CEN – CRASH CUSHION SYSTEM VECU-STOP®

SYSTEM Manual

- SYSTEM APPROVED
  acc. To DIN EN 1317 - Part 3, Table 9 for impact speeds of
  110 - 100 - 80 km/h
- CEN - CONFORM
- VECU-STOP® is a registered Trademark of SPS-Schutzplanken GmbH
- QM Standard since 2 August 1994
  (First QM system in this business line)

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Chapter 1

Product Description

CEN – Crash Cushion System "VECU-STOP®"
MATERIALS

Chapter 1
(Product Description)
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The models of the VECU-STOP® system are all-steel constructions based on the same functional principles so that the materials used can be reduced to a few qualities and dimensions:

- Cylinders of any diameter:
  Steel S 235 JR, DIN EN 10025-2
  Suitable for galvanisation, e.g. Si ≤ 0.03%
- Head sheet metals, segment plates
  Lateral shields, C-profiles, sliding feet, support rollers
  End supports, anchor plates, distance plates
  Steel S 235 JR, DIN EN 10025-2
  suitable for galvanisation, e.g. Si ≤ 0.03%
- Guidance ropes of Ø 20 mm
  DIN 3064 SES Zn Warr.-Seale 1770 sZ
- Rope compaction
  Steel S 235 JR, DIN EN 10025-2
- Neoprene plates
  ASTORflex 15320 - 19
  Cellular rubber Neoprene
- PC - Reaction resin mortar / sticking bridge
  cds - mortar LS
  Techn. Data sheet Nr. 8880
  or similar type
- Edge protection:
  A1 015 black 1,0 - 4,0 100 A=30
  or similar type

Screws / Nuts / Washers:
Hexagon M 20 x 50 DIN 601, tZn
Solidity: 4.6
Galvanisation : EN ISO 1461
Washers: Ø 22 x 50 x 6 tZn. ISO 4759
Galvanisation: EN ISO 1461

*

Hexagon M 16x35, DIN 601, tZn
Nut M 16x13, DIN 555, tZn
Solidity: 4.6, DIN EN ISO 898-1

Washer : 17.5x30x3, DIN 126
Galvanisation: EN ISO1461,

*

Half round: M 16x27, TL-SP
M 16x40, TL-SP
Nuts : M 16x14, 8, ISO 4032
Solidity: 4.6

Washers : 17.5x30x3, DIN 126
Galvanisation: EN ISO 1461,

*

Nuts: M 36x28, DIN 934 ISO 4033
Galvanisation: DIN 1461,

Washers: 37x66x5, DIN 125 ISO 7091
Galvanisation: EN ISO 1461,

*

Spring washers: DIN 2093
FST 159 – 71x36x2 (C 71)
FL = 5141 N (8x723x38)

*

Installation example of the crash cushion system VECU STOP

CEN – Crash Cushion System "VECU-STOP®" Durability - Galvanisation	**Chapter 1** **(Product Description)** **1/ 2**

Galvanisation methods

Hot-dip galvanising is the most common method, to provide steel parts with durable protection against corrosion through metal coating.

All the steel parts of the crash cushion system VECU-STOP® are protected against corrosion by immersing the individual components into melted zinc.
The procedure is as follows:

A: Pre-treatment
Required to achieve a metallic blank surface

- Degreasing bath (if necessary)
- Rinsing bath
- Pickling bath
  Removal of rust and scale
- Rinsing bath
- Flux bath
  Consists of zinc chloride / ammonium chloride and covers the surfaces to be galvanised during immersion
- Drying furnace
  The flowing agent is dried on the surface at 100°C here so that flying rust will be avoided and the surface will be activated for the following galvanisation process

B: Galvanisation process

Immersion of individual components (designed for galvanisation!) in melted zinc (approx. 450° C) There will be an iron-zinc alloy layer and pure zinc layer on the steel surfaces.

Galvanisation is carried out in compliance with EN ISO 1461.

The zinc coating is continuously monitored through test reports. The test reports are stored with the data sheets.

