

novaplan 80

Facing Material for Cylinder Head Gaskets



Manufacturer:	Frenzelit
Material:	novaplan 80
Density	1.15 g/cm³
Sample:	1
Scale:	32 : 1
Position:	←→ Crosswise ↕ Lengthwise

- Technology of production
- Softmaterial Technology
- Material Structure
- Roll-on process
- Typical Mechanical Characteristics

GASKETS

TECHNICAL TEXTILES

EXPANSION JOINTS

INSULATION

NEW MATERIALS

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 **Frenzelit**

creating
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novaplan 80

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Facing Material for Cylinder Head Gaskets

The **novaplan 80** is a member of the third generation of non-asbestos facing materials and has been developed as a material with an excellent price / performance ratio. Due to the high temperature resistant formulation the **novaplan 80** is recommended for applications in the field of Diesel engines, too.

The generally applied production technology for CHG facing materials is the so-called "Fourdrinier-process". This is the most traditional paper-forming process. The formulation of the producible facing material, the pulp, is mixed in water at a concentration of 0.2 to 1.0%, depending on the grade and planned weight of the paper. This mixture is applied over a wide jet onto the surface of a continuously moving wire screen. The water is removed by gravity and with the help of vacuum boxes. After this wet part the first calendering process follows. Then the uniform and unbroken material come to pass the drying and vulcanisation section. This continuous process finishes with the roll-up to big so-called mother rolls with app. 850 kg and an width of app. 2000 mm. It is possible to control the density and the weight (grammage) of the gasket material exactly by an upstreamed X-ray equipment.

The big advantage of this wet-forming process is the high grade of material homogeneity.

This intermediate product - **novaplan 80** - is produced predominantly in a low material density. Through this it is possible to create by the roll-on process the technical required and application deciding roll-on density of the steel core reinforced sandwich or composite material.

For the use as CHG material we recommend our product families **novaplan** and **novatec** with roll-on densities of 1.30 g/cm³ to 1.95 g/cm³, depending on the engine type and the application. By adjustment of the roll-on density it is also possible to create the different requirements concerning the adaptability. With a especially developed software it is possible to calculate the cold and hot setting for **Frenzelit** CHG materials in advance.

Due to the modern basic materials, the development in the process technology and the experiences of **Frenzelit** in working with non-asbestos qualities it is possible to reach emission standards like EURO III and EURO IV.

The carefully selected basic materials of **novaplan 80**,

- Non-asbestos mixture of fibres,
- Organic / inorganic fibres,
- High-quality fillers and
- the developed NBR binding system (sulphur-free, vulcanised),

guarantee high homogeneity, best processability as well as excellent temperature and fluid resistance.

As **novaplan 80** is sulphur-free, the product can be used with all common materials for silicone printing and top coating. For another enhancement of the thermal stability, it is possible to provide the gaskets with all internationally known impregnation mediums.

Starting from a roll-on density of 1.5 g/cm^3 the **novaplan 80** normally can be used without additional impregnation.

A nominal value of 1.6 g/cm^3 is recommended to achieve the mechanical properties according to gasoline engine specifications.

To meet the specification of diesel engines it is necessary to manufacture a roll-on density area of 1.70 g/cm^3 to 1.85 g/cm^3 at the sandwich/composite.

The high performance and thermal stability of **novaplan 80** is also reflected in the frequent application for exhaust gasket.

The below table shows the weights per unit area to reach the typical thicknesses of sandwich / composite.

Frenzelit has samples available in the following weights per unit area:

500 / 634 / 792 / 911 / 987 / 1090 / 1188 / 1291 / 1458 g/sqm

(other grammages upon request)

The CHG facing materials of the current generation, like **novaplan 80** are applicable for all common type of engines. Due to the form stability (low cold and hot setting of the material) a retightening of the bolts is not necessary.

The entire production process is following the regulation for the protection of the environment. It is certified according to ISO 14001/TS16949. We can guarantee a completely non-asbestos product.

