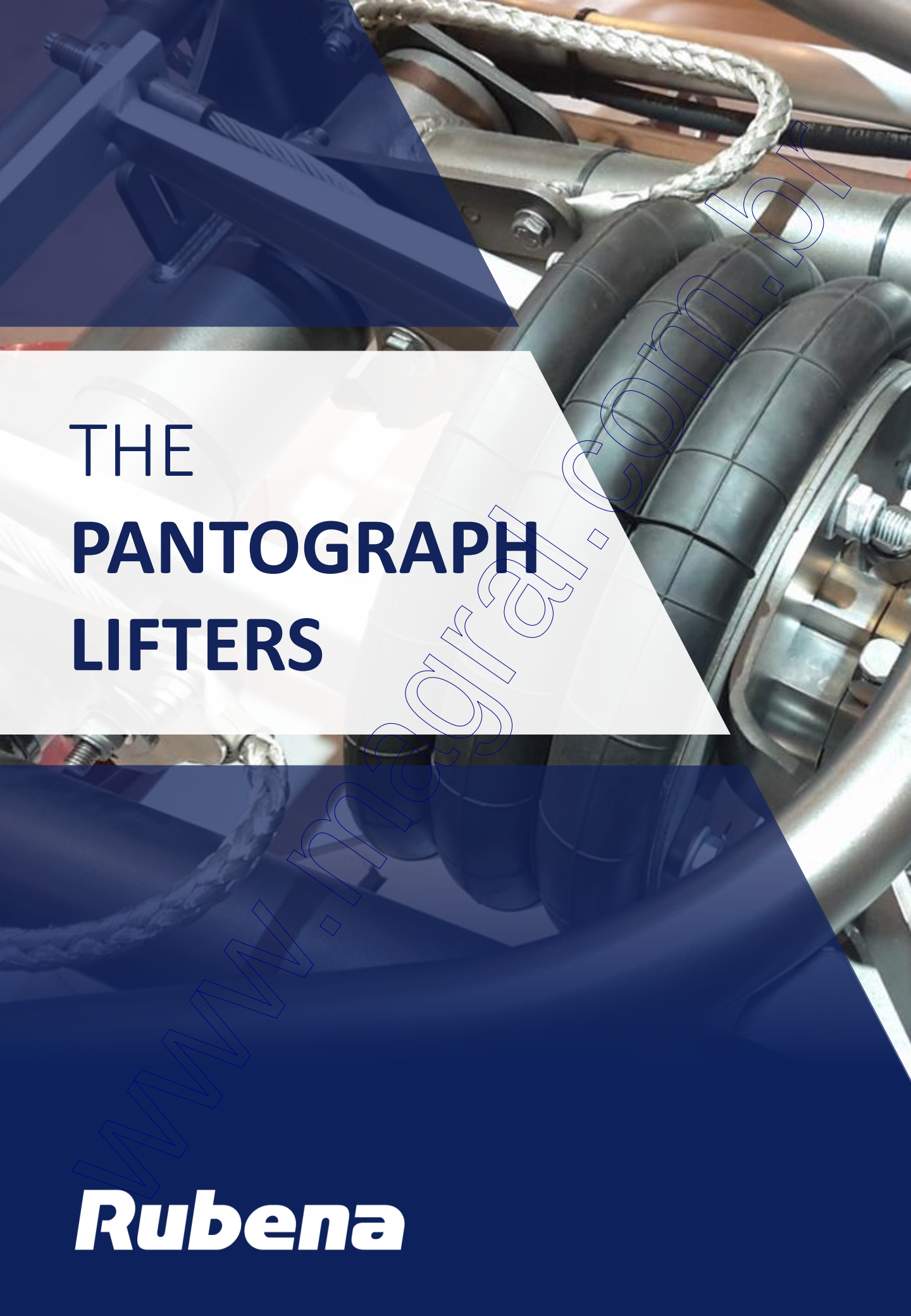
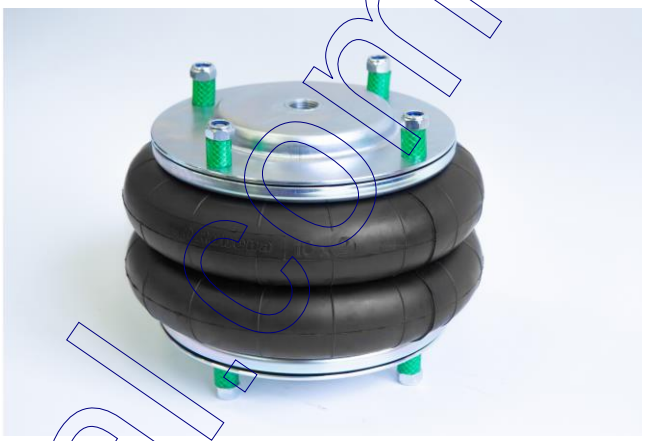


THE **PANTOGRAPH LIFTERS**

Rubena

Product Overview

Many of today's digitally controlled technologies interact with the physical world using a device which seem rather outdated at first look.
Convoluted Air Bellows are a pressurized rubber-textile product.



It is true that they have been in use for many years. However, they have developed into highly sophisticated elements.

Air Bellows allow variation of pressure, force and height while attenuating impacts and vibrations. This is a unique combination of capabilities, and it makes Air Bellows essential in a great diversity of applications

Air Bellows find use in industrial production lines, presses, agricultural, forestry, construction and quarry equipment, automotive, railway transportation and even ship building. Rubena´s highly refined rubber formulas make them suitable for a variety of environments including corrosive atmospheres, outdoor elements and extreme temperatures. Due to the many uses they have many names in many languages. In English they are called the Air Spring, Air Bellow, Air Actuator or simply Airbag, depending on the equipment that they are a part of.

Air Actuators for Pantograph Operation

One particularly exciting application of Air Bellows is in the **Pantograph for collection of electric current**. In electrified transportation it is essential to maintain a constant contact and pressure between the current collector and the catenary wire. Circuit interruption and associated arcs cause damage and premature wear. However, the distance between the electric locomotive and the catenary wire is never constant. Due to surface irregularities and curves along the railroad track, varying temperatures, sag, as well as vibrations at high speed, it can only be maintained within a certain range. Various arrangements of Air Bellows effectively solve this problem due to their unique properties.

By changing the pressure in the Air Bellow, it is possible to

- vary height,
- maintain pressure of the collector on the catenary wire,
- maintain level and
- control vibrations,

even at high speeds.

Similar strategies can be employed in other mass transit vehicles such as trolleys, trolley buses, and even in such vehicles as the heavy trucks which move materials inside quarries.

RUBENA QUALITY

In this sensitive application there is no place for cheap substitutes. A defect can result in severe and costly damages.

Rubena is a traditional European manufacturer of Air Bellows since 1976. We have been supplying the Railway Industry for almost 20 years and **actuators for Pantograph are our No 1 application.** Our actuators serve reliably under a variety of conditions from ozone, UV rays, extreme temperatures, rain, snow and frost. Rubena's refined rubber compounds are suitable for this and many other demanding applications. Most renowned pantograph makers choose us for quality and reliability.

OUR CREDENTIALS

TESTED BY

CZ TESTING

In accordance with EN 45545-2
(fire and smoke)

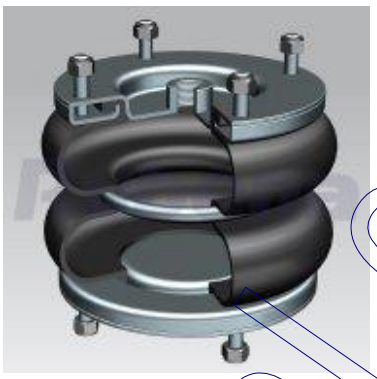
itczlin.cz

In accordance with VW 2.8.1
(low temperature)