– Commercial zinc in accordance with DIN EN 1179

– Zinc bath : Dast-guideline 022

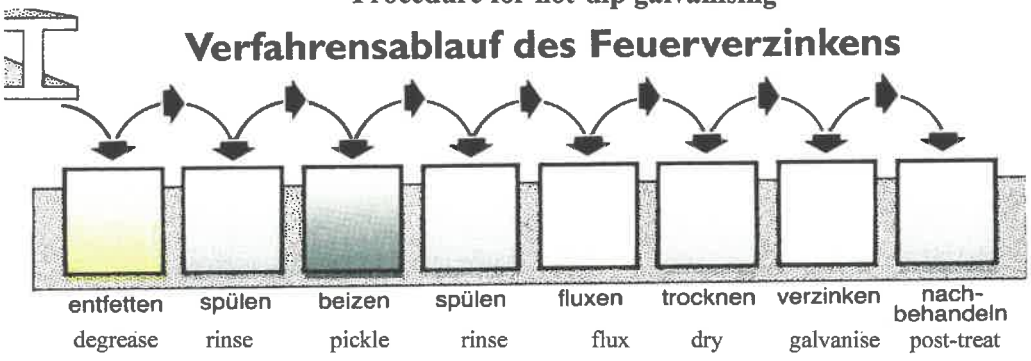
Layer thickness of zinc coatings: in accordance with EN ISO 1461:

Parts mm	Average values	Minimum value
≥ 6	85 my	70 my
≥ 3 - < 6	70 my	55 my
≥ 1,5 - < 3	55 my	45 my
< 1,5	45 my	35 my

The zinc coating must be compact and free of visible defects.

The products are exclusively galvanised at certified galvanisation workshops.

Procedure for hot-dip galvanising



CEN - Crash Cushion System "VECU-STOP®" Essential requirements of a building product	**Chapter 1** **(Product Description)** **1/3**

The essential requirements (ER) of a building product include different requirements which also apply to road restraint systems and are met by the crash cushion system

VECU-STOP®:

1) Mechanical solidity and stability:

- no detached parts which get loose or detach on vehicle impact;
- anchored on the underground

2) Fire protection

- Overall steel construction
- no combustible parts

3) Hygiene, health and environmental protection (DIN 55 926, T3, A 4.4)

- Overall steel construction
- Fire galvanization
- no combustible parts
- completely recyclable
- without toxic or harmful substances
- no form aggressive construction parts

4) Reliability

- laterally closed on all sides
- impact surface at only 10 cm floor clearance, avoids running underneath even by motorcycles
- The service life of the overall construction is approx. 25 years depending on the region where the products shall be installed.

5) Sound protection

- not required for crash cushions.

6) Energy saving and heat protection

- not required for crash cushions.

7) Substances to be monitored

- A. Berner Deutschland GmbH
  Zn-Alu-Spray 400ml (Item 148592)
  (Repair of small zinc damages)
- Possehl-Spezialbau GmbH
  cds - Mortar LS
  (for roof type or rough concrete surfaces)
- Atrion Dübeltechnik GmbH &Co. KG
  Compound mortar AVM-S/CF-T 300V
  (for TOGE screw-in anchor)

Advantages of the "VECU-STOP®" system

A) Maintenance and care

- maintenance free
- no inaccessible parts
- no construction parts get stuck
- no detached parts

B) Repair-friendliness

- all parts are easily accessible
- all parts are recognizable
- quick damage identification
- short-term repair through pre-installed assemblies.

Installation example:

Installation example:

CEN- Crash Cushion System "VECU-STOP®"
Model groups VS 120 100

Chapter 1
(Product Description)
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Model group VS 120
The model group 120 consists of energy absorbing steel cylinders of 600 mm diameter with filling and push elements arranged in-between.

These filling and push elements provide the steel cylinders with a deformation property during a head-on impact due to which the kinetic energy is most effectively converted into deformation so that the impacting vehicle is stopped at acceleration values that are acceptable for the passengers.

In this connection another deformation property is also provided by the combined effect of filling and push elements with the side panels.

Model group VS 100
The model group 100 consists of energy absorbing steel cylinders of 500 mm diameter and filling and push elements arranged in-between.

The functions of the model groups are comparable.

The standard cylinders of all model groups, including side panels, are located on the respective outsides.

The VECU-STOP (VS) System
100 and 120

VS 120

CEN - Anpralldämpfer System „VECU - STOP®"
Modellgruppe VS-120

Stufe	Modell	Zchn. Nr.	Form	Winkel	L	B (K)	B (B)
		Parallel Figure VS-P 120					
80	VS - P 120 / 2:10	4772.01		0	7,2	1,2	1,2
100	VS - P 120 / 2:13	4851.01		0	9,0	1,2	1,2
110	VS - P 120 / 2:14	5232.00		0	9,7	1,2	1,2
		Winkelförmige Ausführung VS-V 120					
80	VS - V 120 / 3:10	5281.00		6	7,2	1,2	1,8
	VS - V 120 / 4:10	5294.00		13	7,2	1,2	2,4
	VS - V 120 / 5:10	4842.02		19	7,2	1,2	3,2
100	VS - V 120 / 3:13	5272.01		5	9,0	1,2	1,8
	VS - V 120 / 4:13	4993.01		10	9,0	1,2	2,4
110	VS - V 120 / 3:14	5289.00		4	9,6	1,2	1,8
	VS - V 120 / 4:14	5005.01		9	9,6	1,2	2,4

