



Titus damper

Multipurpose
damping technology

Important Information

Intellectual Property

Titus International reserves all intellectual property rights worldwide for all information contained in this catalogue.

Responsibility

It is the responsibility of the user to ensure the fitness of products for the intended purpose. We recommend assessment through appropriate testing of the application and by technical enquiry with our representatives.

Technical Information

While every effort has been made in the production of this catalogue to ensure the accuracy of information, our products are continually revised and users should confirm the current specification before ordering.

***Non Preferred Articles**

All item numbers in the catalogue marked with * are for non preferred, non stock items available upon special request. For such products, extended delivery times may apply.

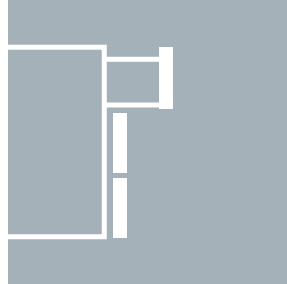
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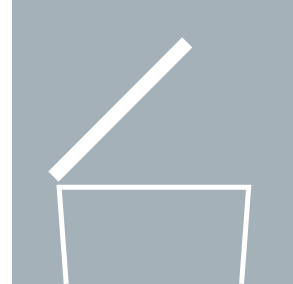
Multipurpose damping technology for high volume applications



Furniture doors



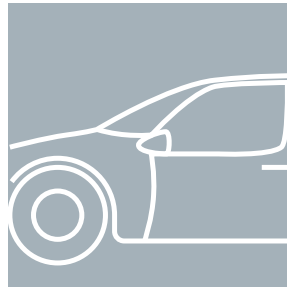
Drawers



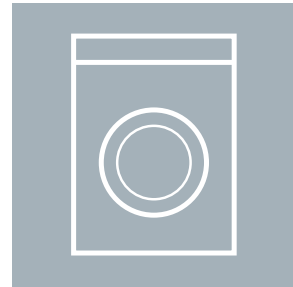
Lids for various purposes



Interior doors



Automotive industry



House-hold appliances
and sanitary equipment

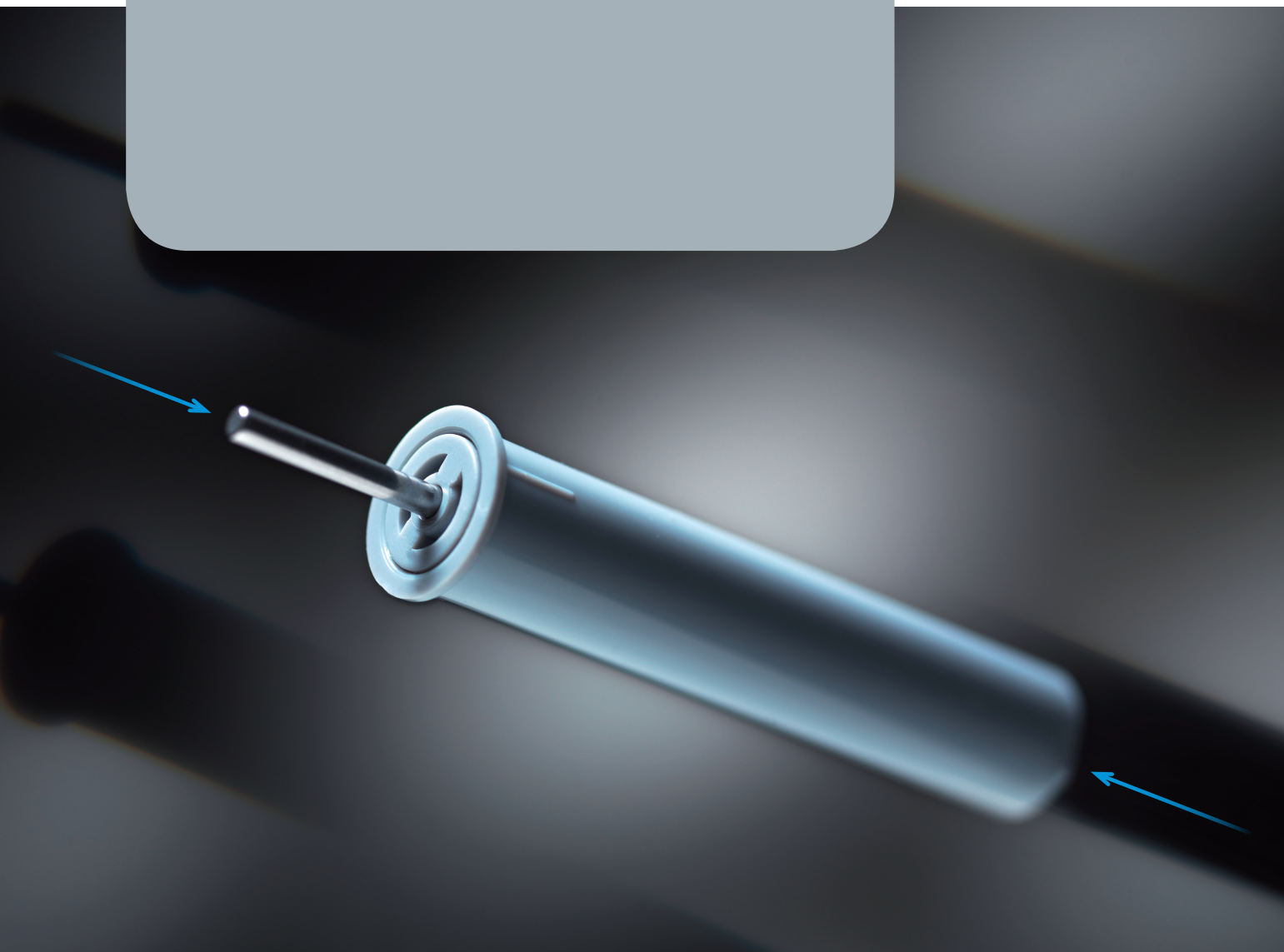
Efficient modular design

- A low number of assembly parts enables quick development of customised solutions
- Engineered for efficient and high precision manufacturing
- Wide range of applications
- Customised solutions for various furniture and other applications