ACTUATORS

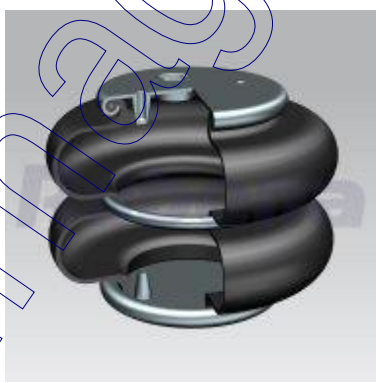
Dismantlable

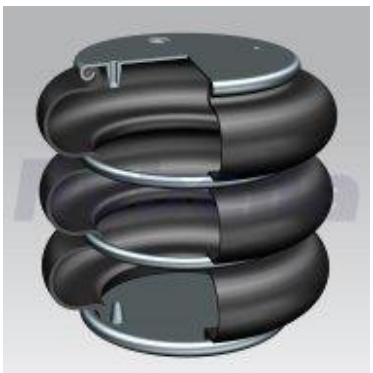
- 8” x 2
- 8” x 3
- 10“ x 2
- 10” x 3



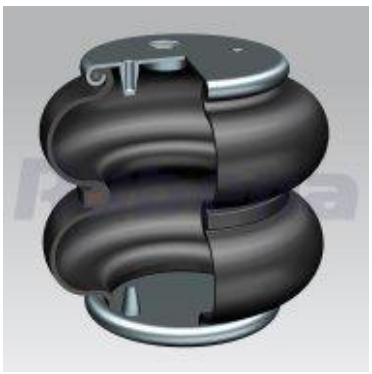
Crimped

- 8” x 2
- 9.5” x 2
- 12” x 2





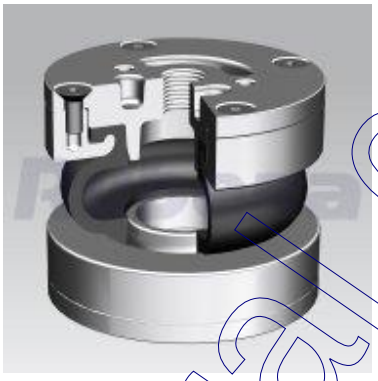
- 220 x 2
- 220 x 2E
- 220 x 2EE



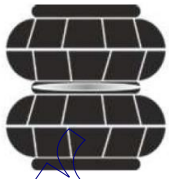
LEVELING SUSPENSION

Dismantlable

- 2.75” x 1
- 2.75” x 2

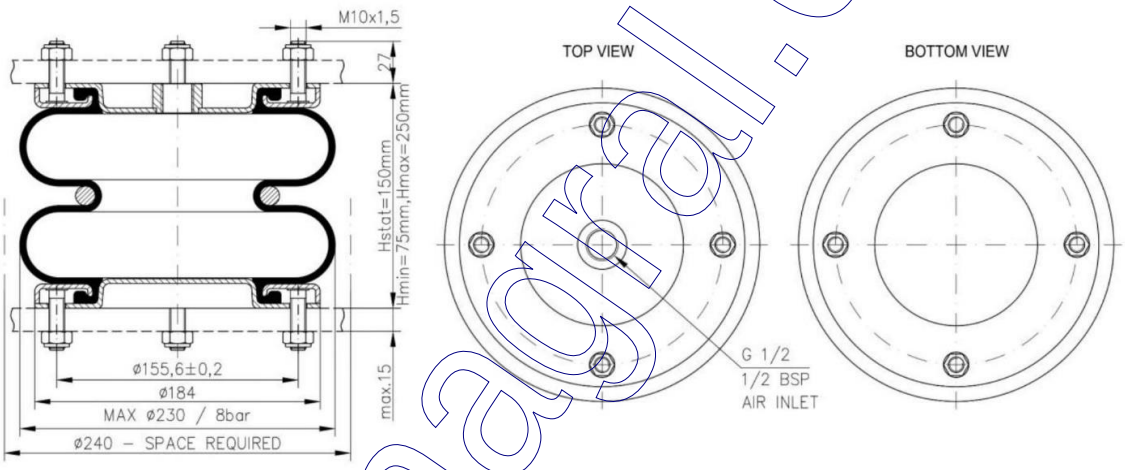


Rubena



BELLOW TYPE
8“ x 2

PRODUCT LINE	COVER TYPE
Dunlop design line	**Steel standard**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
250	**150**	**75**	**175**	**230**	**240**

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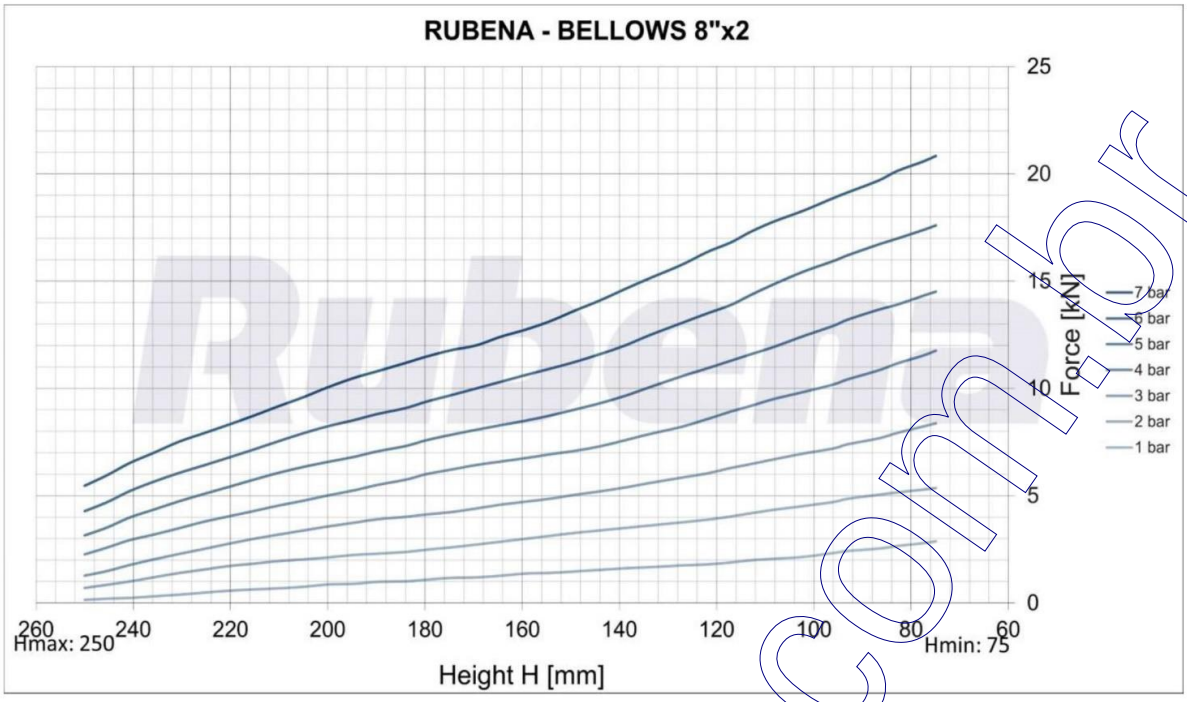

Rubber Type	Features	Application temperatures	
		Static [°C]	Dynamic [°C]
SBR	Standard use	-50° to 70°	-40° to 60°
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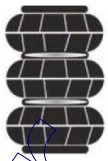
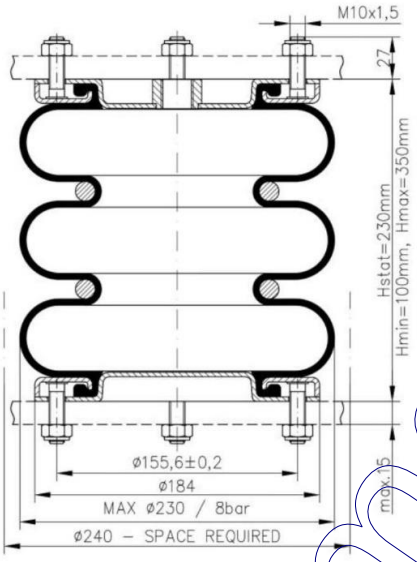
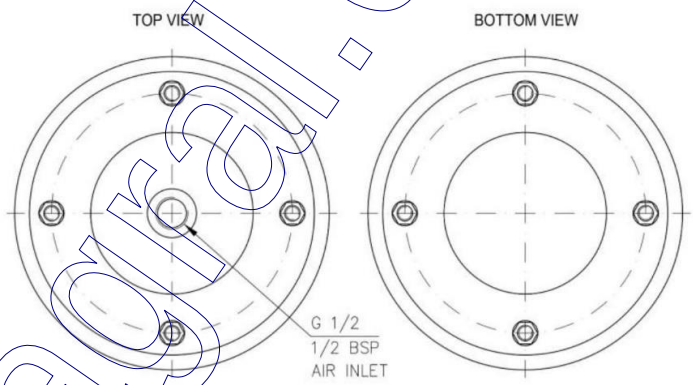


BELLOW TYPE
8“ x 3

PRODUCT LINE	COVER TYPE
Dunlop design line	**Steel standard**





HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
350	**230**	**100**	**250**	**230**	**240**

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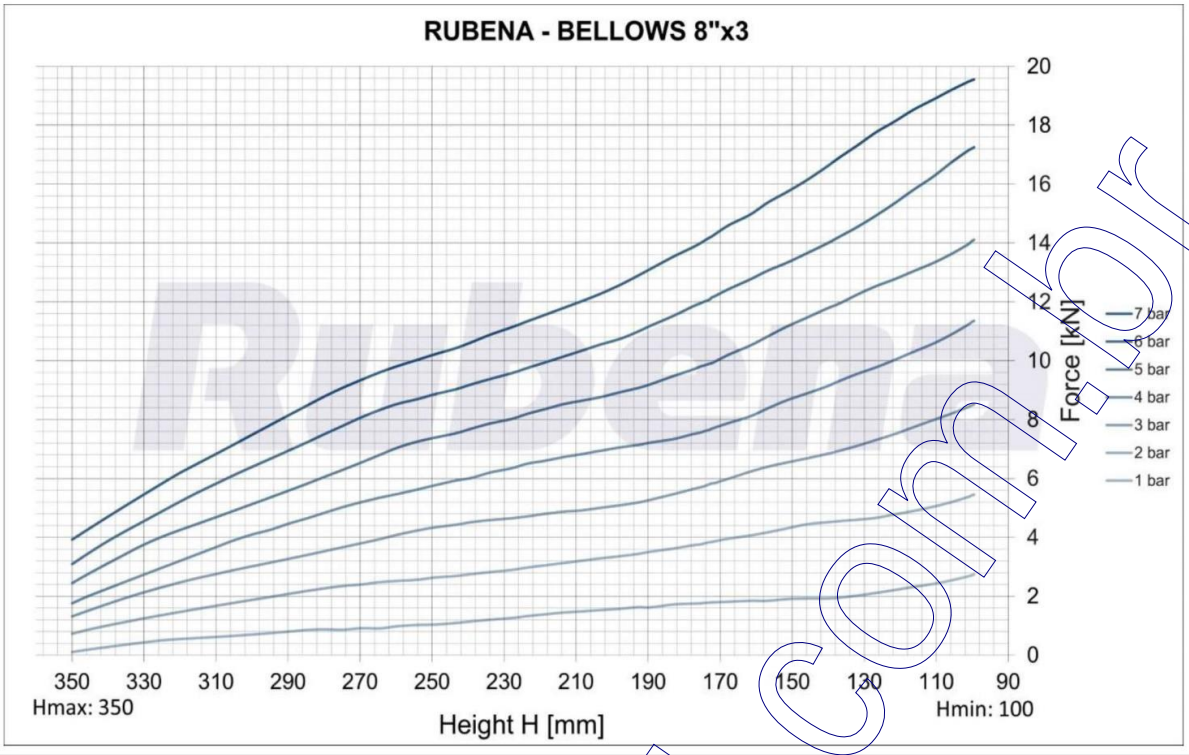