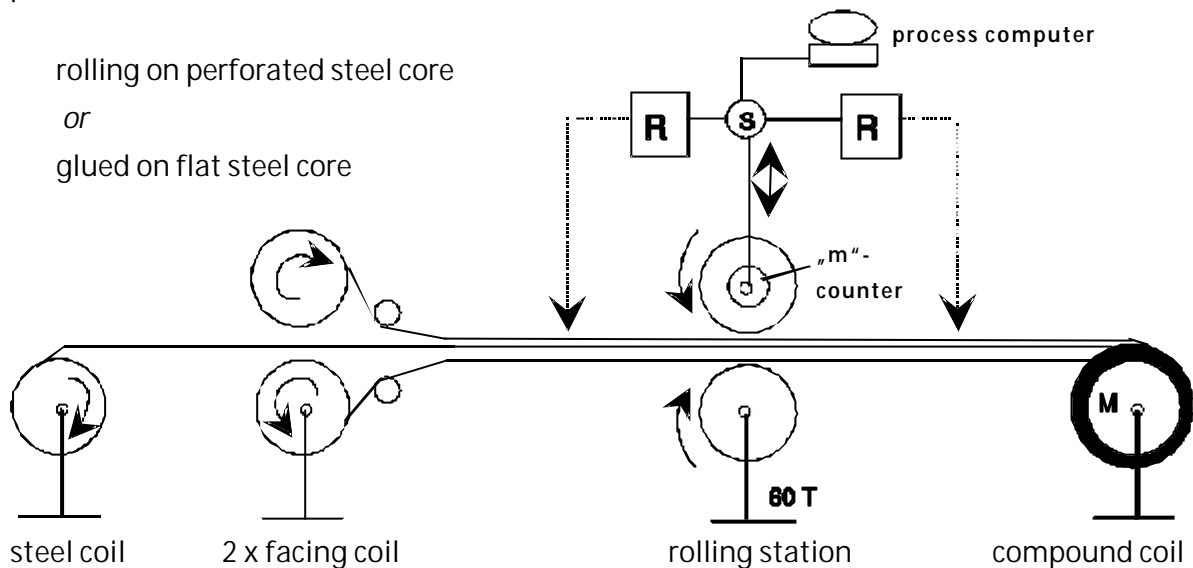
The story of success for **novaplan 80** is also visible due to the fact that the production volume has doubled in the last 3 years.

Frenzelit is well-equipped for solutions as required in practice. Our well-experienced application engineers will give you all necessary advice. Personal discussions always lead to precise proposals.

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Technology for Facing Materials

It is possible to use **novaplan 80** on all common roll-on machinery without any problems.



Roll-on density 1.50 g/cm³

Cylinder head gaskets and secondary soft gaskets
oil or silicon saturation possible
high adaptability

Standard solution 1.60 g/cm³

Cylinder head gaskets for high surface pressure,
high compressive strength and **impregnation-free**, cross-sectional tightness

Diesel 1.65-1.85 g/cm³

Cylinder head gaskets with surface pressures in the critical range (diesel)

Silk screening with silicone or epoxy resin

for locally increasing the surface pressure is possible

Coating with silicone or epoxy resin

for better micro-sealing and antisticking (customer) is possible

Factory-made antistick based on silicone or A 310 (e.g. black)

as standard on rolls is available

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Compressibility / Recovery ASTM F36J

