$A_c = 7878 \text{ mm}^2$$

$$A_p = 2520 \text{ mm}^2$$

$$\sigma_v = 40 \text{ MPa}$$

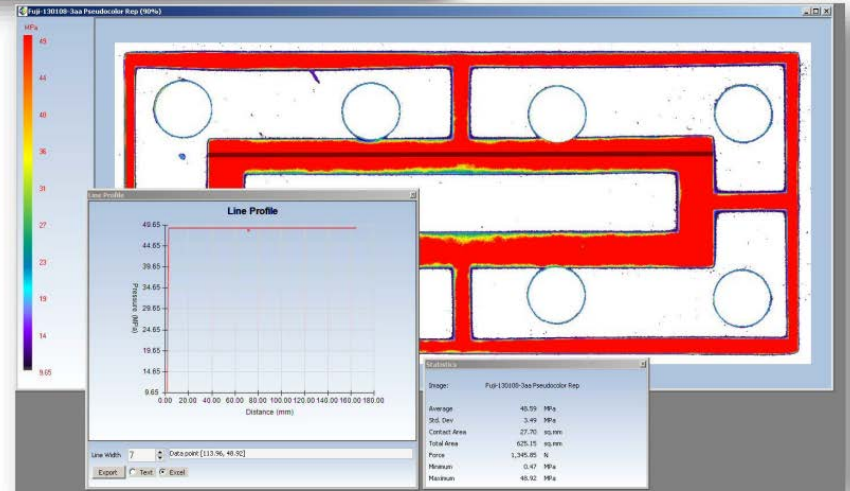
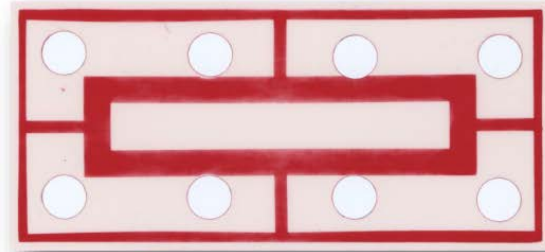
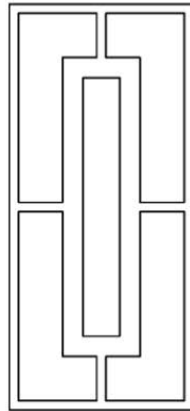
How do we design gaskets?

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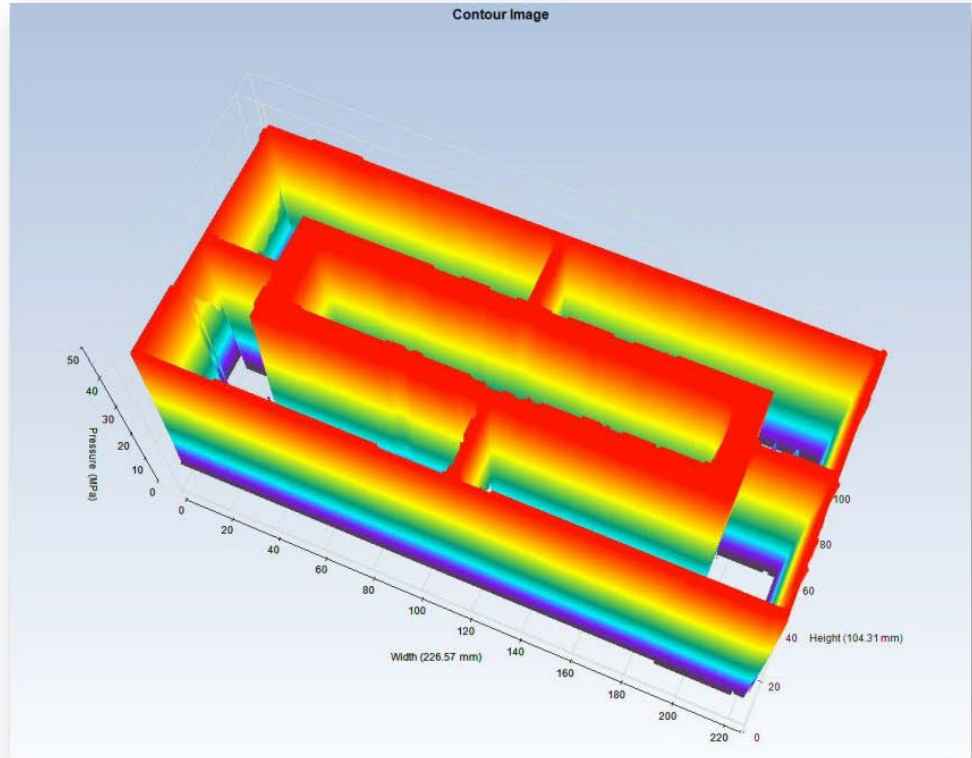
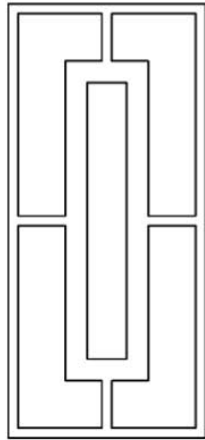
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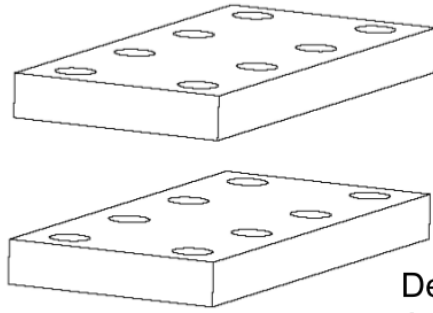
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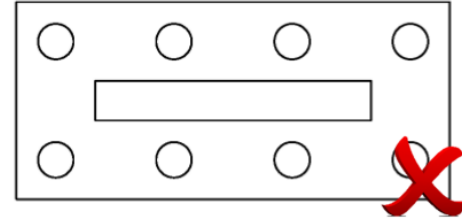
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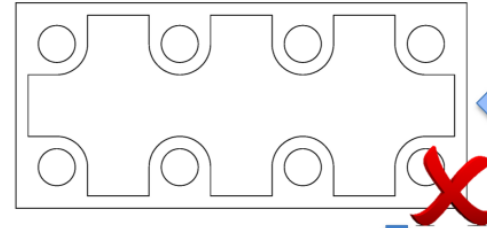
How do we design gaskets?