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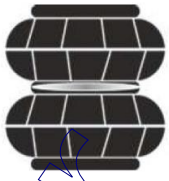
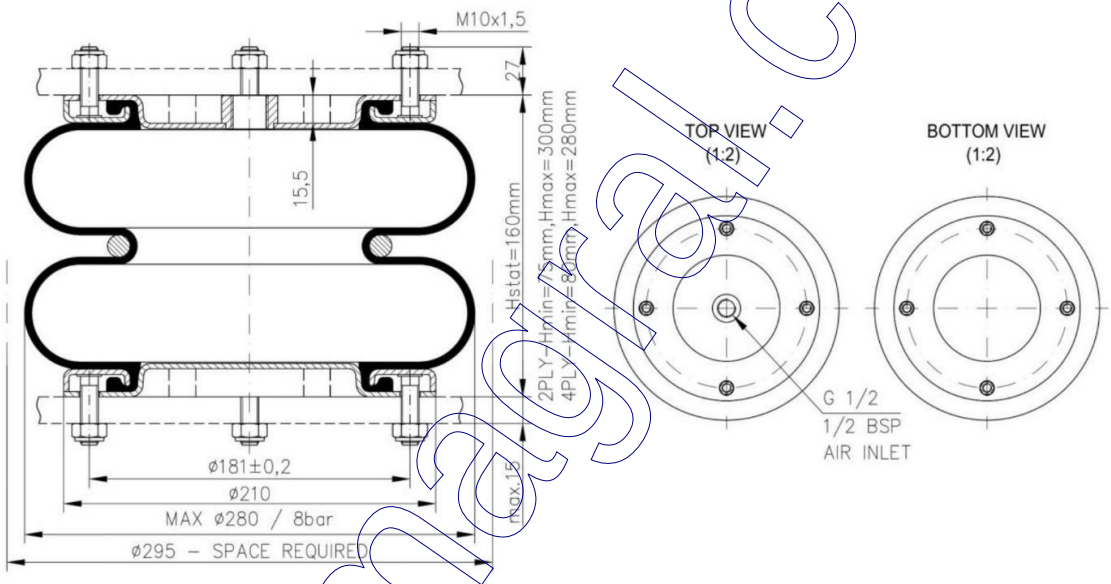


BELLOW TYPE
10“ x 2

PRODUCT LINE	COVER TYPE
Dunlop design line	**Steel standard**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
300	**175**	**75**	**225**	**280**	**295**

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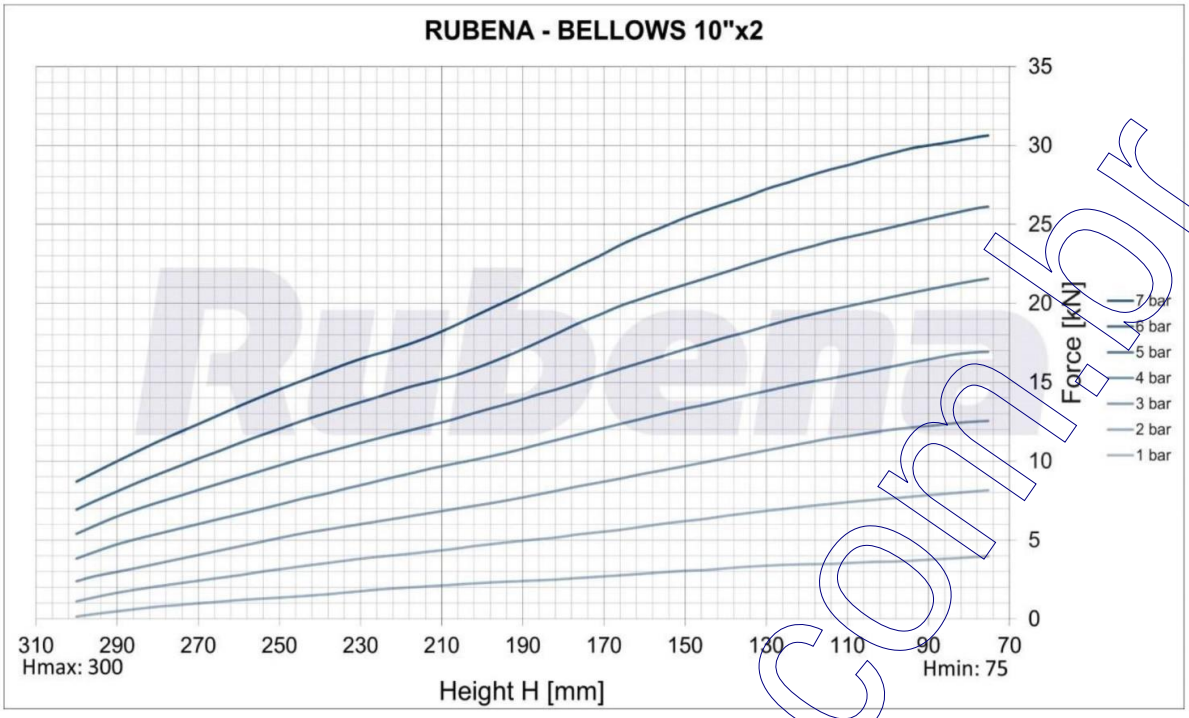

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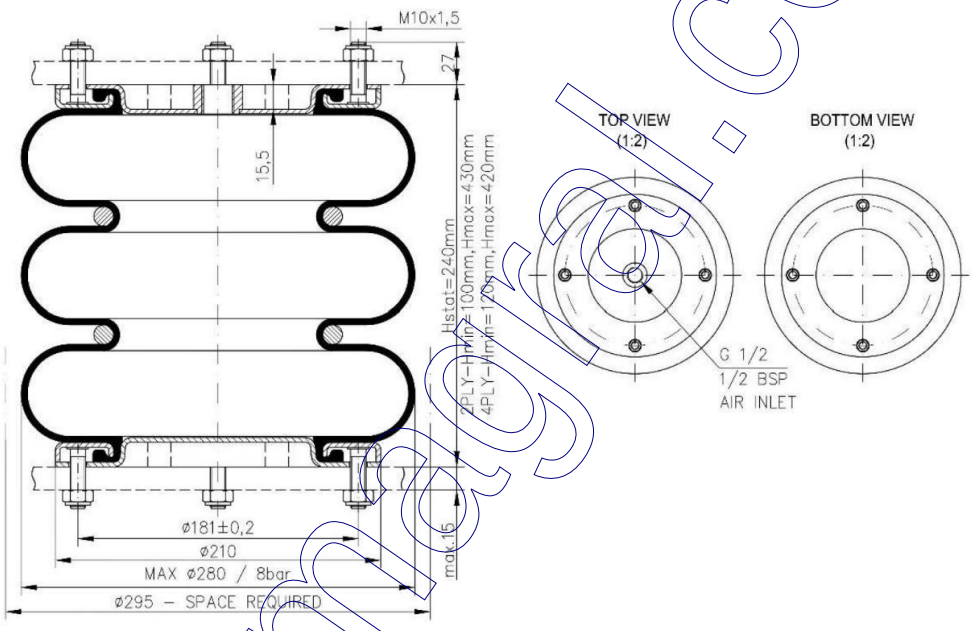
Rubena

BELLOW TYPE

10“ x 3

PRODUCT LINE	COVER TYPE
Dunlop design line	**Steel standard**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
430	**240**	**100**	**330**	**280**	**295**

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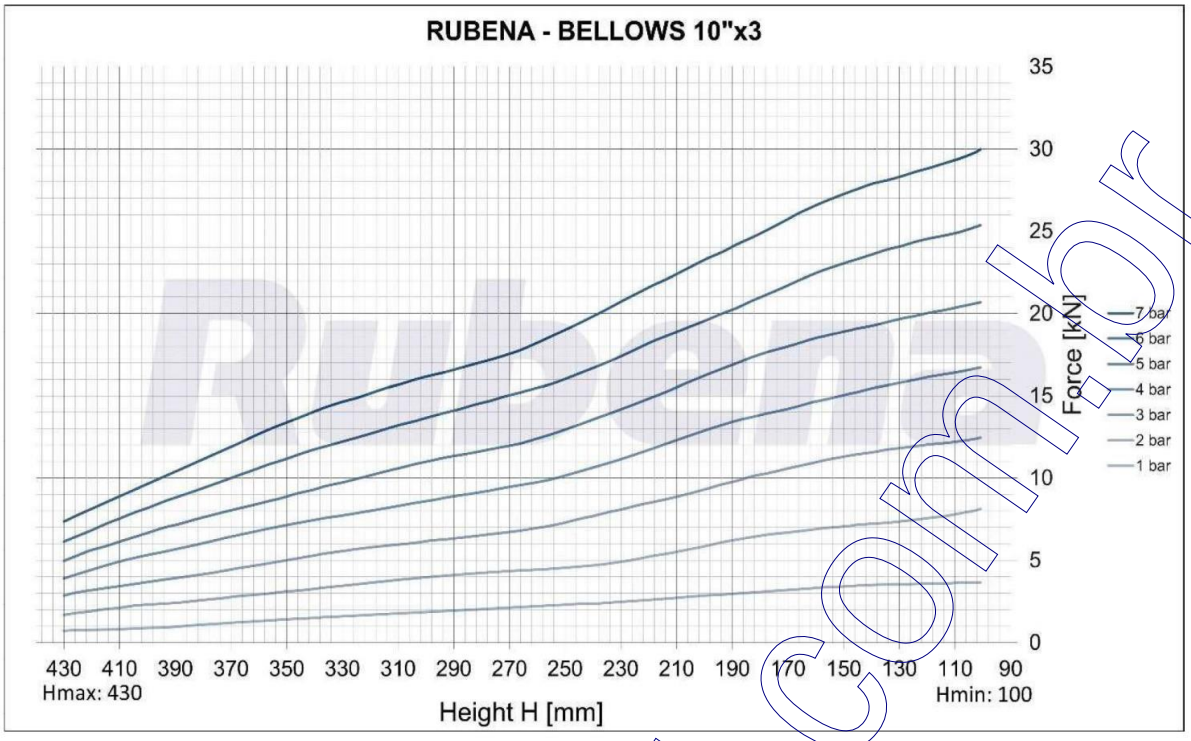