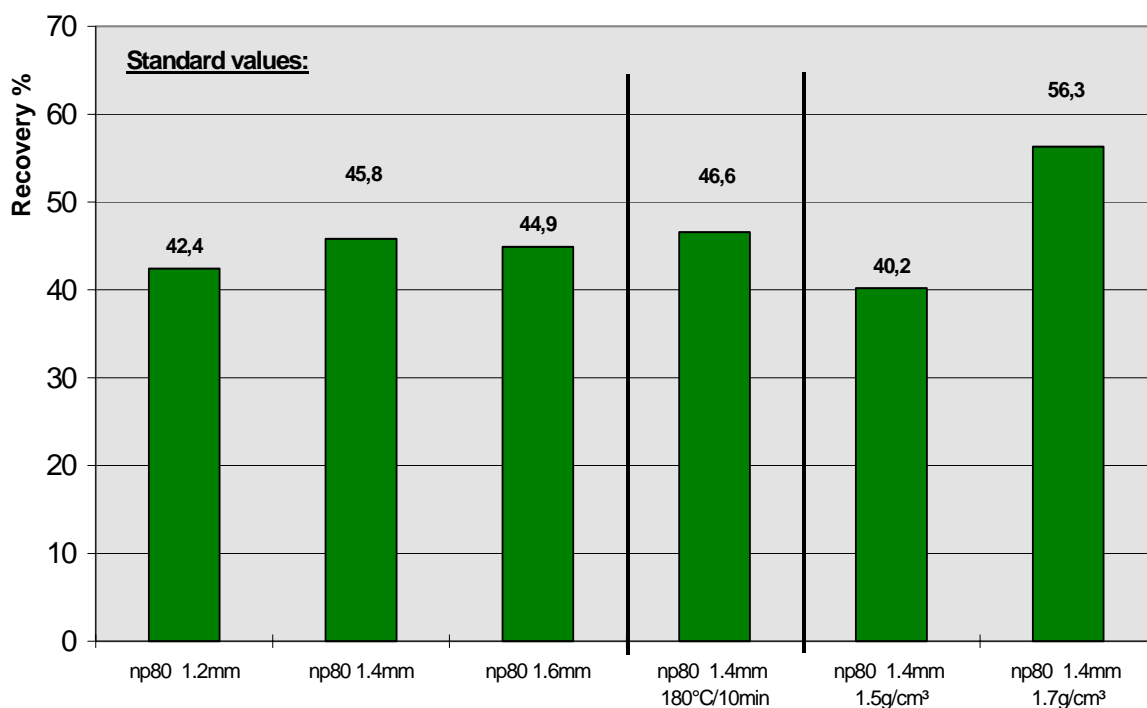
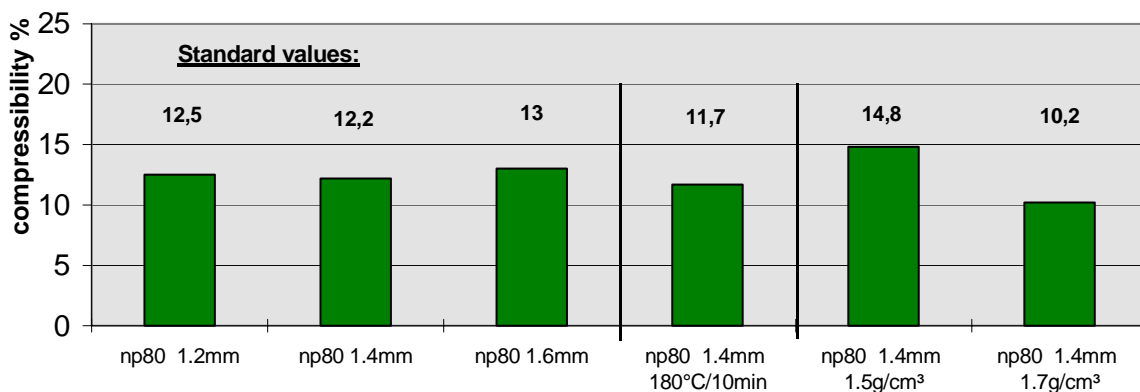
Standard values roll-on density 1.6 g/cm³ (Sandwich without tempering etc):

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- 2 x 792 g/m², tanged metal 0.20mm, SW thickness 1.2 mm
- 2 x 911 g/m², tanged metal 0.25mm, SW thickness 1.4 mm
- 2 x 1069 g/m², tanged metal 0.25mm, SW thickness 1.6 mm

Additional information sandwich 1.4 mm after vulcanisation 180°C / 10 min

Additional information sandwich 1.4 mm, roll-on density 1.5 and 1.7 g/cm³



(typical values)

