

LESS WEIGHT, MORE LOCK

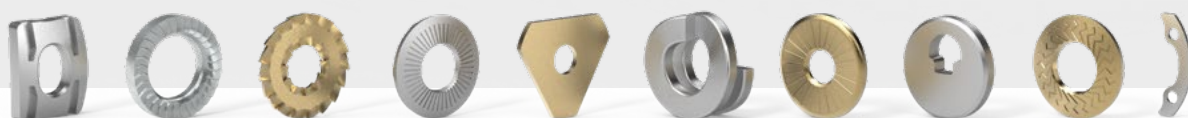


GROWER ECONICAL®

OUR LATEST EVOLUTION

Grower Econical® is the ultimate green evolution of **the standard conical washers**. With a **20% reduction in weight**, this washer offers maximum lightness while

overtaking the performance of the standard conical washers (for example according to **DIN 6796** or **NFE 25-510** standards).



Growermetal
Around ideas

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**GROWER
ECONICAL®**

**LESS WEIGHT,
MORE LOCK**



LIGHTWEIGHT



GREEN



**HIGH
PERFORMANCE**



DURABLE



COST-EFFECTIVE



-20%

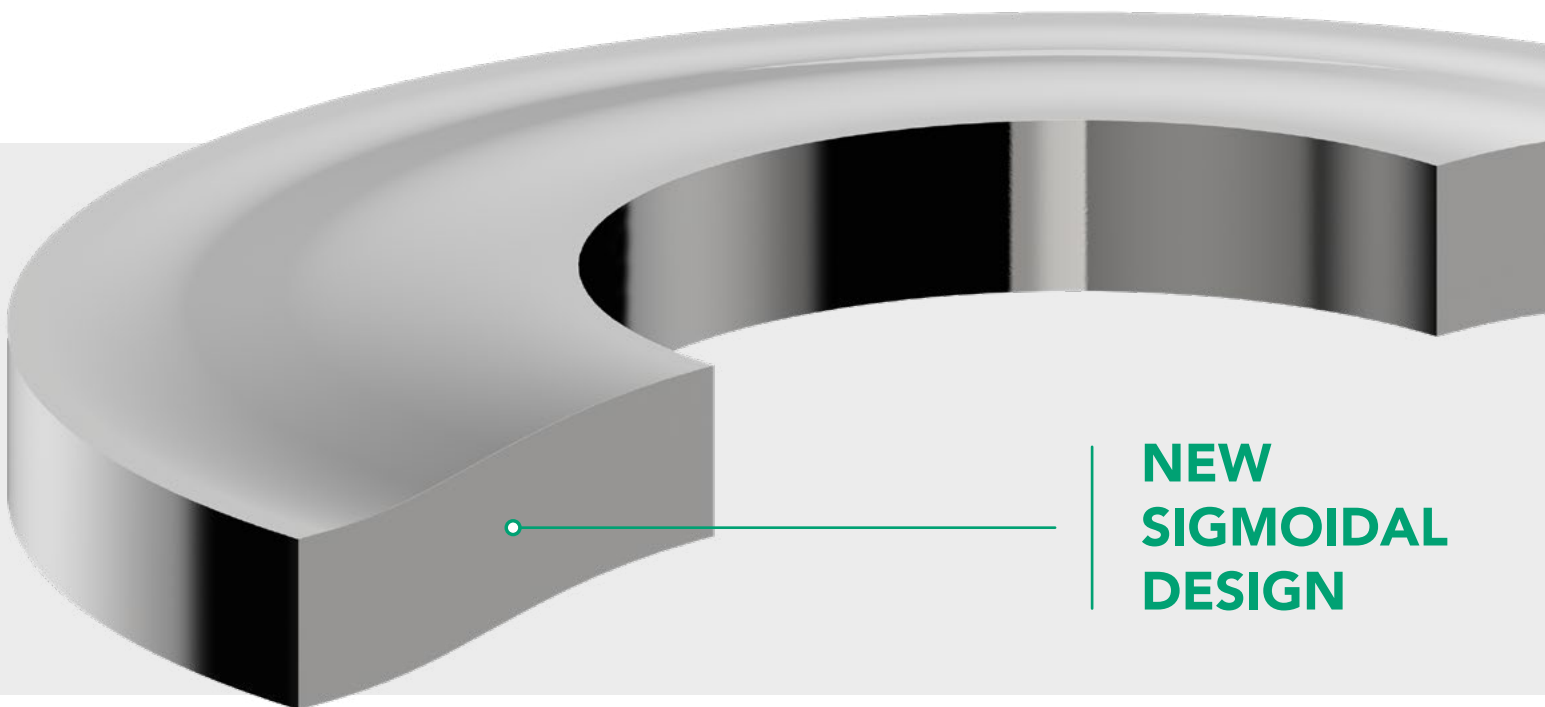
**IN
WEIGHT**

+15%

**OF RESIDUAL
DEFLECTION**

+25%

**OF
SPRING FORCE**



**NEW
SIGMOIDAL
DESIGN**



SUPERIOR SPRING FORCE AND RESIDUAL DEFLECTION

Grower Econical® provides **higher spring force** than standard conical washers (+25% compared to Growermetal's DIN 6796 conical washers), especially near to the flattening point.

The product also shows **improved elastic recovery and higher residual deflection after load release** (+15% compared to Growermetal's DIN 6796 conical washers). This significantly enhances the bolted joint's ability to compensate for gaps and maintain the bolt preload in presence of heat and thermal expansion.

REDUCTION OF SURFACE DAMAGE

The innovative sigmoidal design **removes indentations** at the washer's contact points, protecting both the bearing surface and the bolt underhead from damage, including wear on paint or surface coatings.

20% LESS WEIGHT AND CARBON FOOTPRINT REDUCTION

Grower Econical® is **significantly lighter** than standard conical washers (20% lighter compared to Growermetal's DIN 6796 conical washers), resulting in **raw material saving** and a **reduction in weight**. This contributes to a significant reduction in the product's environmental footprint.

UNIFORM LOAD DISTRIBUTION