Uniform damping action

- Smooth and even soft closing action
- Reliable damping at any closing speed

Titus damper



Life-long consistent damping

- Life-time warranty

Quality

- Integrated quality checks assure consistency over high volume production runs
- Sealing process prevents oil leakage

Fully integrated manufacturing

- Titus Group has the competence, experience and resources to offer support in all phases of the product life-cycle; from product design to efficient high volume manufacturing
- All manufacturing phases at one location

Damping technology

Design and functional principles

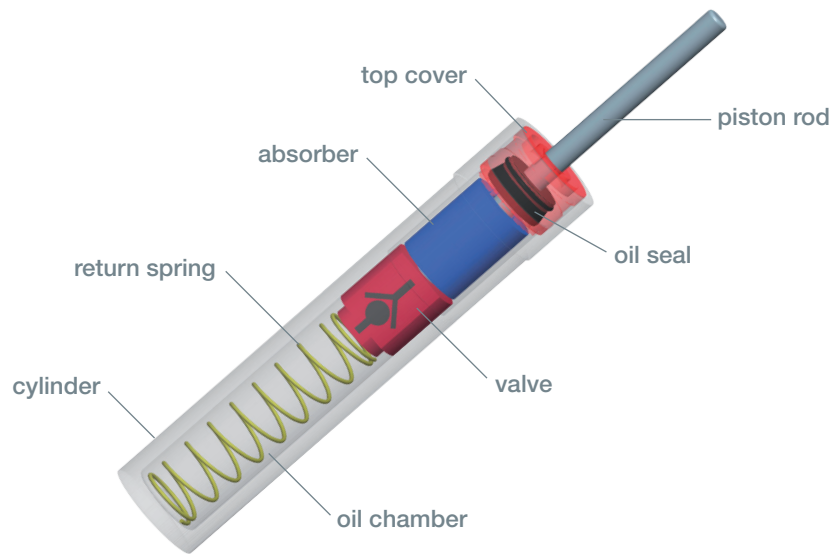
Titus dampers slow down linear or rotary movement before reaching a resting position.



Functional principles

By converting kinetic energy into thermal energy, hydraulic dampers reduce hard shocks and oscillation amplitudes. In a linear damper, the kinetic energy of the moving object is transferred through the steel rod to the valve in the damping cylinder.

Hydraulic fluid is pushed through the valve and heat is generated. As the spring returns the valve to its original position hydraulic fluid flows back into the damping chamber.



Types of dampers

Titus dampers are single-directional linear hydraulic dampers.

Types of dampers

Linear, hydraulic

Operation

smooth, released

Operating temperature

0 to 40 °C (32 °F to 104 °F)
0 to 120 °C (32 °F to 248 °F)

Storage temperature

-20 °C to 70 °C (-4 °F to 158 °F)
-20 °C to 120 °C (-4 °F to 248 °F)

Piston rod material

Stainless steel

Product range-stroke

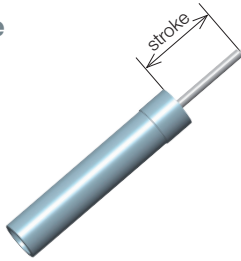
Short stroke dampers (stroke up to 16 mm)
Long stroke dampers (stroke from 16 mm to 52 mm)

Product range-size

Standard product range:
Ø 8, Ø 9, Ø 10
Customised solutions

Application

Stroke



S Series

Short stroke dampers are dampers with a maximum stroke of 16 mm. They are suitable for solutions requiring the damping action to be spread over a short course.

L Series

Long stroke dampers have a stroke greater than 16 mm. They are suitable for solutions that require the damping action to be spread over a long course.

Long stroke dampers are usually needed for systems with heavier weights or faster initial speeds.

Areas of application

Interior home or commercial application



swinging doors



drawers, pull-out systems in base cabinets, pantry pull-out systems, office filing systems, waste bin pull-out systems



lift-up doors



drop-down doors



sliding doors



interior doors



house-hold appliances



bathroom and sanitary equipment

Automotive industry



Various other purposes

Standard range

Overview

Technical details

Diameter of cylinder	8 mm, 9 mm, 10 mm
Damping forces (at 12 mm/s)	from 4 N to 400 N
Standard stroke lengths	from 10 mm to 52 mm
Damper type	Hydraulic
Damping characteristics	Flat, ramp, reverse ramp
Operating temperature	0 to 40 °C (32 °F to 104 °F) 0 to 120 °C (32 °F to 248 °F)
Storage temperature	-20 °C to 70 °C (-4 °F to 158 °F) -20 °C to 120 °C (-4 °F to 248 °F)
Material of piston rod	Stainless steel
Material of cylinder	Plastic

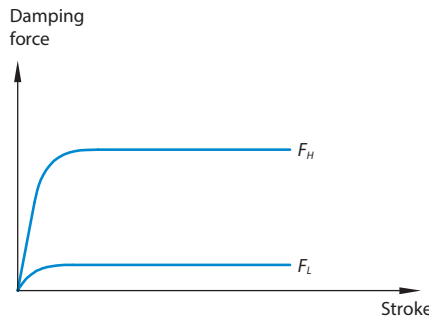
For optimal damping performance standard dampers can be customised with: damper connection, damping force, damping characteristics, body colour, type of self closing mechanism.