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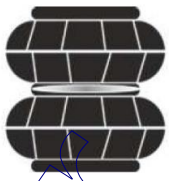
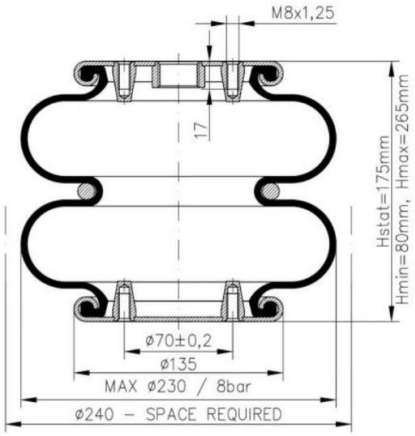
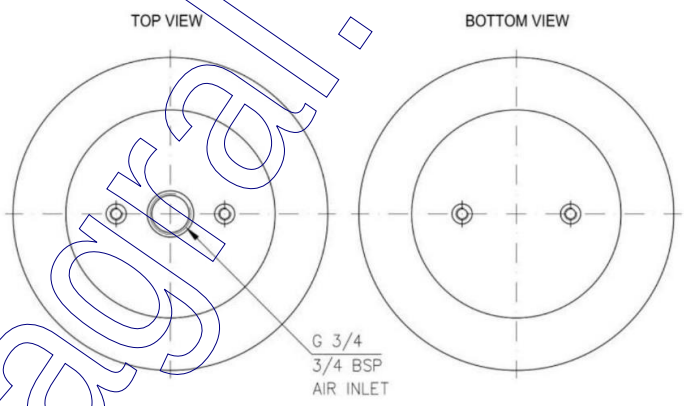


BELLOW TYPE
8“ x 2

PRODUCT LINE	COVER TYPE
Dunlop design line	**Crimped**





HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
265	**175**	**80**	**185**	**230**	**240**

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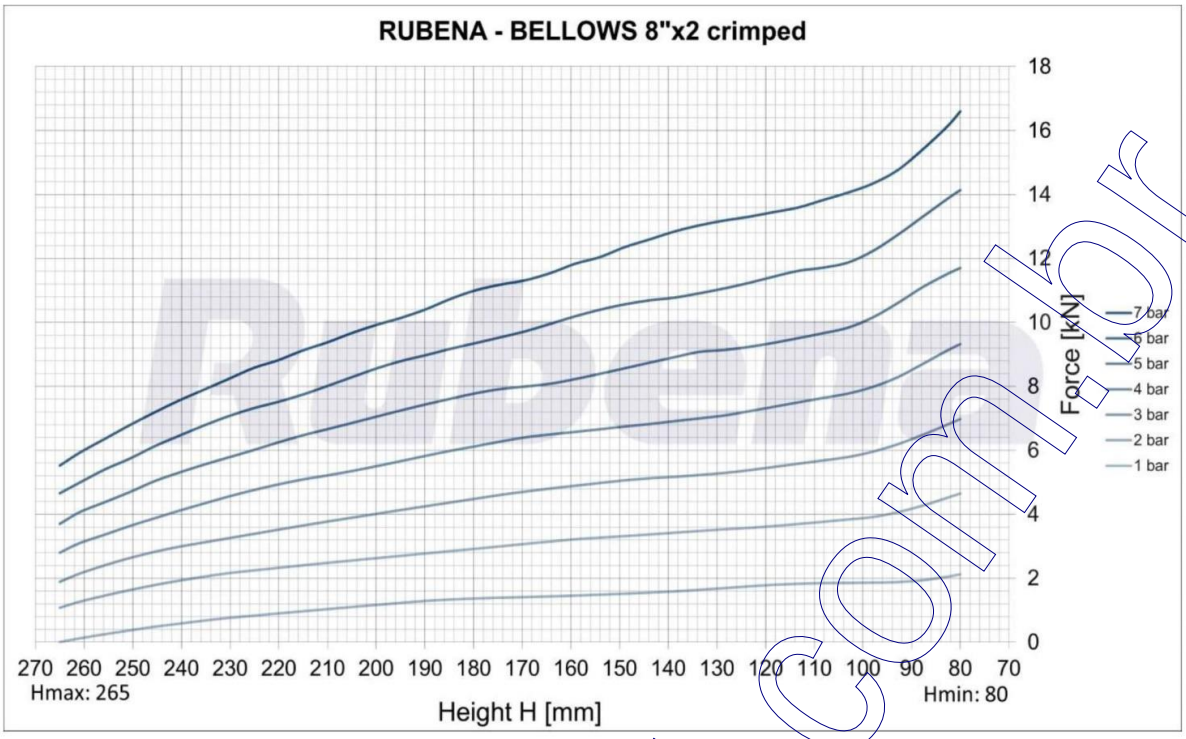

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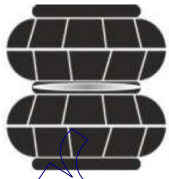
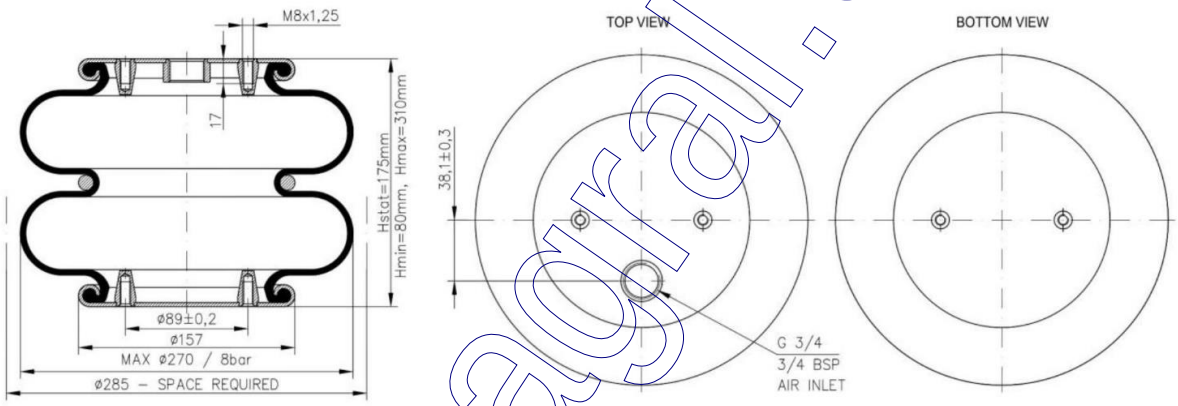


BELLOW TYPE
9 ½“ x 2

PRODUCT LINE	COVER TYPE
Dunlop design line	**Crimped**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
310	**175**	**80**	**230**	**270**	**285**

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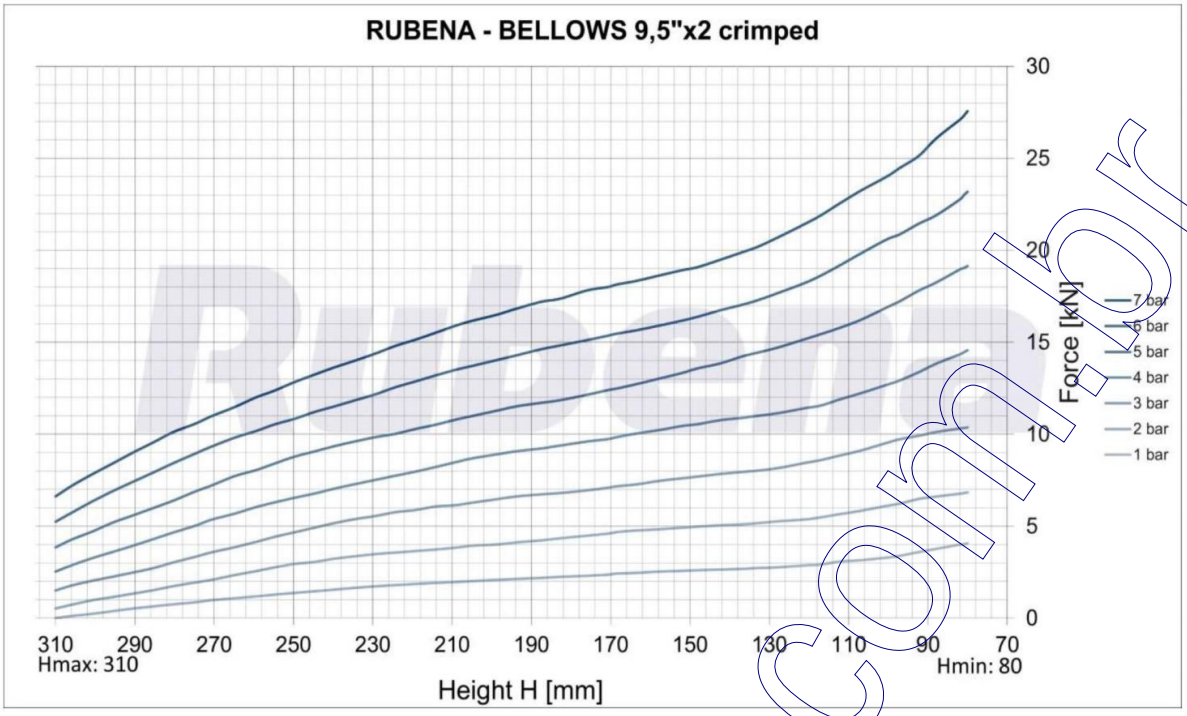