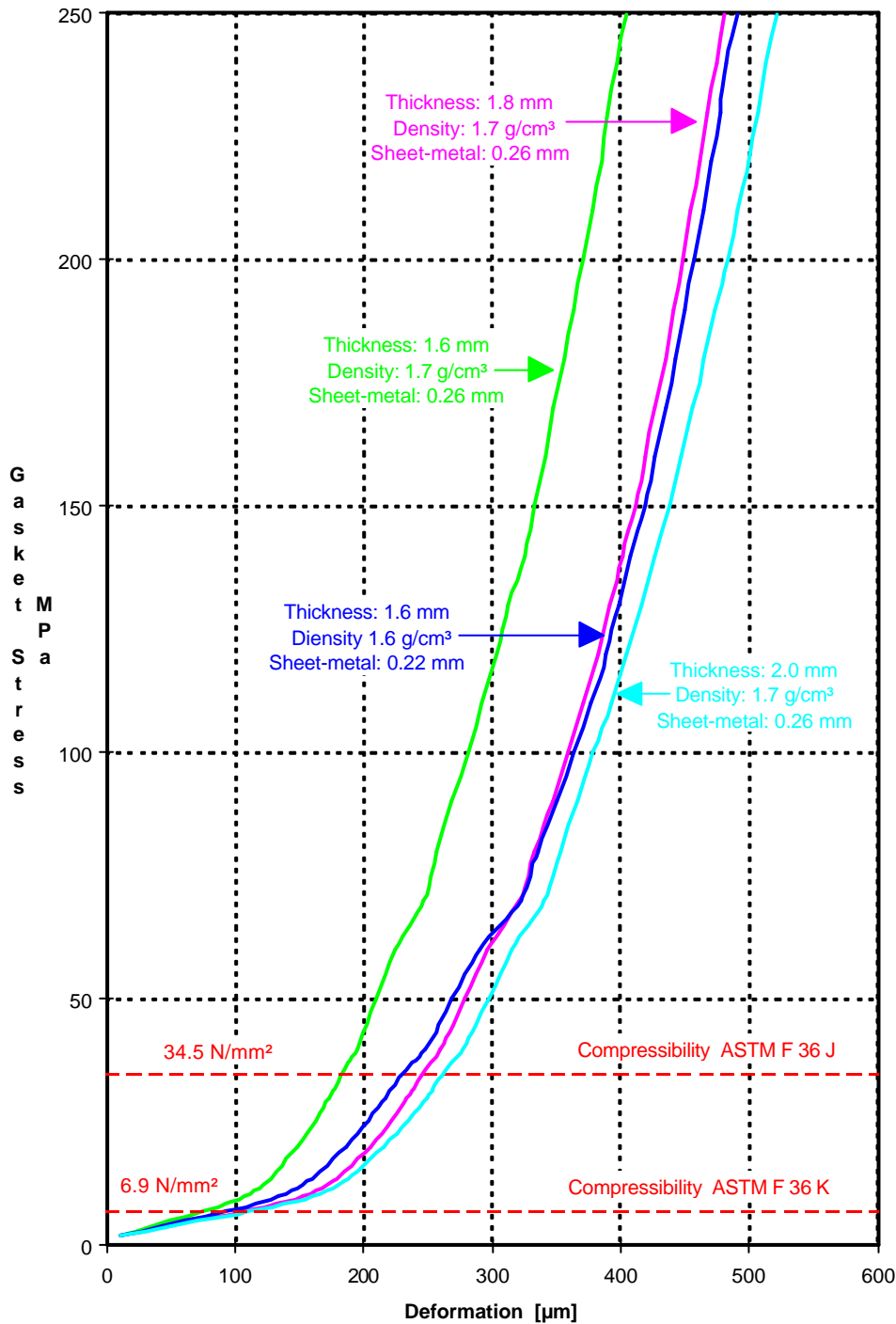
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Cold Deformation Characteristic Cylinder-Head Gasket Body