P = parallel V = winkelförmig L = Länge(m) B(K) = Kopfbreite B(B) = Basisbreite

VS 100

CEN - Anpralldämpfer System „VECU - STOP®"
Modellgruppe VS-100

Stufe	Modell	Zchn. Nr.	Form	Winkel	L	B (K)	B (B)
		Parallele Ausführung VS-P 100					
80	VS - P 100 / 2:10	5002.02		0	6,1	1,0	1,0
100	VS - P 100 / 2:13	5001.02		0	7,6	1,0	1,0
110	VS - P 100 / 2:14	4995.02		0	8,2	1,0	1,0
		Winkelförmige Ausführung VS-V 100					
80	VS - V 100 / 2:10	5196.00		6	6,2	1,0	1,5
	VS - V 100 / 4:10	5190.00		13	6,1	1,0	2,0
	VS - V 100 / 5:10	5003.04		19	6,2	1,0	2,5
100	VS - V 100 / 3:13	5093.01		5	7,7	1,0	1,5
	VS - V 100 / 4:13	5004.02		10	7,6	1,0	2,0
110	VS - V 100 / 3:14	5179.00		4	8,2	1,0	1,5
	VS - V 100 / 4:14	4992.02		9	8,2	1,0	2,0

P = parallel V = winkelförmig L = Länge(m) B(K) = Kopfbreite B(B) = Basisbreite

CEN- Crash Cushion System "VECU-STOP®" Construction – Models of the Groups	**Chapter 1** **(Product Description)** **1 / 5**

Construction

The progressive concept of the crash cushion system

VECU-STOP®

is based on more than fifty years of experience in the construction of vehicle restraint systems (passive safety devices) on roads and in places. (HLB 1957 / ARS 1960 / ARS 1972 / RAL-RG 620 / TL-SP 72 / RPS 1989 /2009

All the models of the

VECU-STOP®

system consist of cylinders arranged in parallel and one after the other, which on the one hand function as highly effective energy absorbing attenuators and can on the other hand absorb redirecting forces.

The entire energy absorbing part of a crash cushion model "VECU-STOP" is located on a system of sliding feet being arranged in parallel and one after the other and is functionally controlled via steel rope system.

When immersing the parts into melted zinc all the steel parts are reliably protected against corrosion (EN ISO 1461).

On all models, the rear "multifunctional support" consists of a rigid V-shaped core and flexible lateral parts.
In case of lateral impacts, the lateral deflectors and segment plates provide function-proof redirection and sliding of an impacting vehicle.

In case of side and head-on impacts, the central attenuating area lying outside between the cylinders does most of the deformation work. Due to the filling and push elements arranged between the cylinders in impact direction, each cylinder is given a deformation property which converts the kinetic energies into deformation work in a most effective way.

The progressive CEN – crash cushion system

VECU-STOP ®

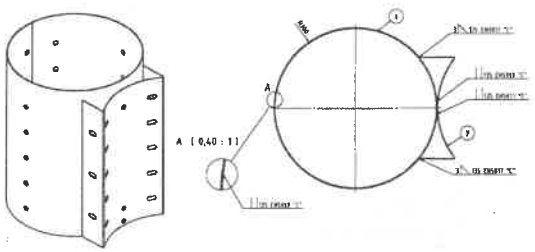
is presently subdivided in two model groups approved:

Group VS 120 = 1.20 m wide (2x0.60)
Group VS 100 = 1.00 m wide (2x0.50)

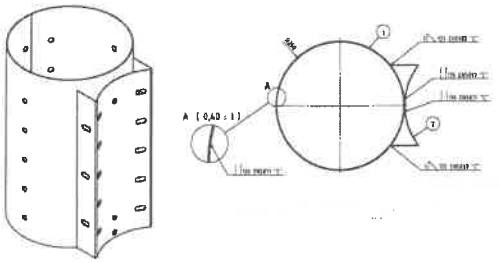
- parallel design and
- V-shaped design.

The model groups 120 and 100 have been successfully tested in accordance with DIN EN 1317 Parts 1 and 3 Table 9

Standard cylinder with filling element Model group 120



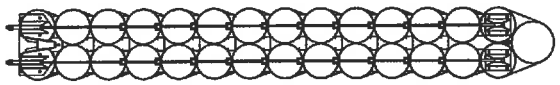
Standard cylinder with filling element Model group 100



Crash Cushion System "VECU-STOP®" Construction – Model groups – Components	**Chapter 1** **(Product Description)** **1/6**

Standard cylinders

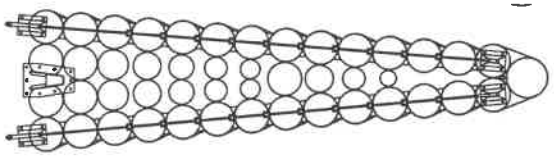
With side parallel designs of the model groups 120, 100 the standard cylinders are arranged in pairs in parallel.