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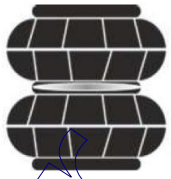
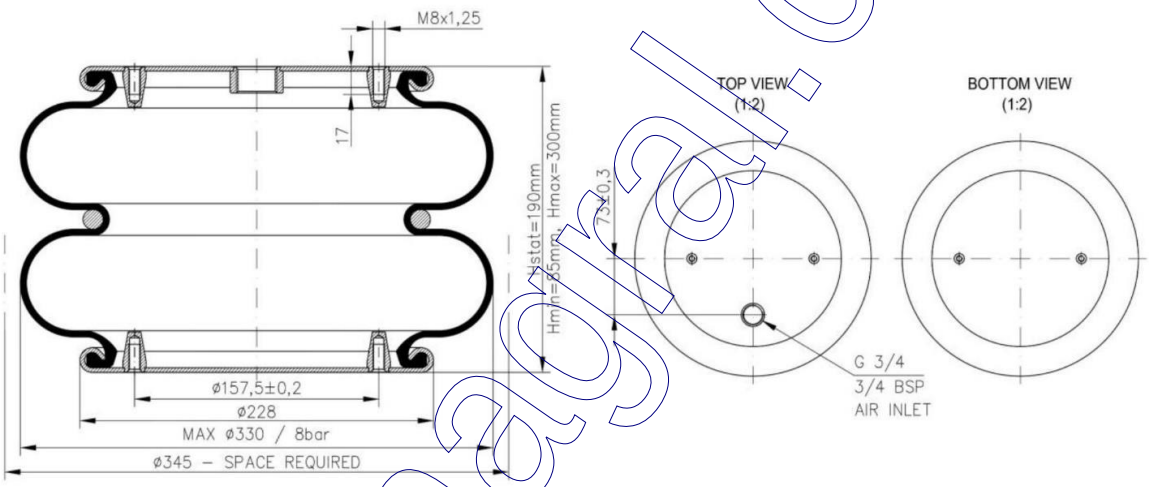


BELLOW TYPE
12“ x 2

PRODUCT LINE	COVER TYPE
Dunlop design line	**Crimped**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
300	**190**	**85**	**215**	**330**	**345**

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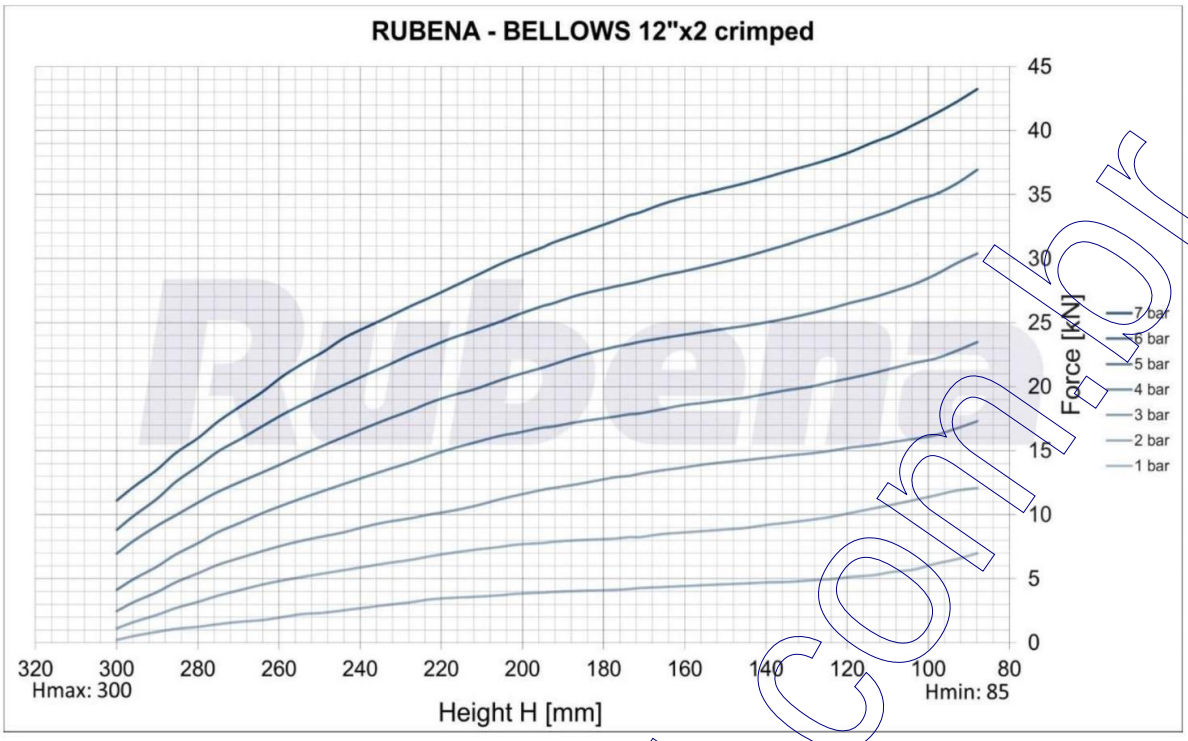

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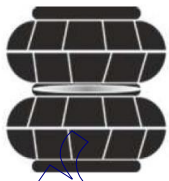
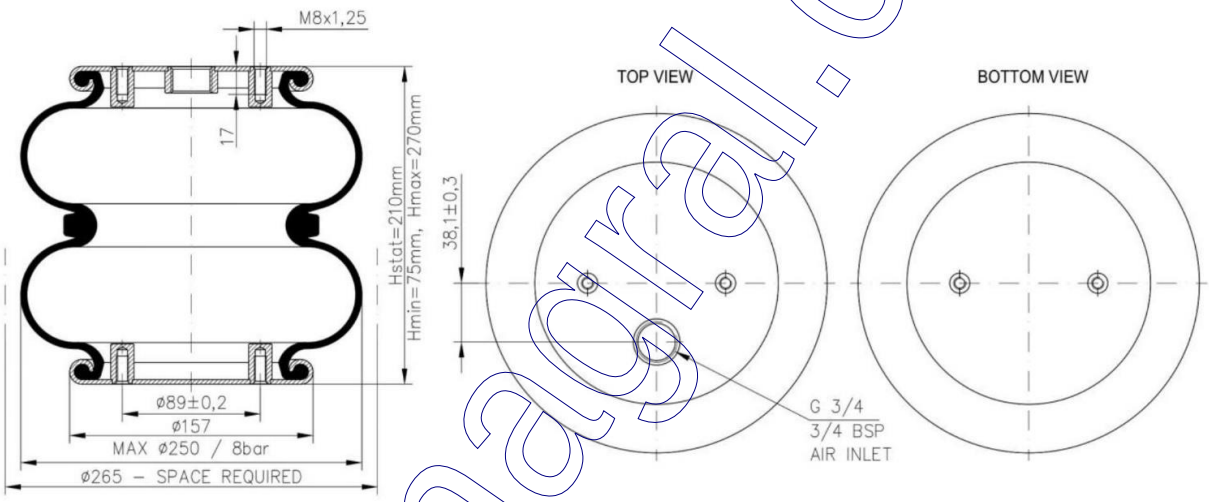


BELLOW TYPE
220x2

PRODUCT LINE	COVER TYPE
Rubena design line	**Crimped**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
270	**210**	**75**	**195**	**250**	**265**