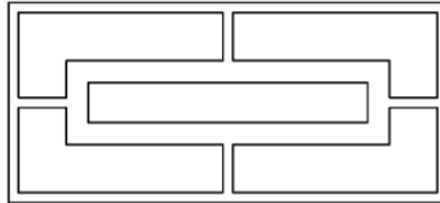
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GREEN AT HEART

0% of Asbestos

High degree of material usage

Recycling

Renewable materials

Constant search and use the most environmentally friendly materials and sealing solutions is required

Installation

- Installation of a gasket is a HUGE part of a reliable flange connection
- Even high quality material have to be used properly, you can not use an axe for writing.
- Following rules and guidelines are critical (cross tightening sequence + 3 stages)
30% -> 60% -> 100%
- After 1h retightening if needed
- Lubricated bolts + washers
- Avoiding over-compression or lack of compression



Maintenance

We all aim to develop and manufacture an engine that works well.

For that purpose we have to do maintenance.

Gaskets have to be:

- Used only once
- Easy to access (gasket kits, flexible production methods)
- Carefully assembled



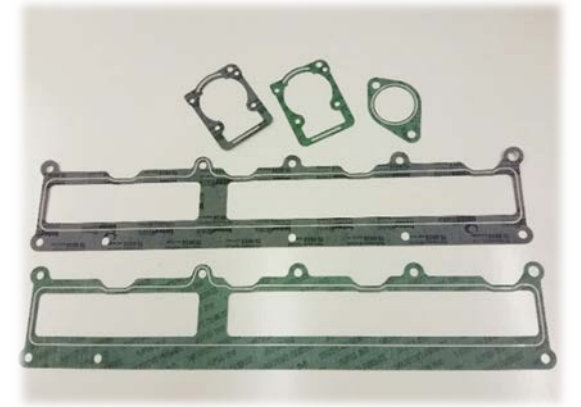
Storage

- ☐ Dry atmosphere , air humidity 30-50%
- ☐ Darkened storage, protected from direct sunlight or near heaters
- ☐ Storage temperature under + 25 C
- ☐ Store gaskets flat, not hanging on pegs or nails or rolled
- ☐ Storage according “First In – First out” principle

Material	Indicative Storage time
Rubber gasket	2-3 year
Rubber cork	2 years
Fiber gasket	3-7 years
Graphite gasket	10-15 years
Semi-Metal Gasket	10 years
Metal gaskets	10 years