The curvature on the upper and lower parts of the washer enables **effective load distribution** over a larger surface, thanks to the **"tilting" action** during tightening.

TECHNICAL FEATURES

Grower Econical® washers are made of **C60 carbon steel** according to **EN 10132 standard**. The parts undergo a **heat treatment** process (quenching and tempering) in order to achieve a **hardness of 430-480 Hv**.

TESTED AND LONG-LASTING EFFECTIVENESS

Simulations and numerous experimental tests carried out on Grower Econical® have demonstrated its excellent performance in terms of **spring force, residual deflection, and uniform load distribution**. Thanks to its sigmoidal design, the product **prevents the risk of indentation and damage** to the bearing surface, allowing for increased reusability.



TECHNICAL DATA SHEET

Screw Size	Dimensions (Øint-Øext-thick) [mm]	Min. Spring Force according to DIN 6796 standard [N]	Growermetal DIN 6796 Spring Force [N]	Grower Econical® Spring Force [N]	Growermetal DIN 6796 Residual Deflection [mm]	Grower Econical® Residual Deflection [mm]
M4	4.30 - 9.00 - 0.80	1'400	1'750	2'100	0.11	0.13
M5	5.30 - 11.00 - 1.00	2'300	2'500	3'100	0.21	0.24
M6	6.40 - 14.00 - 1.20	4'200	5'100	6'300	0.20	0.24
M8	8.40 - 18.00 - 1.60	7'700	9'500	12'500	0.26	0.31
M10	10.50 - 23.00 - 2.00	12'400	15'000	19'000	0.33	0.38
M12	13.00 - 29.00 - 2.40	18'000	25'000	34'000	0.48	0.54
M16	17.00 - 39.00 - 3.20	34'000	47'000	59'000	0.65	0.73
M20	21.00 - 45.00 - 4.00	73'000	115'000	147'000	0.71	0.82
M24	25.00 - 56.00 - 4.80	122'000	165'000	210'000	0.82	0.94

APPLICATIONS

Grower Econical® washer can be used in all industrial applications where **thermal expansion compensation** and the **elimination of clearances** are needed to maintain the

required clamping force in a bolted joint connection.

For **automotive applications**, a version with a **reduced hole** is available for captive pre-assembly with the corresponding bolt.