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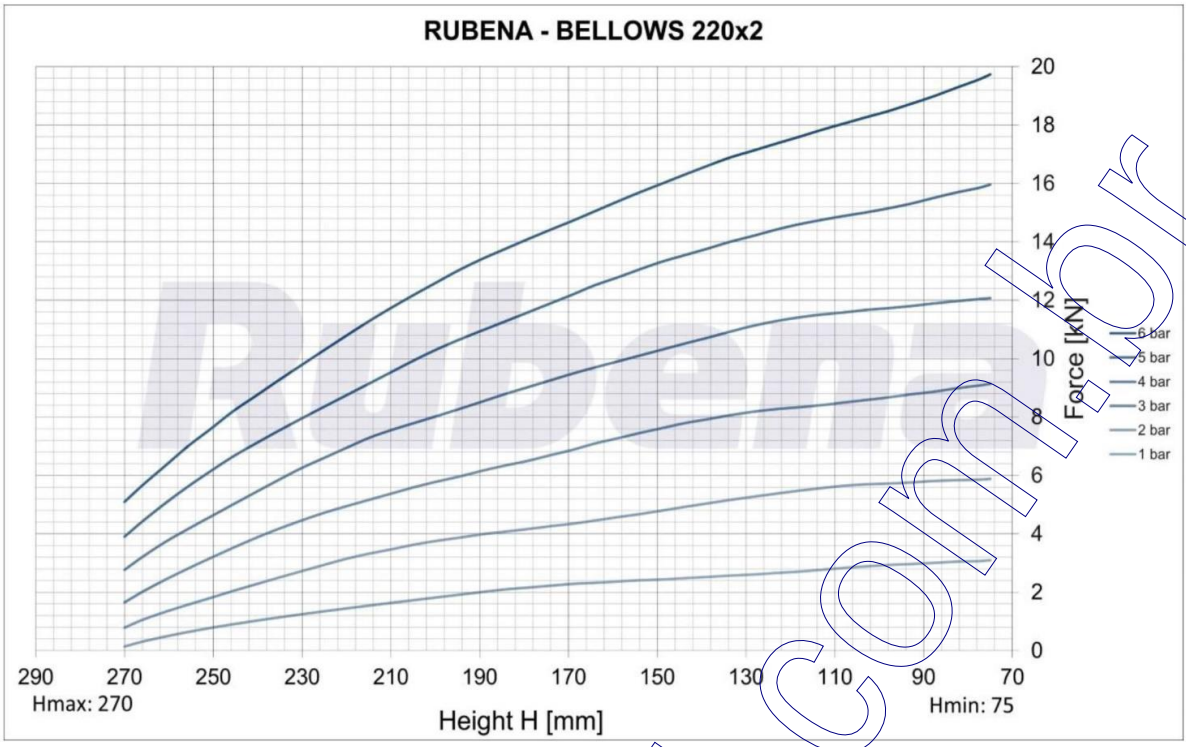

Rubber Type	Features	Application temperatures	
		Static [°C]	Dynamic [°C]
SBR	Standard use	-50° to 70°	-40° to 60°
CIIR	For higher temperature, steam and acids* resistence	-30° to 90°	-20° to 80°
ECO/GECO	Extreme heat endurance, best acids, oil and fuel resistence	-30° to 115°	-20° to 105°
CR	For higher temperature applications, acids and oil* resistance	-35° to 90°	-25° to 80°
CR (AF - Anti Fire)	For higher temperature applications, acids and oil* resistance; **flame retardant, compatible with EN 45545**	-50° to 90°	-40° to 80°

*depends on the type of acid / oil and their concentration. Always consult Rubena for specific use and application of the rubber type.

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4) Please check the overpressure in case of quick compression.

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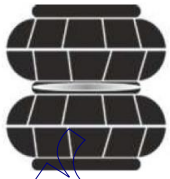
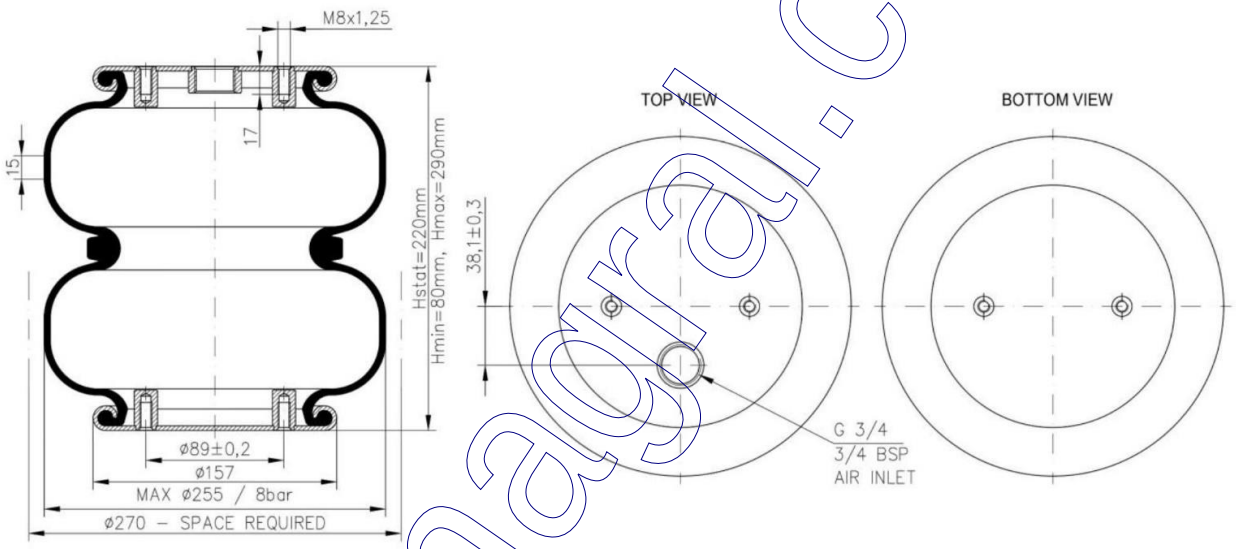
Rubena



BELLOW TYPE
220x2E

PRODUCT LINE	COVER TYPE
Rubena design line	**Crimped**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
290	**220**	**80**	**210**	**255**	**270**

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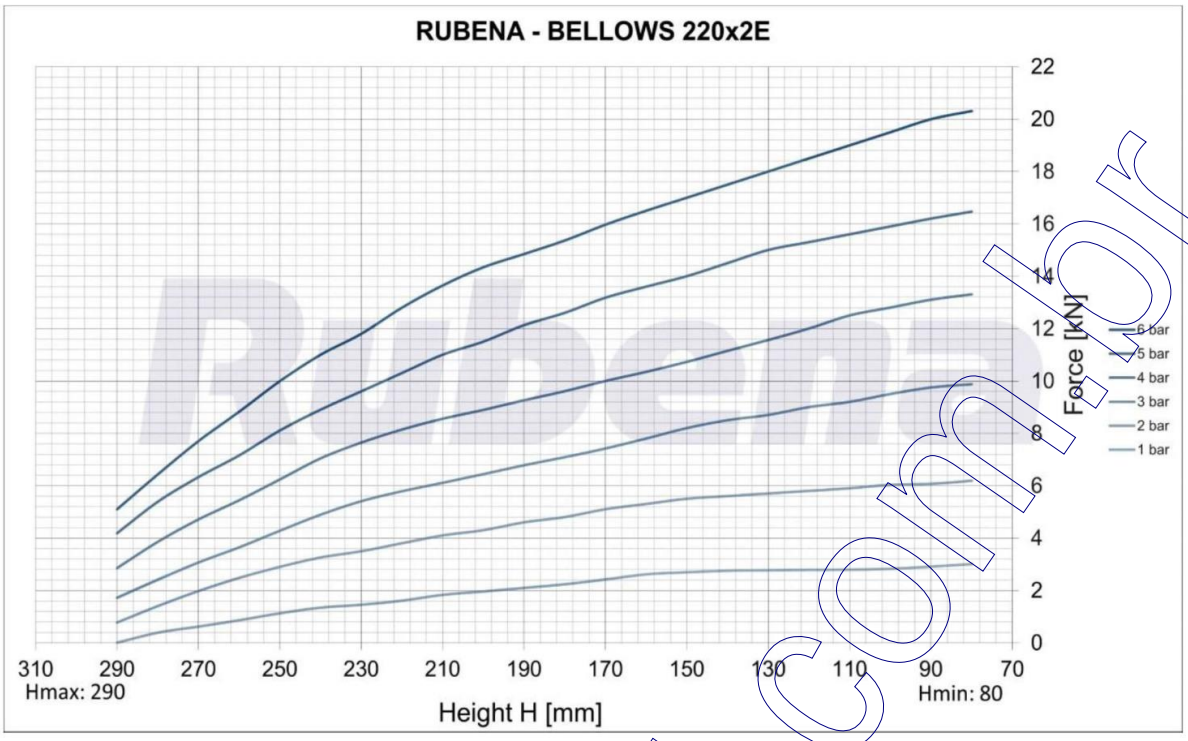

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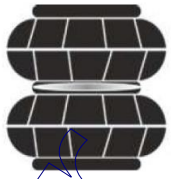
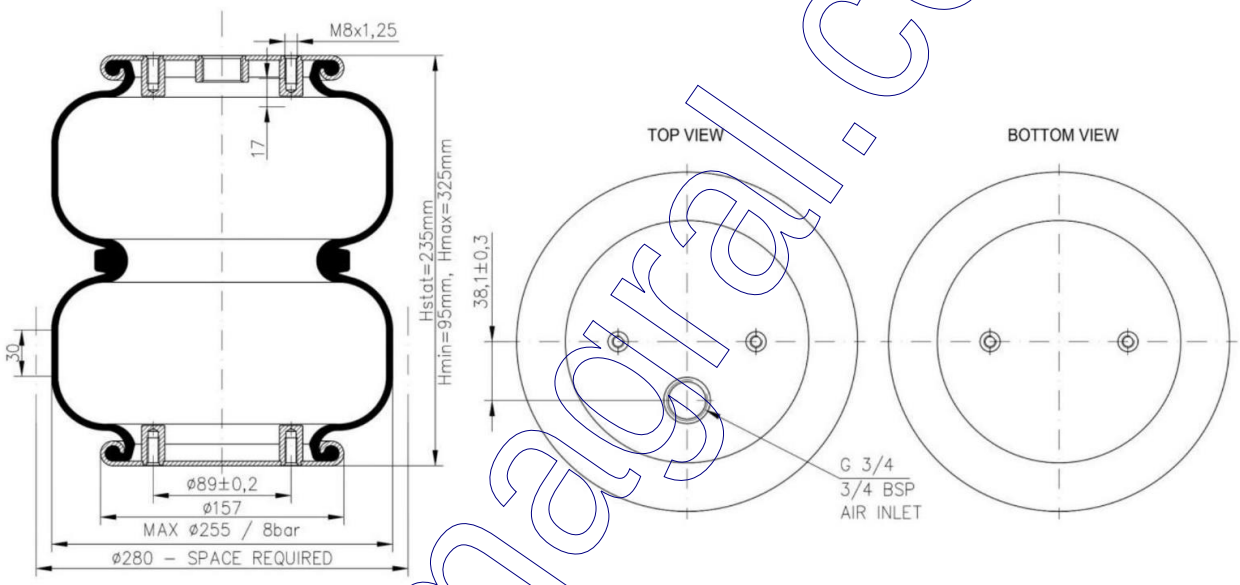