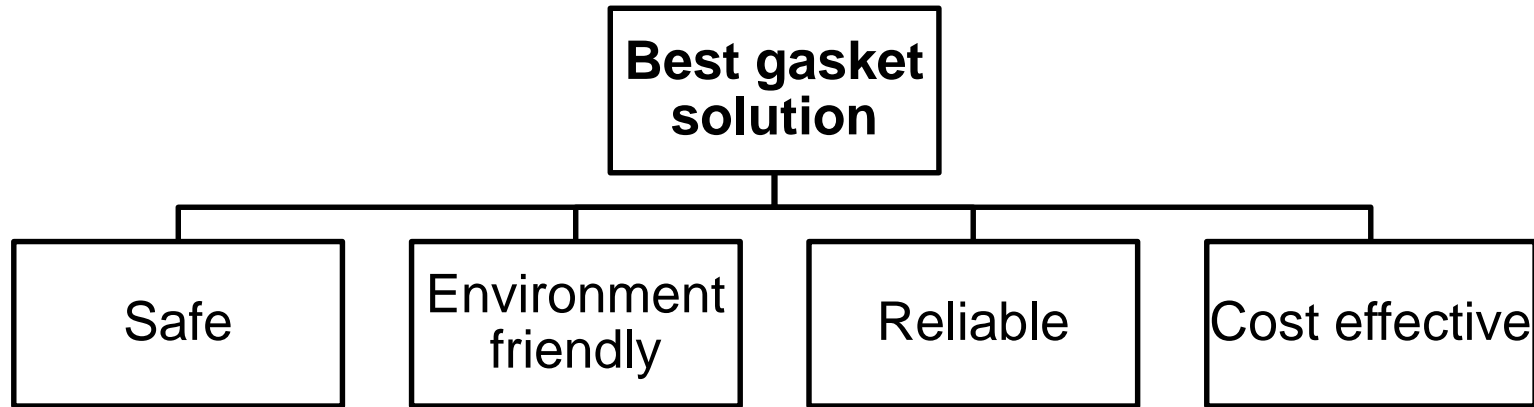
Future of gaskets

- Gaskets are getting more and more complex as technology develops
- Shifting to thinner materials
- Shifting to ecologically friendly materials
- Shifting from using glue and sealing pastes to flat gaskets
- Shifting from hose gaskets and o-rings to flat gaskets with silicone printing



Best sealing solution

The perfect gasket solution hasn't been created yet and remains to be seen if it ever will. However, we can get close to perfection.
We always aim for the best gasket solution in your benefit



TT GASKETS

MODERN SEALING TO IMPROVE YOUR VALUE CHAIN

We work hard to make your life easier



YOUR CONTACT PERSON FOR FURTHER INFORMATION

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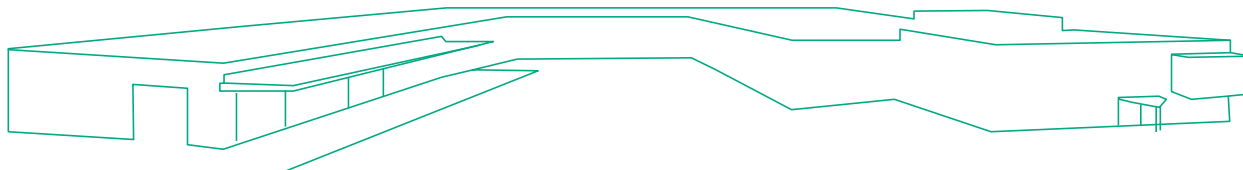
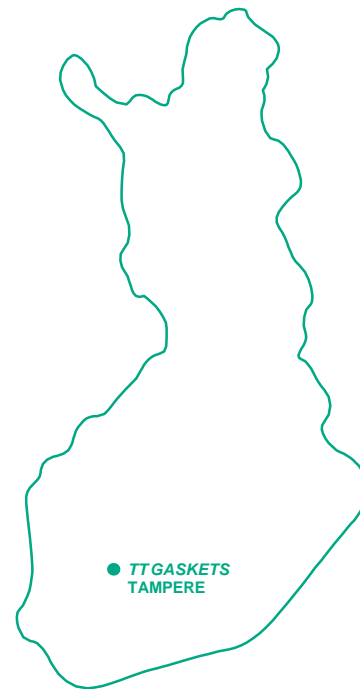
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THANK YOU

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