With V-shaped designs, the standard cylinders are located on the outsides. The inner space is equipped with

filling pipes

which are able to spread the forces arising during a side impact.



The dimensions of the filling pipes are indicated in the respective parts lists and included in the parts lists of the model groups, which are an integral part of this manual.

Side panels

The side panels are always on the outsides; this applies to all models.

Side panel / VECU-STOP ®

During a side impact, they provide unhindered redirection and continuous sliding of the vehicle in the deflection phase.

In case of a head-on impact of a vehicle on the head of the respective model the pushing effect of the lateral parts will cause an additional energy converting bending process on the outer part of the deforming standard cylinders.

Crash cushion system VECU-STOP® Type R (redirecting type) side parallel shape

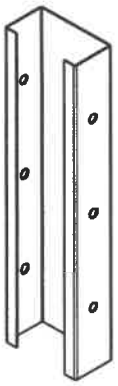
Crash cushion system VECU-STOP® Type R (redirecting type) angular shape

CEN- Crash Cushion System "VECU-STOP®" Construction – Model groups - Components	**Chapter 1** **(Product Description)** **1/7**

C - Profiles

These profiles are used for side parallel models of model group 120 and 100. They are used for transmission and spread of the impact forces in case of a side impact. They are alternately fastened with M 16 screws on the filling and push elements.

C-Profile



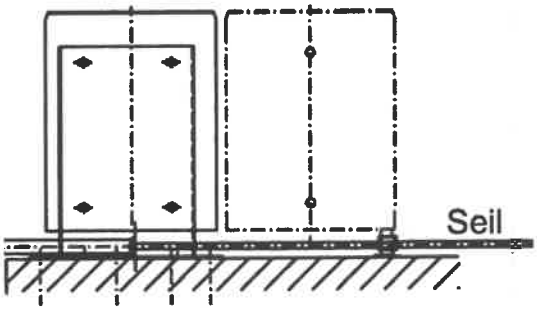
Sliding feet

The entire mobile, energy converting area of the VECU-STOP® crash cushion is installed on a large number of sliding feet that are arranged one after the other. They are equipped with a slide board at the bottom end and they are connected to the standard cylinders via 2 M 16 screws at the top end.

The guidance ropes of 20 mm Ø are pulled through the entirely closed duct into the sliding feet (see figure below) guiding the crash cushion longitudinally and preventing too strong deflection in lateral direction.

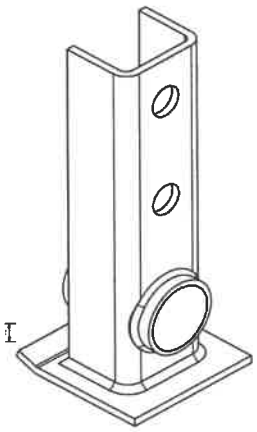
Not only at the beginning but also at the end of the crash cushion are the otherwise closed rope guides open on one side in order to assure perfect functioning while a vehicle is sliding along. (see figure below)

Guidance rope system in the foot area

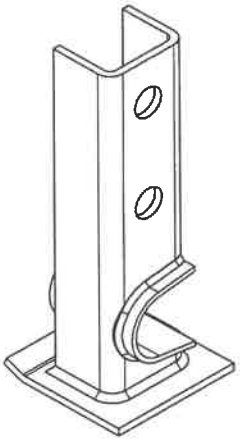


Rope

Sliding foot closed



Sliding foot laterally open

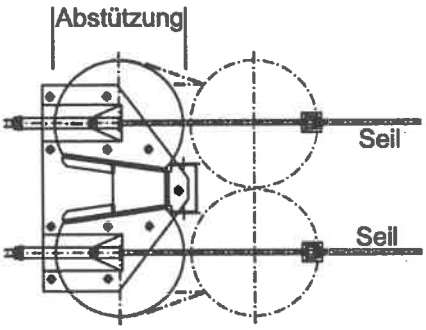


CEN - Crash Cushion System "VECU-STOP®"
Construction – Model groups - Components

Chapter 1
(Product Description)
1/8

End support

On all models the rear, multifunctional support consists of a rigid V-shaped core and of elastic lateral parts which are composed of segment pipes, filling pipes and standard cylinders. The parts are indicated in the respective parts lists.