Piston rod return (resetting)

Automatic – with spring
The piston rod is automatically reset by the internal spring.

Mechanical – without spring
The piston rod is manually pulled out into the starting position.

Operating scope



- High coefficient γ of Titus damper assures efficient damping at any closing speed
- Damping force can be easily adapted to customer needs

$$\gamma = \frac{F_H}{F_L}$$

F_H - damping force at slam speed (12 mm/s)

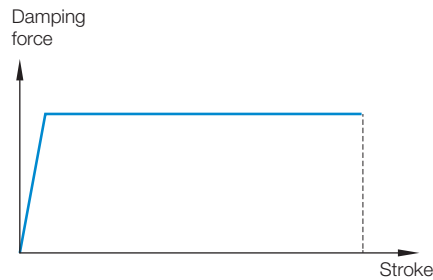
F_L - damping force at slow speed (1 mm/s)

Reliable damping and closing at any speed



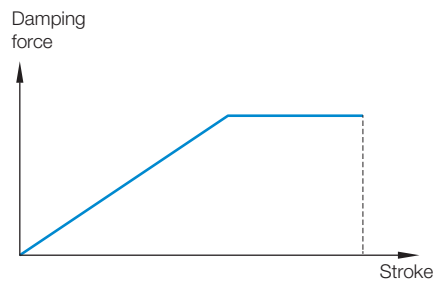
Higher coefficient γ means reliable damping at high speed and ensures that the system will reach its final position even at very slow speed.

Damping action

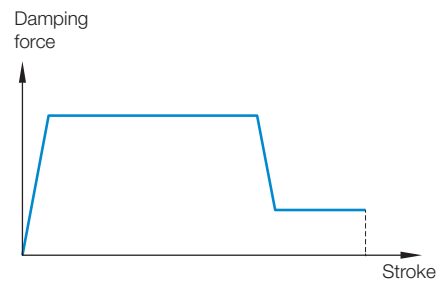


Flat damping curve shows the uniform action produced during damper closing at a defined speed.

- Even and smooth soft closing action
- Soft and reliable closing



Ramp damping curve shows the progressive action produced during damper closing at a defined speed.

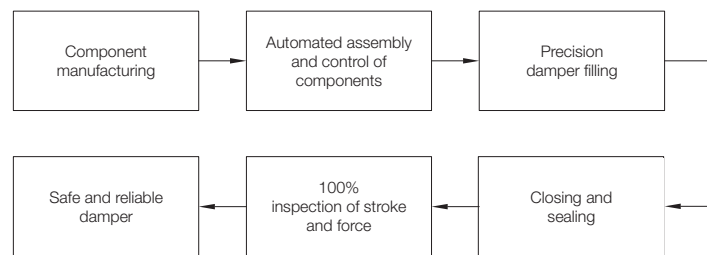


Reverse damping curve shows the uniform action produced during damper closing at a defined speed and drop of the force before the damper reaches the end position.

Quality control system

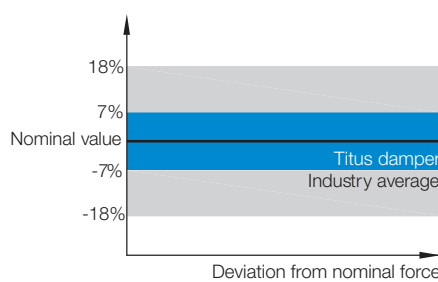
100% quality check of all dampers

- High precision manufacturing
- Automated assembly technology minimises variations in performance
- Integrated 100 % quality checks ensure consistency over high volume production runs
- Proprietary assembly and quality assurance equipment



Process chart

Force consistency



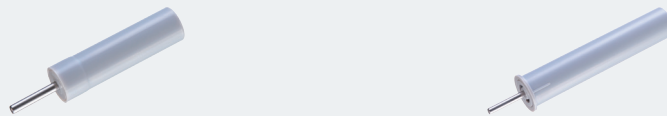
- Full control over all phases of manufacturing process
- Quality system management

Standard deviation measured on a sample of 1000 pcs

Standard range

Product guide

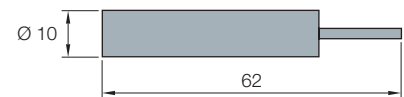
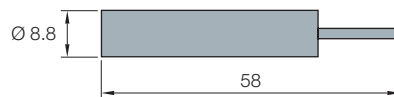
Product group S Series - Short stroke dampers
Product For standard temperature range



Technical characteristics

Length (mm)	42	50
Ø piston rod (mm)	2	2
Ø cylinder (mm)	8	10
Max. stroke (mm)	16	12
Max. damping force (N)	60	80
Damping characteristics	flat, ramp	flat, ramp
Piston rod return	spring	spring
Operating temperature	0 °C to 40 °C (32 °F to 104 °F)	0 °C to 40 °C (32 °F to 104 °F)
Storage temperature	-20 °C to 70 °C (-4 °F to 158 °F)	-20 °C to 70 °C (-4 °F to 158 °F)
Material of the piston rod	Stainless steel	Stainless steel
Damper type	hydraulic	hydraulic

*Space requirements



Stroke limits



*Space requirements = Minimum extent of space required to place the damper



Titus dampers can be altered for customised solutions

For additional information please contact Titus group representative or submit the criteria form available on www.titusplus.com