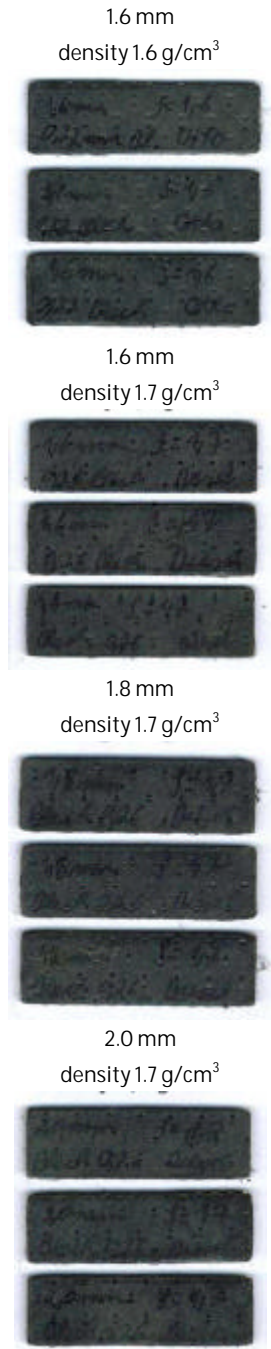
novaplan 80, rolled on 0.26 mm perforated steel core,

rolling density 1.60 g/cm³ (gasoline engine) and 1.70 g/cm³ (diesel engine),

area 3 x 10 mm x 33,3 mm = 1000 mm², area Load 1 – 250 N/mm², Testing Time 50 min.