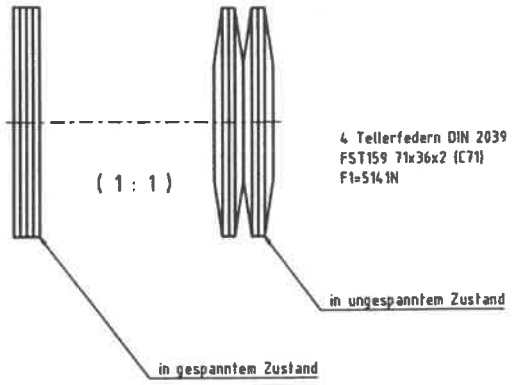
Anchorage and rope guidance system

The rear support as well as guidance rope of the individual models are fastened on the respective installation surfaces (underground) via anchorages.

The rope guidance system provides directionally solid absorbing behaviour during head-on impacts and safe redirecting behaviour of each model in case of side impacts.

The tension of the guidance ropes is controlled by spring washers

During installation, attention is to be paid to the spring washers that they are tensioned lying on top of each other evenly.



Due to the flatness of all four spring washers per rope, the spring force is increased from 5144 N to 6260 N.
This corresponds to a pretension of 6.3 kN for each individual rope.

The anchorage technology

A detailed description of the anchorage technology used on the different installation surfaces can be found in Chapter 2 of the installation manual under transport and installation with corresponding drawing examples.

Should there be any unevenness of the installation surface, it could be necessary to use plastic mortar or a balancing plate for levelling. These levelling layers are not considered as component part of the crash cushion design.

Rope guidance: see Annex :

Model group VS 100 Draw. No. 5024.01 VS-100/10
Draw. No. 5025.01 VS-100/13
Draw. No. 5026.01 VS-100/14

Model group VS 120 Draw. No. 4853.01 VS-120/10
Draw. No. 4304.04 VS-120/13
Draw. No. 5233.00 VS-120/14

Chapter 2

Installation Manual

CEN – Crash Cushion System „VECU-STOP®“ General Notes	**Chapter 2 (Installation Manual) 2/1**

General Notes

The crash cushion system VECU STOP® 100 and 120 was successfully tested for the speed classes 80 / 100 / 110 in accordance with the requirements of Din EN 1317-1 / 3 / 5. All the crash cushion models are "redirective", Type R.

When installing the crash cushions from the VECU STOP 100 a. 120 system, it is necessary to consider the following execution details.

The crash cushion is provided for installation in the traffic area in compliance with the corresponding national regulations. Applicable regulations: RPS 2009 / DIN EN 1317 / Recommendations for use by BASt / ZTV-FRS / relevant DIN standards (currently applicable versions)

Installation of the crash cushion models from the VECU STOP system should be carried out by skilled installation specialists or supervised by qualified personnel of the manufacturer SPS - Schutzplanken GmbH. Self-monitoring inspections shall be carried out.
A self-monitoring record shall be prepared.

It is always necessary to ensure that only marked components are installed for which a verification of suitability (certificate of successful third-party monitoring) is available.

Always make sure that screwing is carried out properly.
Screws M 14 to M 16 = 50 Nm maximum 140 Nm

Connecting constructions to further vehicle restraint systems are available and can be ordered for the respective system from the manufacturer (SPS- Schutzplanken GmbH). They are not an integral part of impact tests.

Practical cases of use cannot always correspond to the conditions described in the test reports. In these cases, the manufacturer SPS-Schutzplanken GmbH should be contacted so that they can develop solutions to reach the best possible protection level.

CEN – Crash Cushion System "VECU-STOP®" Transport and Installation	**Chapter 2 (Installation Manual) 2/2**

Shipping instructions

All the main parts are loaded as pre-mounted modular units of max. 1000 kg total weight.

When bundling, do only use package tape which protects bundled parts against corrosion.

During loading and unloading, take care that the surface coating (zinc-plating) is not damaged.

Make sure that the load on the transport vehicle is secured and observe the relevant safety regulations.

Installation

Install crash cushions following SPS' manufacturer's instructions. The installation has been described in detail in Chapter 2 of the installation manual. In order to avoid installation errors trained personnel will be issued training certificates.

Shipment

Crash cushions are shipped in pre-mounted assemblies. As to their dimensions / compositions they depend on the means of transport being available. From case to case, a loading plan is drawn up: It shows the individual pre-mounted assemblies which are marked for assembly. Please refer to our QM transport and installation instructions.

Positioning

1) Find out the speed driven at the construction site.

2) Decide which design is installed for the intended use:
   a) a parallel model
   b) a V-shaped model
as the geometrical shape of the crash cushion needs to be adjusted to the geometry of the local condition.