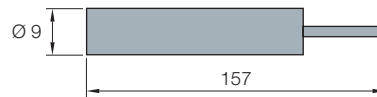
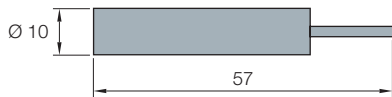
L Series - Long stroke dampers

For extended temperature range

For standard temperature range



	42	97
	2	2
	10	9
	16	50
	400	10
	flat, ramp	flat, ramp, reverse ramp
	spring	mechanical
	0 to 120 °C (32 °F to 248 °F)	0 °C to 40 °C (32 °F to 104 °F)
	-20 °C to 120 °C (-4 °F to 248 °F)	-20 °C to 70 °C (-4 °F to 158 °F)
	Stainless steel	Stainless steel
	hydraulic	hydraulic


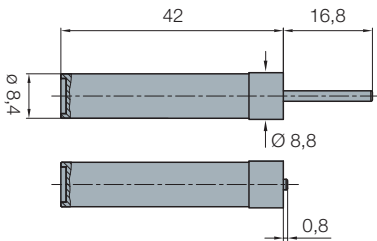

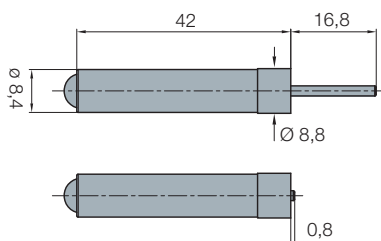

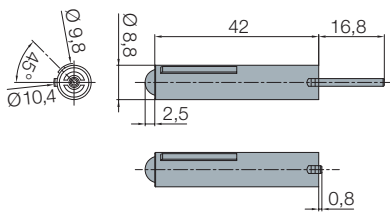


S Series

For standard temperature range

- Series of standard dampers for various applications requiring low force
- Applications: furniture doors, various lids
- Damping force, stroke and damping characteristics can be tuned to customer requirements



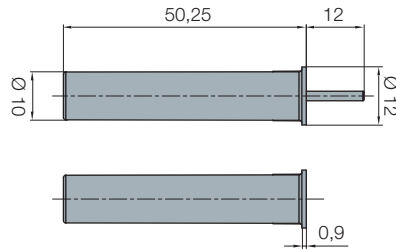
Technical details		Working stroke (mm)	Damping force at v = 12 mm/s (N)	Piston rod return	Damping characteristics	Item number																				
SD 42 – 8 – 16  		16	45	spring	flat	963.0X31																				
Damping characteristics → see page 7																										
SD 42 – 8 – 16 with rubber tip  		16	45	spring	flat	963.0X20																				
Damping characteristics → see page 7																										
Dampers with rubber tips should be used if object of damping comes in direct contact with the damper. The tip softens the impact.																										
SD 42 – 8 – 16 with rubber tip adjustable  		16	17	spring	flat	963.0F20																				
Damping characteristics → see page 7																										
Dampers with rubber tips should be used if object of damping comes in direct contact with the damper. The tip softens the impact.																										
<table border="1"> <tbody> <tr> <td>16</td> <td>28</td> <td>spring</td> <td>flat</td> <td>963.0F21</td> </tr> <tr> <td>16</td> <td>35</td> <td>spring</td> <td>flat</td> <td>963.0X37</td> </tr> <tr> <td>16</td> <td>45</td> <td>spring</td> <td>flat</td> <td>963.0X26</td> </tr> <tr> <td>16</td> <td>60</td> <td>spring</td> <td>flat</td> <td>963.0X73</td> </tr> </tbody> </table>							16	28	spring	flat	963.0F21	16	35	spring	flat	963.0X37	16	45	spring	flat	963.0X26	16	60	spring	flat	963.0X73
16	28	spring	flat	963.0F21																						
16	35	spring	flat	963.0X37																						
16	45	spring	flat	963.0X26																						
16	60	spring	flat	963.0X73																						

- Final dampers for various applications in areas with higher force
- Applications: furniture doors (swinging, lift-up, drop-down), various lids
- Damping force, stroke and damping characteristics can be tuned to customer requirements



Technical details

SD 50 – 10 – 12



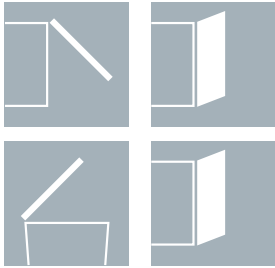
Working stroke (mm)	Damping force at v = 12 mm/s (N)	Piston rod return	Damping characteristics	Item number
12	43	spring	flat	960.0K17
12	60	spring	flat	960.0K11
12	80	spring	flat	960.0K20

Damping characteristics → see page 7

S Series

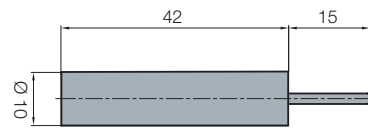
For extended temperature range

- Series of short stroke dampers for various application in areas with bigger temperature fluctuations and areas where higher damping force is required
- Applications: kitchen ovens, refrigerators, heavier furniture doors or lids, toilet seats
- Damping force, stroke and damping characteristics can be tuned to customer requirements



Technical details

SD 42 - 10 - 15



Working stroke (mm)	Damping force at v = 12 mm/s (N)	Piston rod return	Damping characteristics	Item number
15	150	spring	flat	960.0T30
11	280	spring	flat	960.0X98
15	200	spring	flat	960.0N70
15	240	spring	flat	960.0N29