BELLOW TYPE
220x2EE

PRODUCT LINE	COVER TYPE
Rubena design line	**Crimped**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
325	**235**	**95**	**230**	**255**	**280**

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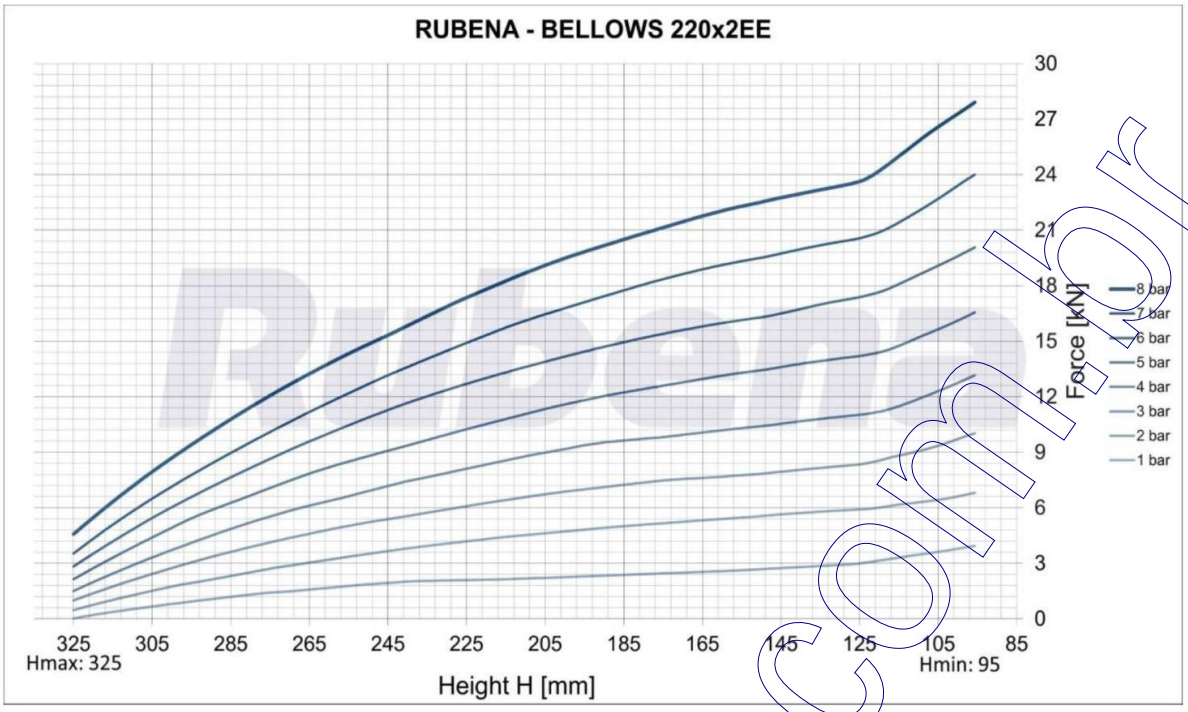

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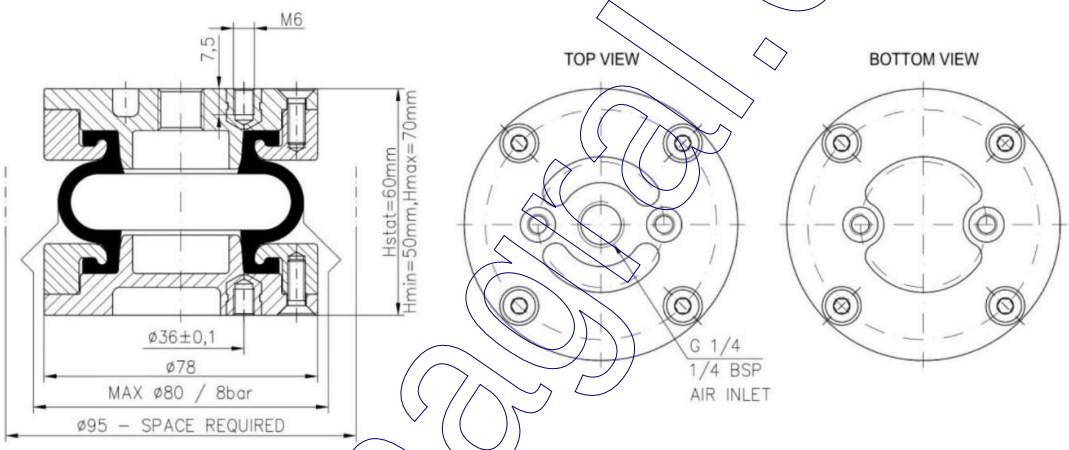
Rubena

BELLOW TYPE

2 ¾“ x 1

PRODUCT LINE	COVER TYPE
Dunlop design line	**Aluminium**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
70	**60**	**50**	**20**	**80**	**95**

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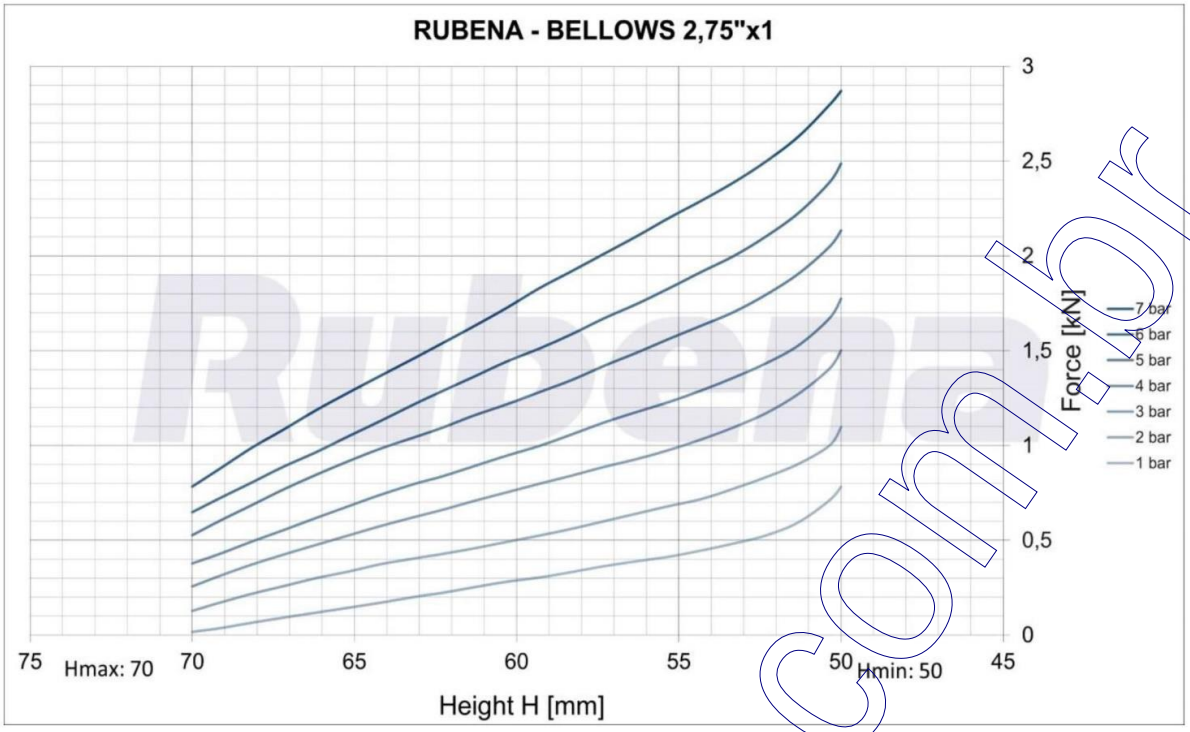

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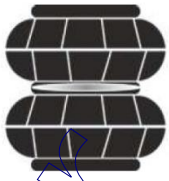
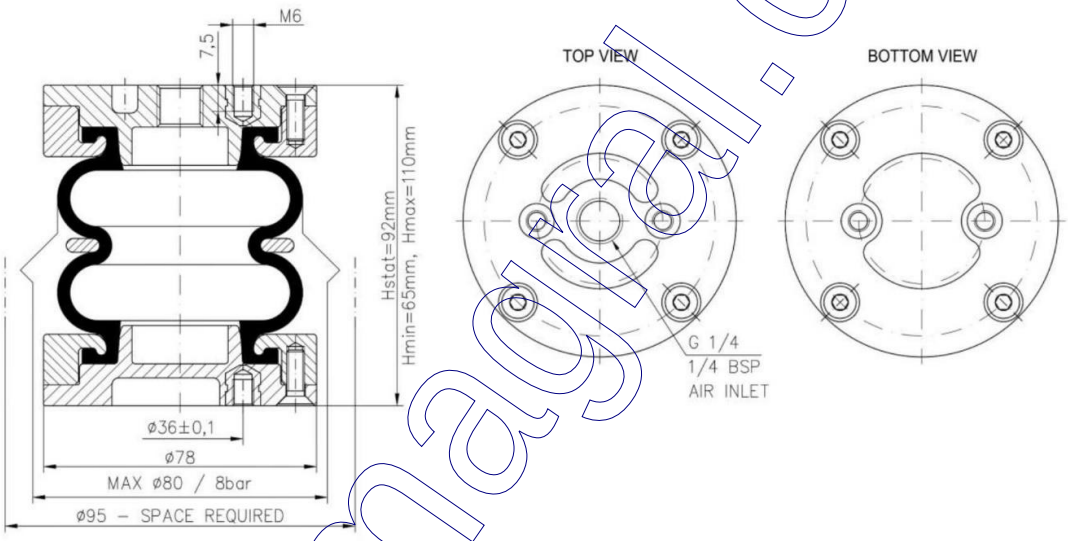
Rubena