3) Check whether the crash cushion is to be installed directly in front of the obstacle in question or whether it should be preferably located at a possibly long safety distance between obstacle and end of crash cushion. This safety distance, which may be 20 to 30 m, is often important in case of approaching lorries.

4) Around and within the crash cushion it is not allowed to install any objects or road equipment, which could affect the function of the crash cushion in a negative way such as e.g. sign tubes or similar.

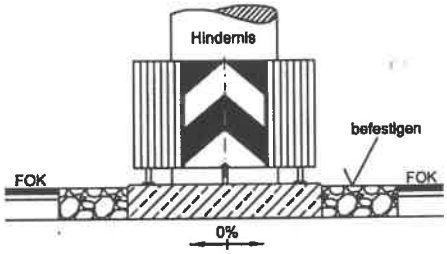
5) If a crash cushion is to be installed on an island with edged kerbstones, these kerbstones are to be removed and lowered to the level of the upper edge of the lane + 0.02/0.03 m. If the kerbstones are 0.07 m high and inclined, it will be the customer's decision to consider modification of the kerbstones as necessary.

6) Furthermore, check whether there are supply lines or shafts in the area of the installation place, which need to be taken into account for the location and design of the crash cushion.

CEN - Crash Cushion System "VECU-STOP®" Installation at different roadway heights	**Chapter 2** **(Installation Manual)** **2/3**

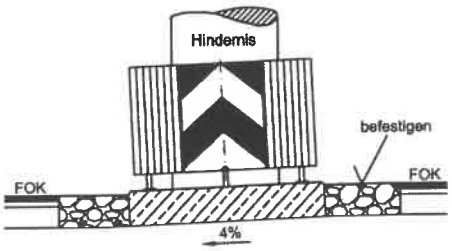
Installation up to a transversal slope of 8% is possible, should however be avoided for optical as well as especially functional reasons.

1



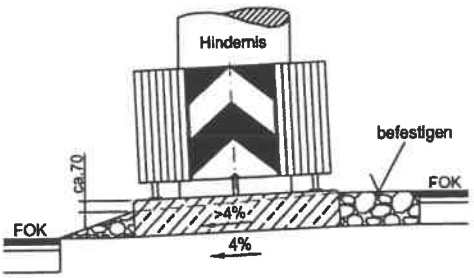
No special action needs to be taken for installation ***if there is an obvious transversal slope*** of the installation area of up to 4%.

2



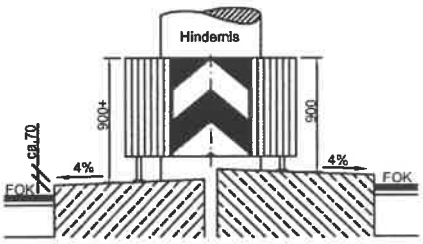
In case of bigger transversal slopes, it will be necessary to provide compensation measures in order to reach an inclination of 4% in that area.

3



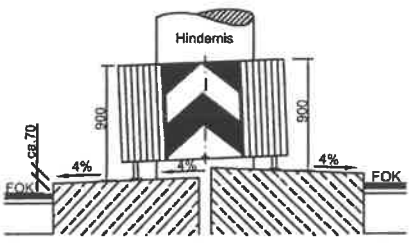
If the installation surface is terraced, the crash cushion needs to be arranged such that the unevenness is levelled out in the lower area of the crash cushion.

4



If the installation surface consists of two surfaces divided longitudinally, take care that the different movements of these surface parts are absorbed by the crash cushion.

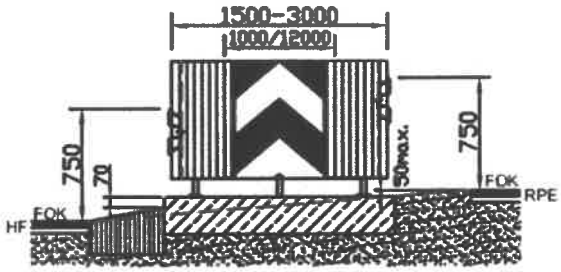
5



CEN – Crash Cushion System "VECU-STOP®" Anchorage at different roadway heights	**Chapter 2** **(Installation Manual)** **2/4**

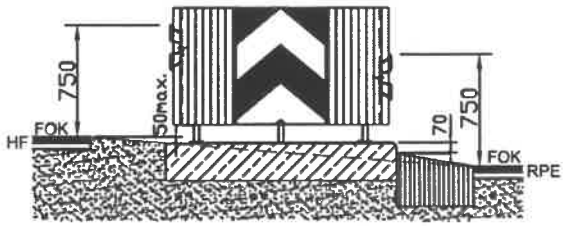
As far as possible install crash cushions horizontally. Take connections to other restraint systems into consideration.