Damping characteristics → see page 7

L Series

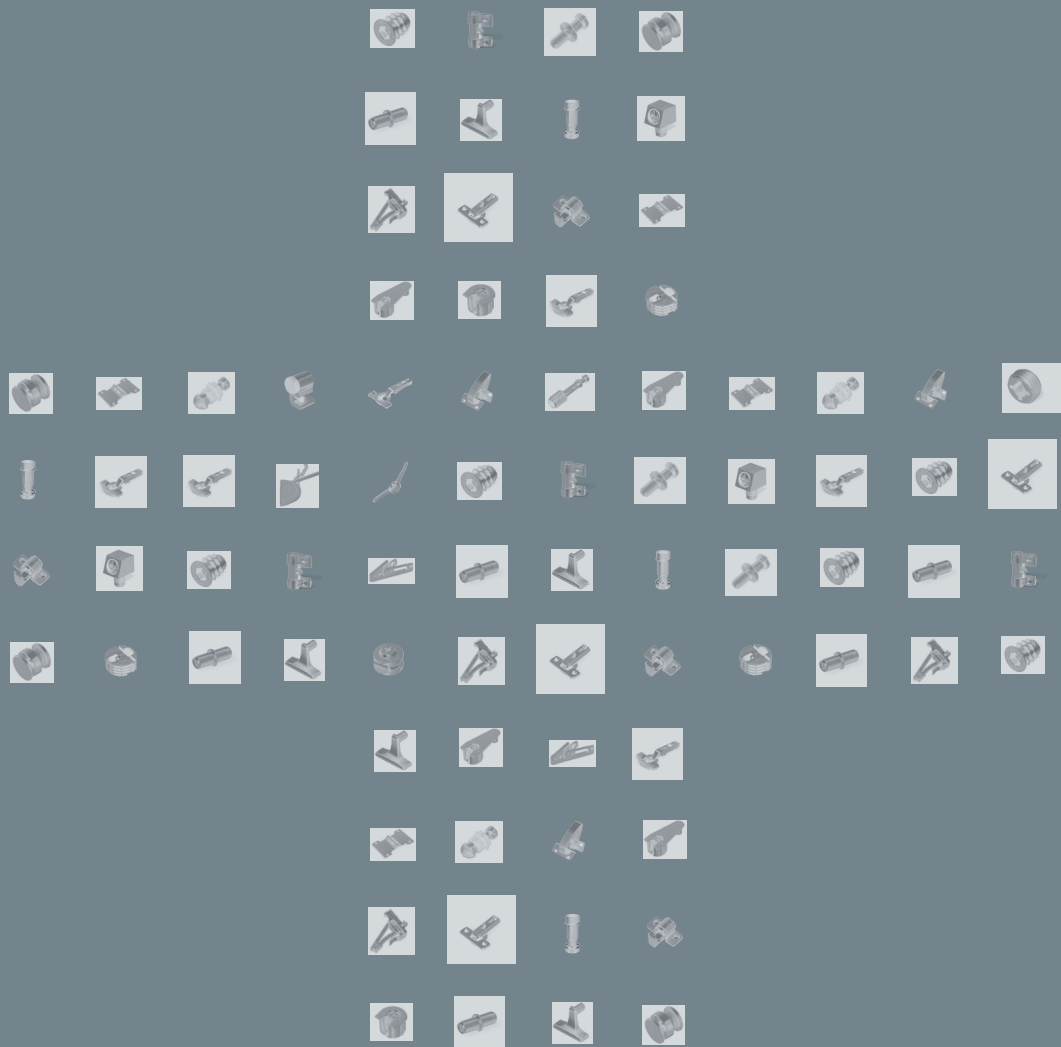
For standard temperature range

- Long stroke dampers have a longer path of damping at a low force - smooth, reliable damping
- Applications: sliding doors, drawers and other applications with sliding motion
- Damping force, stroke and damping characteristics can be tuned to customer requirements



Technical details		Working stroke (mm)	Damping force at v = 12 mm/s (N)	Piston rod return	Damping characteristics	Item number
LD 97 - 9 - 50 		50	4	mechanical	flat	961.0V32
		50	7	mechanical	flat	961.0X53
		50	9	mechanical	flat	961.0X54
<i>Damping characteristics → see page 7</i>						
LD 86 - 9 - 40 		40	4	mechanical	reverse ramp	961.0X52
	<i>Damping characteristics → see page 7</i>					
LD 97 - 9 - 50 with connection 	Connection A	50	4	mechanical	flat	961.0V31
		50	7	mechanical	flat	961.0X49
		50	9	mechanical	flat	961.0X48
	Connection B	50	4	mechanical	flat	961.0V36
	<i>Damping characteristics → see page 7</i>					
Connection can be customised						