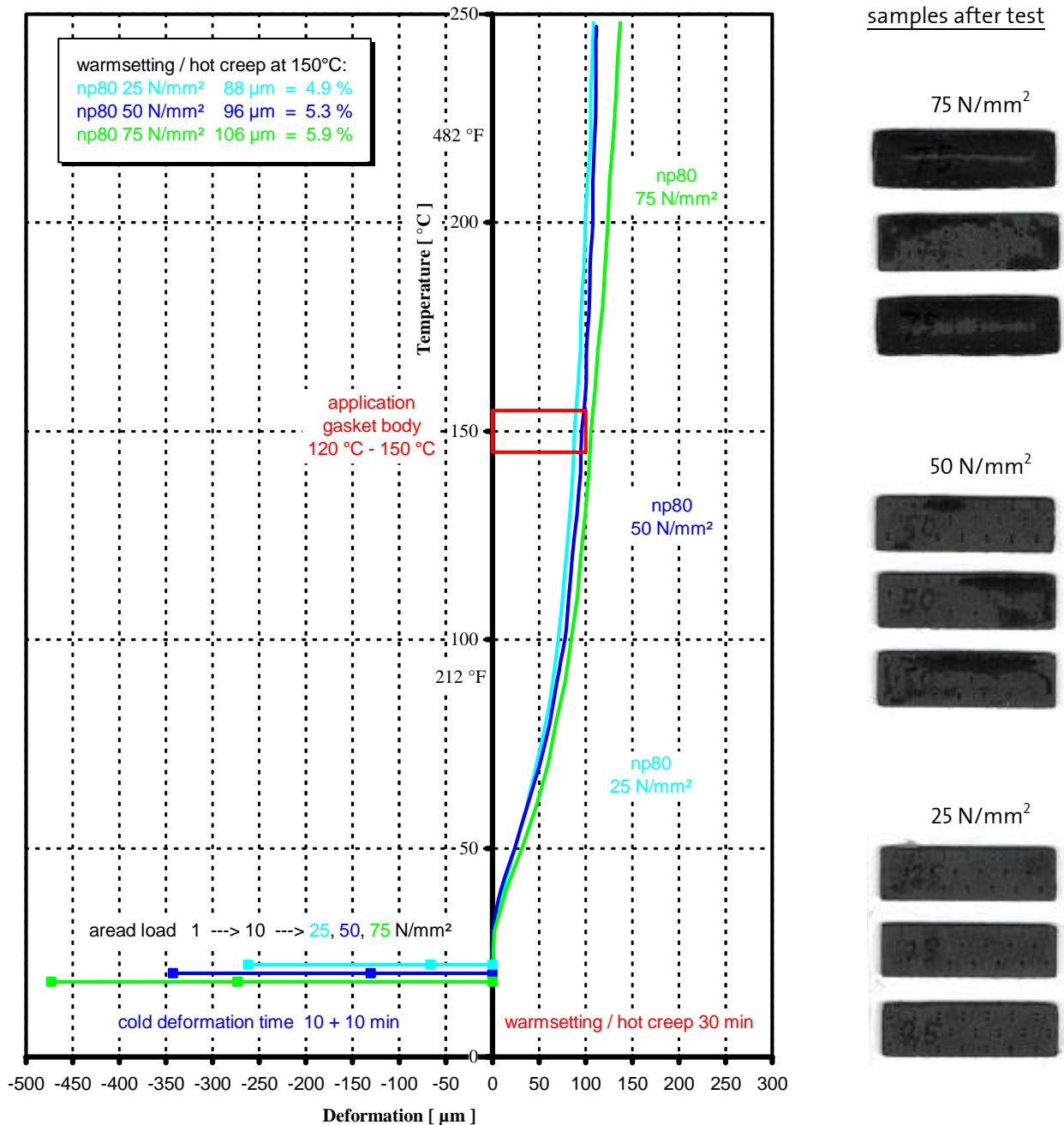
samples after test



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Break Point Test Cylinder-Head Gasket Body

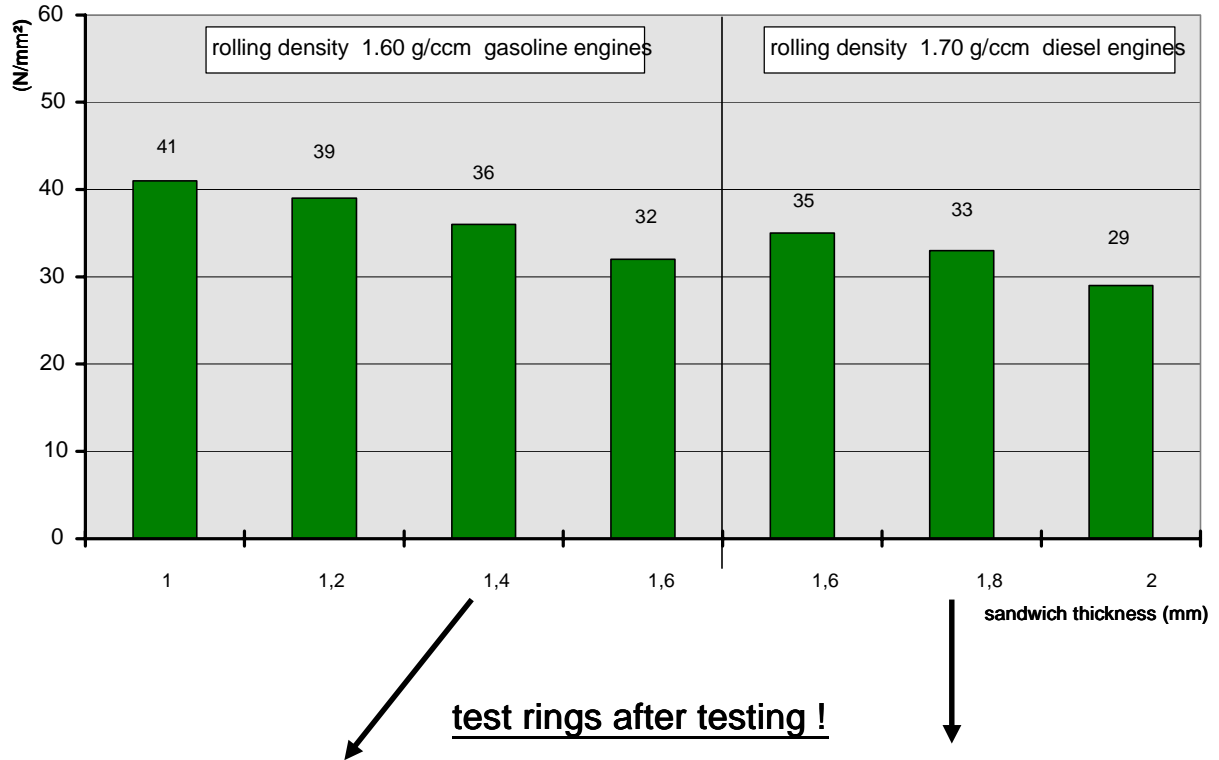
novaplan 80 2 x 1291 g/m², rolled on 0.25 mm perforated steel core, sandwich 1.8 mm, rolling density 1.70 g/cm³ (diesel engine application), test area 3 x 10 mm x 33.3 mm = 1000 mm², area load 1 ⇒ 10 ⇒ max. value, max. temperature 250°C, total testing time 50 min.