6



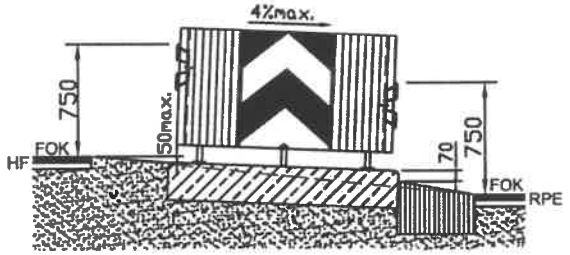
If roadway heights are different, major inclination of the crash cushion can be avoided when lifting the foundation on the deeper side.
Take connections to other restraint systems into consideration.

7



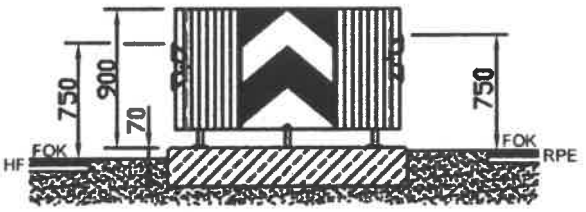
The foundation may overhang by up to 70 mm on the side of the crash cushion.
Take connections to other restraint systems into consideration.

8



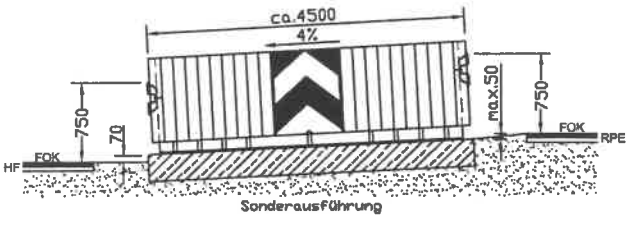
In case of major inclination the foundations should be arranged in a way that the inclination of the crash cushion will possibly not exceed 4%.
Take connections to other restraint systems into consideration.

9



Compensation is effected as shown in the drawing.
Take connections to other restraint systems into consideration.

10



When taking any action, take care that the foundations will not project more than 20 to 30 mm above FOK (foundation upper edge) in the **front area.**

HF: Hauptfahrbahn – principal roadway
RPE: Rampe - ramp

CEN – Crash Cushion System "VECU-STOP®" Installation / Installation surfaces	**Chapter 2** **(Installation Manual)** **2/5**

Also check whether a crash cushion should be installed standing alone or whether continuing restraint systems made of concrete or steel need to be connected.

Appropriate connections are included in the SPS drawings which have been elaborated for nearly all German and foreign constructions.

Underground

The crash cushion "VECU-STOP®" can be anchored.

a) on a foundation with foundation frame, reinforcement, and anchorage, which has been designed for the individual model using M 20 x 50 8.8 tZn bolts,

b) on a reinforced concrete surface, which is free of cracks, of at least 200 mm thickness via anchorage heavy-duty anchor Hilti HSL-3 ...M 20 or equivalent.

c) on an asphalt surface of at least 200 mm thickness using asphalt - screw-in anchors e.g. TOGE TSM B 22x150, M 16x30 or equivalent. Mounting on the existing asphalt surface should be checked with regard of future repairs

The entire surface underneath the crash cushion is to be secured. It should be at least 0.05 m larger than the exterior dimensions of the crash cushion in order to facilitate works in the road area and to avoid natural plant growth.

The contact areas must not affect the roadway surface water sewage system in a negative way either.

When anchoring takes place on a foundation produced on site, it is necessary to use the following concrete quality

Concrete class min. C 30/37 (LP) XC4, XD3, XF4 WA according to DIN EN 206 und DIN 1045-2

Due to the max. installation quantity of 5 m³ per foundation, third-party monitoring is not required.

When anchoring is effected on a reinforced concrete surface, which is free of cracks, respect the specified minimum thickness of the concrete surface, the heavy-duty anchor M20 heavy-duty anchor Hilti HSL-3 M 20 or equivalent used.

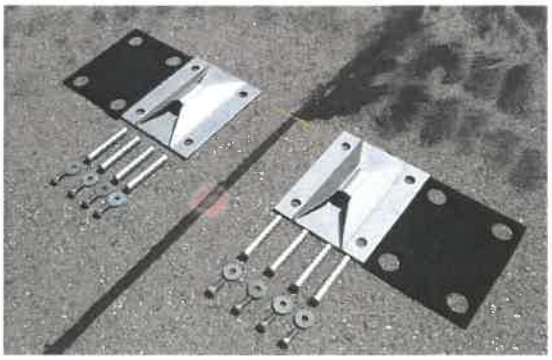
The installation temperature should neither exceed +30°C nor fall below +5°C. According to DIN 1045-3, the minimum temperatures of wet concrete are required for the installation; they apply to construction sites and ready-mix concrete.