The Titus Group profile



Titus Group Strategy

Vision

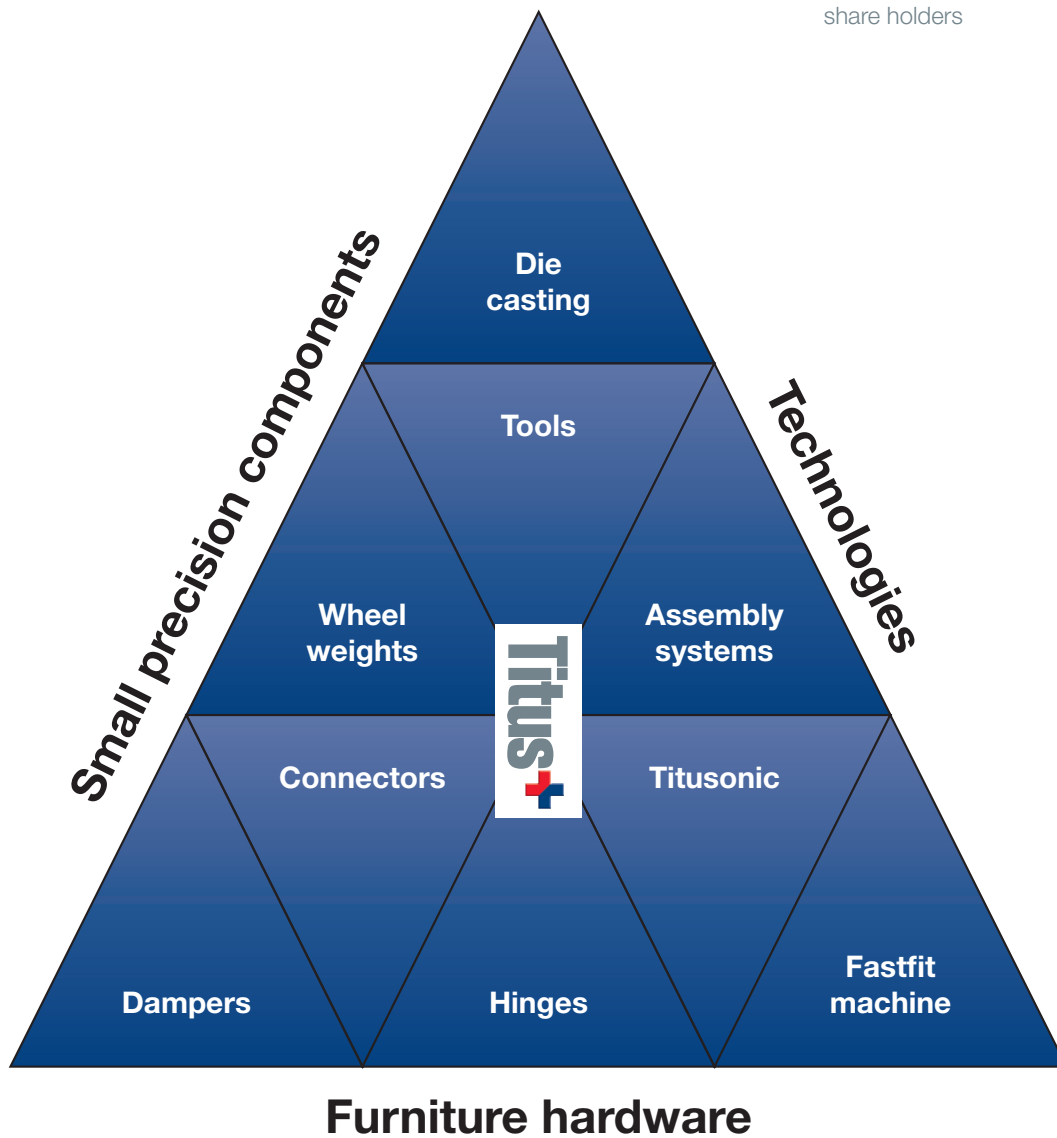
The world's best engineering for small components

Mission

To provide manufacturers with components solutions that improve competitiveness

Titus Business Philosophies and Principles

- Gain total knowledge of our customers and their markets
- Focus on identifying and creating high volume component niches
- Meet our customers expectations with global consistency
- Build long term associations with customers, suppliers, colleagues and share holders



Titus Technologies

- Automation systems
- Die Cast Technologies
- Tooling
- Ultrasound fastening technology

Titus Components

- Dampers
- Automotive components

Titus Furniture Hardware

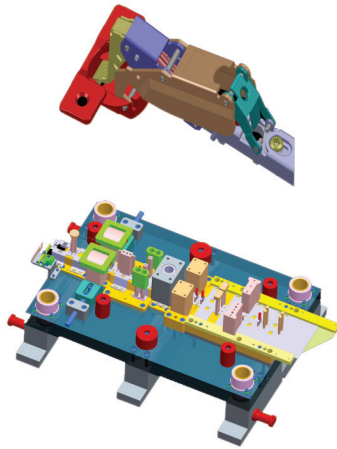
- Connectors
- Concealed hinges
- Soft closing systems