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DIN 52913 Residual Stress Test 300°C / 50 N/mm²/22h

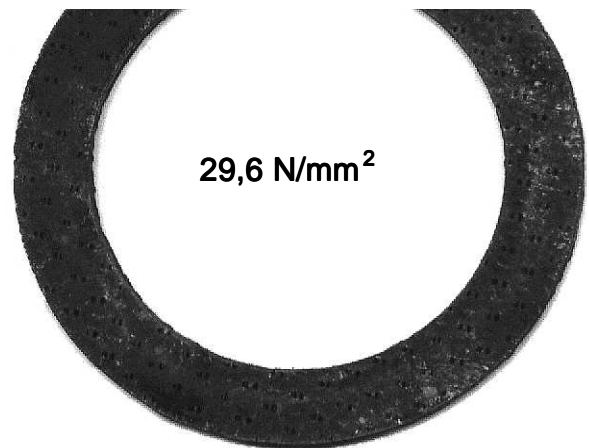
novaplan 80, rolled on steel core, rolling density 1.60 - 1.70 g/cm³



test rings after testing !

35,6 N/mm²

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1.4 mm



29,6 N/mm²

novaplan 80
1.8 mm

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Material profile:

- Facing material for cylinder head gaskets
- The main components are organic/inorganic fibres, high-quality fillers, bound with NBR rubber
- can be used without impregnation
- compatible with all known materials for silk screening/ top coating

Typical applications:

- Steel-reinforced soft material for tanged metal / flat sheet technology especially for the aftermarket
- Secondary gaskets
- intake and exhaust manifold
- Otto carburetor engines
- Diesel engines

Supply data:

Rolls	• 1000 / 1010 or 2000 / 2020mm	Thickness	• from 0.40 to 1.30mm
Outer diameter	• 700mm	Weight / unit area	• 500 - 1500g/m ² (± 4%)
Coils	• from 150 to 2020mm wound on paper coils - inner diameter 70mm or 100mm		
	• Special sizes upon request		

General data	Binders:		NBR, sulphur-free		
	Branding		without branding		
	Anti-stick-coating		optional Anti-Sticking-Coating, A310 black		
	Colour:		black		
	State of vulcanisation:		vulcanised		
Physical properties (Gasket thicken. 0.80mm)	Property		Standard	Unity	Value *
	Density		DIN 28 090-2	[g/cm ³]	1.15
	Tensile strength	longitudinal	DIN 52 910	[N/mm ²]	4.5
		transvers		[N/mm ²]	3.0
	Residual stress $\sigma_{dE/16}$	175°C	DIN 52 913	[N/mm ²]	44
	Compressibility		ASTM F 36 J	[%]	35
	Recovery		ASTM F 36 J	[%]	22
	Loss on ignition	600°C	DIN 52 911	[%]	< 20
	Fluid resistance		ASTM F 146		
		<u>ASTM IRM903</u>	5h/150°C		
		Weight change		[%]	42
		Thickness increase		[%]	4
		<u>ASTM Fuel B</u>	5h/23°C		
	Weight change		[%]	32	
	Thickness increase		[%]	2	
	<u>Coolant/Water (50:50)</u>	5h/100°C			
	Weight change		[%]	48	
	Thickness increase		[%]	5	

* = Mode (typical value)

Issue: 05.02

Modifications: 6

Supersedes all prior versions

The technical data stated has been determined with standard material under laboratory conditions. With the variety of installation and operating conditions no guarantee claim can be inferred regarding the behaviour in a specific application.

We reserve the right to product changes which serve the purpose of technical progress.