BELLOW TYPE
2 ¾“ x 2

PRODUCT LINE	COVER TYPE
Dunlop design line	**Aluminium**



HEIGHT			STROKE	DIAMETERS	
Hmax [mm]	Hstat [mm]	Hmin [mm]	L [mm]	⌀ Max [mm]	⌀ For assembly [mm]
110	**92**	**65**	**45**	**80**	**95**

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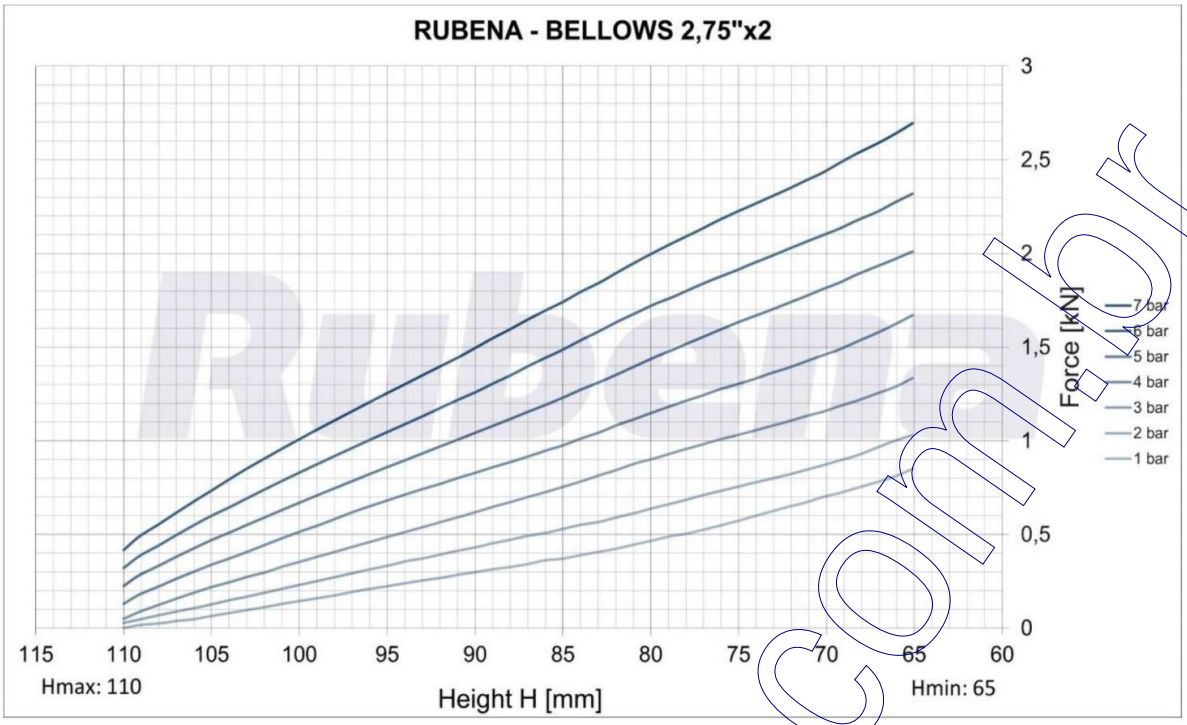

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RUBENA
CERTIFICATION

Certifikát CZ21/1160
Vydání č. 2

Rubena, s.r.o.
Adresa: Českých bratří 338, 547 01 Náchod, Česká republika

ISO 9001:2015

Vývoj a výroba gumárenských směsí, těsnících elementů, pryžových dílů, pryžokovových dílů, veloduší, velopláštů, povlaků válců, gumárenských forem, lisovacích nástrojů, pryžotextilních výrobků, klínových řemenů a pryžových koberců

Certifikace je platná od 19. října 2022 do 12. prosince 2024
a zůstává platná v případě úspěšného splnění dohledových auditů
Recertifikační audit musí proběhnout do 27. listopadu 2024
Organizace je certifikována od prosince 2021
Datum vydání certifikátu: 19. října 2022

Podrobnosti o dalších certifikovaných provozech jsou uvedeny na následující straně

S 3231

Certifikát CZ21/1161
Vydání č. 2

Rubena, s.r.o.
Adresa: Českých bratří 338, 547 01 Náchod, Česká republika

ISO 14001:2015

Vývoj a výroba gumárenských směsí, těsnících elementů, pryžových dílů, pryžokovových dílů, veloduší, velopláštů, povlaků válců, gumárenských forem, lisovacích nástrojů, pryžotextilních výrobků, klínových řemenů a pryžových koberců

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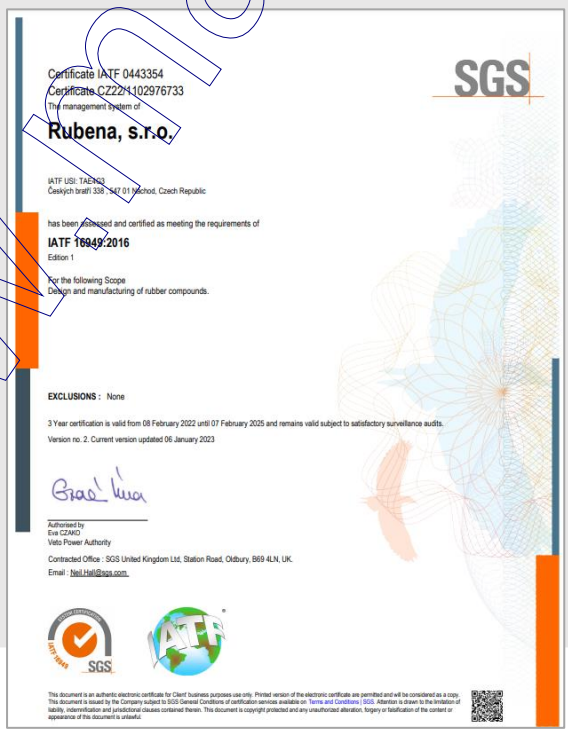
S 3231

ISO 9001 ISO 14001



Certificate IATF 0443354
Certificate CZ22/1102976733

The management system of

Rubena, s.r.o.

IATF USI: TAE403
Českých bratří 338, 547 01 Náchod, Czech Republic

has been assessed and certified as meeting the requirements of

IATF 16949:2016
Edition 1

For the following Scope
Design and manufacturing of rubber compounds.

EXCLUSIONS : None

3 Year certification is valid from 08 February 2022 until 07 February 2025 and remains valid subject to satisfactory surveillance audits.

Version no. 2. Current version updated 06 January 2023

Authorised by
Eva CZAKO
Veto Power Authority

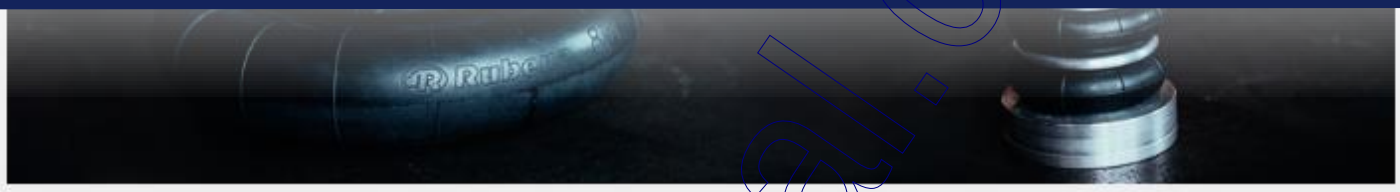
Contracted Office : SGS United Kingdom Ltd, Station Road, Oldbury, B69 4LN, UK.

Email : Neil.Hall@sgs.com

IATF 16949:2016

SEE OUR CATALOGUE AT:

www.rubena.eu/en/products/air-springs-power-elements/online-catalogue/



Metric Imperial

Product line: Select

Material: Select

Cross Reference: Select

Cover: Select

Hmax [mm]: 70 – 590

Stroke [mm]: 20 – 485

Space required ⌀D [mm]: 95 – 630

Hmin [mm]: 50 – 200

Product line	Typ	Cover	Material	Cross Reference	⌀D [mm]	Hmin [mm]	Stroke [mm]	Hmax [mm]	Hstat [mm]	
Rubena design line	130x1	Steel	SBR		155	55	80	115	85	Detail
Rubena design line	130x2	Steel	SBR		155	100	80	180	140	Detail
Rubena design line	130x3	Steel	SBR		155	120	120	240	180	Detail
Rubena design line	170x1	Steel	SBR		195	60	60	120	90	Detail
Rubena design line	170x1E	Steel	SBR		215	60	95	155	135	Detail
Rubena design line	170x2	Steel	SBR		195	85	120	205	145	Detail
Rubena design line	170x2 4Bl	Steel	SBR		195	90	105	195	145	Detail
	x2E	Steel	SBR		215	100	180	280	220	Detail

Rubena