Fully Integrated Manufacturing

Experience and resources to support all phases of the product life cycle

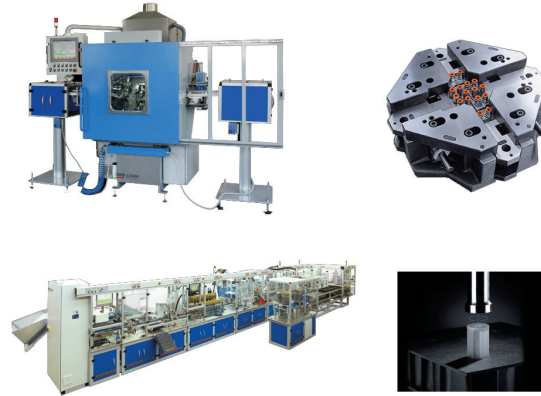
Product design

Design and engineering of unique components



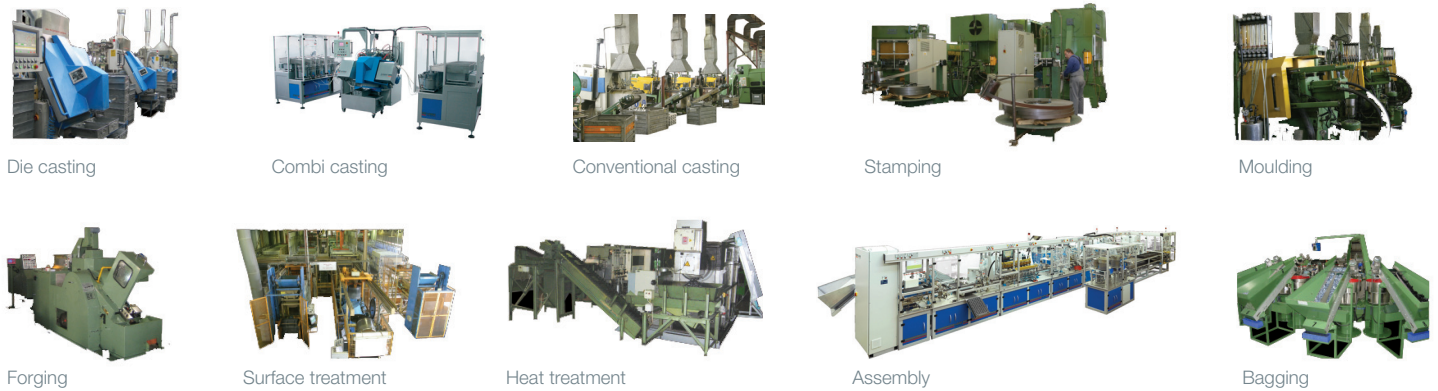
Technologies

Unique solutions to improve productivity and product quality



Manufacturing operations

All key technologies and services required for high volume production of small components available in-house



High volume components

Manufacture of high volume precision components of consistent quality



Global manufacturing capabilities

Global manufacturing capability and support of Titus Group
Certified according to ISO 9001:2008 and 14001:2004



Quality

We believe that the Titus Group Mission is achieved most effectively through the management of our design, manufacturing and service activities in conformance with the internationally recognised ISO 9001:2008 standard for quality management.

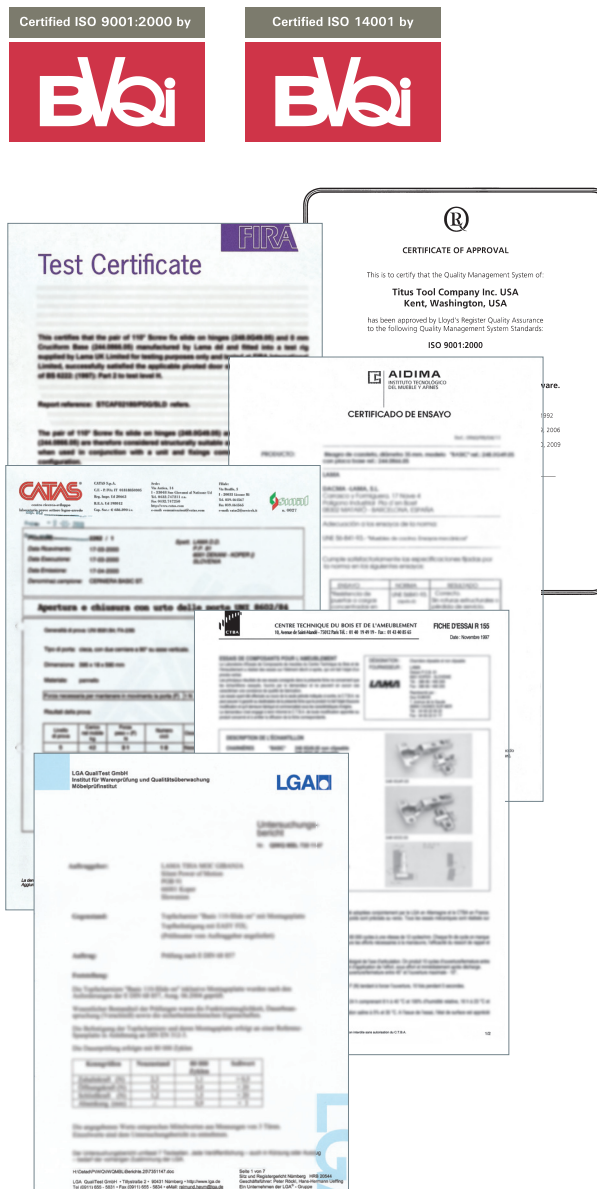
Quality has a broad meaning for us: it is our guide to the selection of materials, work, processes, internal relations and cooperation with our partners.

Environment

Our policy is to ensure that all our activities conform to an environmental management system within the guidelines of the International Standard ISO 14001:2004. Measures to prevent or minimise the impacts our activities may have on the environment are integrated within all Titus Group business functions.

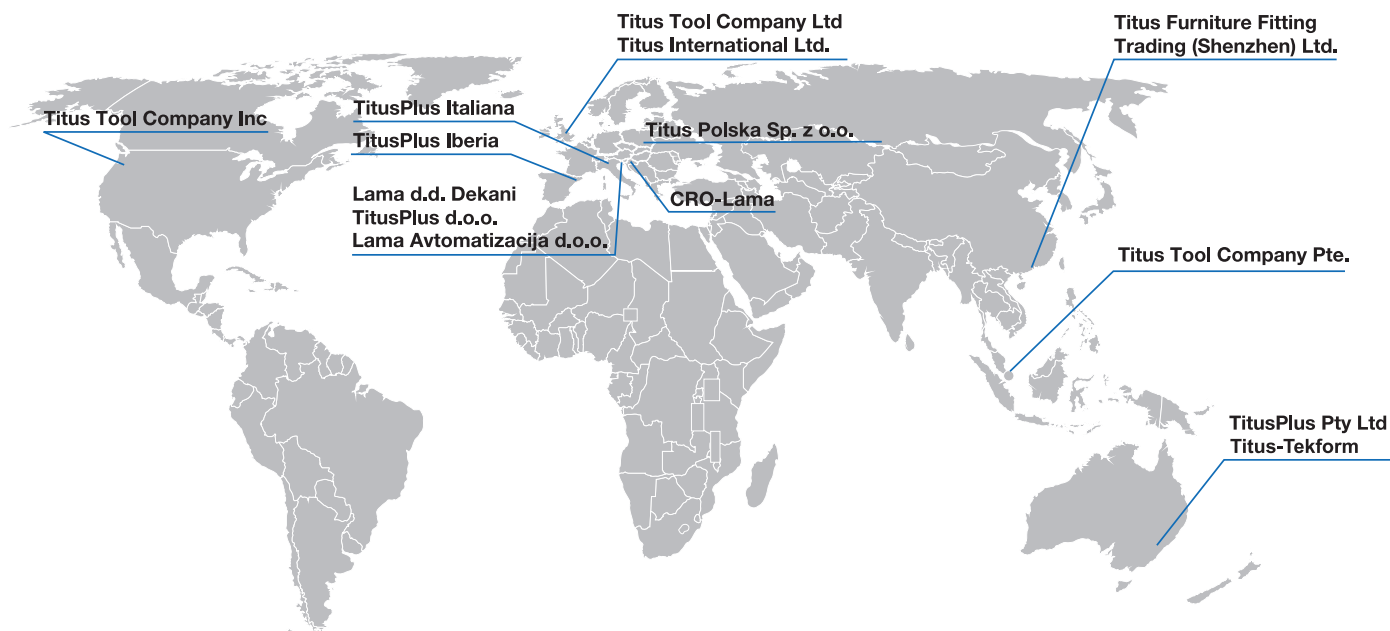
Working within the framework of our environmental policy we aim for:

- Inclusion of the best available technologies in the production process
- Minimising the use of space, natural resources, energy and emissions
- Waste management



Global player

Worldwide design, manufacturing and distribution capabilities



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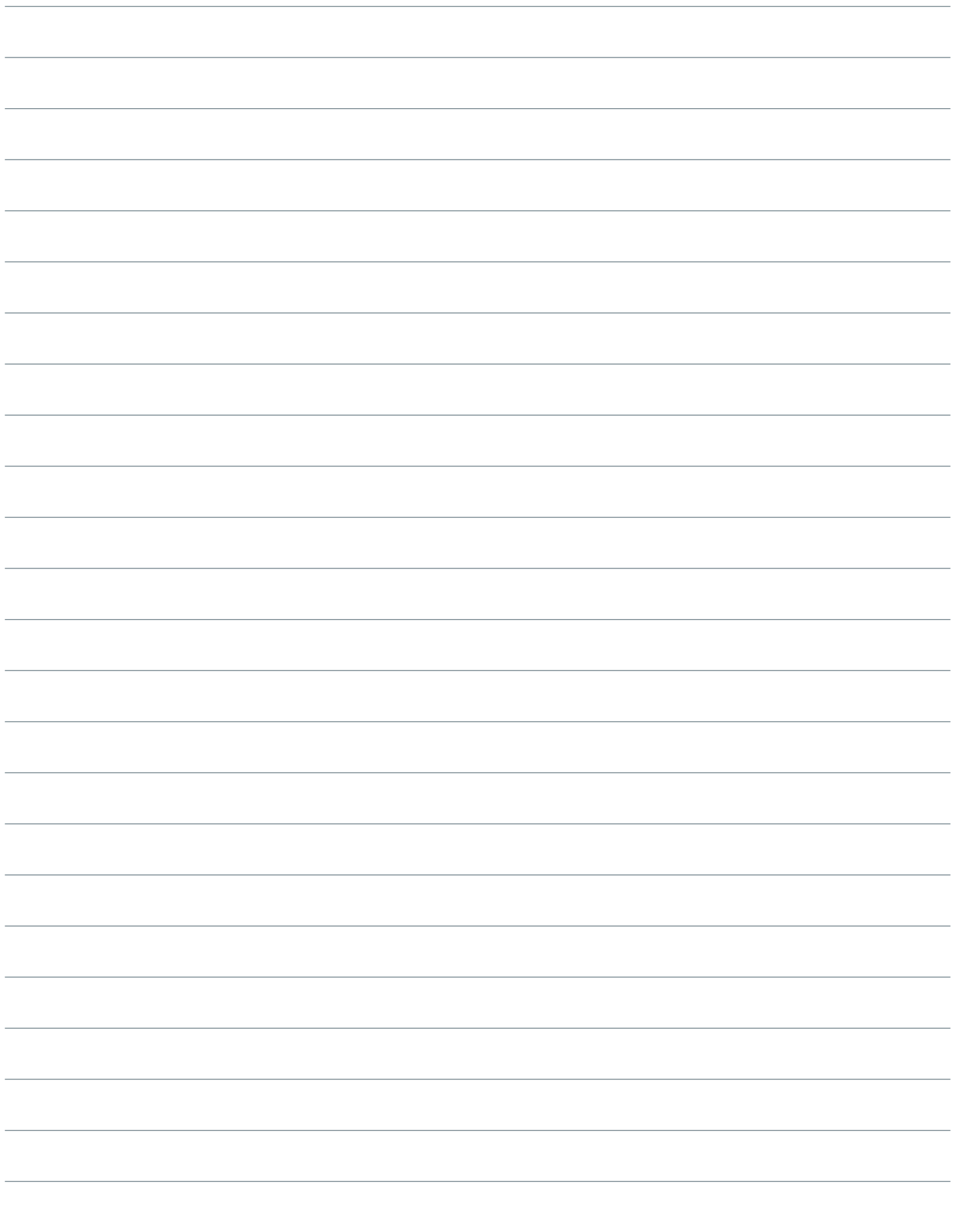
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