When anchoring is effected on an asphalt cover, make sure the minimum thickness is 0.20 m.

The minimum requirement / homogenous areas of the soil conditions – for the foundations / produced on site
= silt weak sandy clayey (clay)
Soft consistency; plasticity: slightly to medium plastic / local designation clay.

Foundation with reinforcement and anchorage

Asphalt screw-in anchor for anchorage plates (Front)



CEN – Crash Cushion System "VECU-STOP®"
Minimum Requirement of the Homogenous Area

Chapter 2 (Installation Manual) 2/6

System 100

INSTITUT FÜR ANGEWANDTE GEOLOGIE UND UMWELTANALYTIK BREHM	SPS Schutzplanken GmbH - Aschaffenburg				Auftragsnr.:	1608504
	Modelle und Setzungen				Anlage:	2
Modell-Bezeichnung	Gesamtmasse (to)	Vertikallast (kN)	Fläche Fundament (m²)	Bodenpressung (kN/m²)	maximale Setzung (cm)		
VS-P100/2:10	7,1	71,0	7,04	10,1	0,27		
VS-V100/3:10	7,63	76,3	8,93	8,5	0,25		
VS-V100/4:10	8,76	87,6	10,52	8,3	0,26		
VS-V100/5:10	10	100,0	12,16	8,2	0,27		
VS-P100/2:13	8,8	88,0	8,69	10,1	0,29		
VS-V100/3:13	9,36	93,6	10,90	8,6	0,26		
VS-V100/4:13	10,92	109,2	12,90	8,5	0,28		
VS-P100/2:14	9,46	94,6	9,24	10,2	0,29		
VS-V100/3:14	9,9	99,0	11,67	8,5	0,26		
VS-V100/4:14	11,6	116,0	13,99	8,3	0,27		

Eigenschaften Verwendete Bodenart / Homogenbereich: Schluff, schwach sandig, tonig (Lehm), Konsistenz: weich; Plastizität: leicht bis mittelplastisch (wl = < 35% bis < 50%, wp = 10 bis < 20 %); Wichte, feucht, γ: 18 kN/m³; Reibungswinkel ϕ: 27,5°, Steifemodul Es = 3,0 MN/m², Organischer Anteil: < 5%; Bodengruppe n. DIN 18196: UL/TL bis UM/TM; Anteil Steine: < 5%; Undrainierte Scherfestigkeit cu: ca. 50 kN/m²; Wassergehalt: ca. 15-20 %; Ortsübliche Bezeichnung: Lehm (z.B. Auelehm, Lößlehm, Hanglehm)

System 120

INSTITUT FÜR ANGEWANDTE GEOLOGIE UND UMWELTANALYTIK BREHM	SPS Schutzplanken GmbH - Aschaffenburg				Auftragsnr.:	1608504
	Modelle und Setzungen				Anlage:	1
Modell-Bezeichnung	Gesamtmasse (to)	Vertikallast (kN)	Fläche Fundament (m²)	Bodenpressung (kN/m²)	maximale Setzung (cm)		
VS-P120/2:10	9,18	92,0	9,2	10,0	0,30		
VS-V120/3:10	9,9	99,0	11,9	8,3	0,30		
VS-V120/4:10	11,7	117,0	14,4	8,1	0,24		
VS-V120/5:10	13,5	135,0	16,7	8,1	0,30		
VS-P120/2:13	11,5	115,0	11,9	9,7	0,30		
VS-V120/3:13	12,5	125,0	14,9	8,4	0,28		
VS-V120/4:13	12,5	125,0	18,0	6,9	0,23		
VS-P120/2:14	12,4	124,0	12,7	9,8	0,31		
VS-V120/3:14	13,2	132,0	15,9	8,3	0,28		
VS-V120/4:14	15,6	156,0	19,1	8,2	0,30		

Eigenschaften Verwendete Bodenart / Homogenbereich: Schluff, schwach sandig, tonig (Lehm), Konsistenz: weich; Plastizität: leicht bis mittelplastisch (wl = < 35% bis < 50%, wp = 10 bis < 20 %); Wichte, feucht, γ: 18 kN/m³; Reibungswinkel ϕ: 27,5°, Steifemodul Es = 3,0 MN/m², Organischer Anteil: < 5%; Bodengruppe n. DIN 18196: UL/TL bis UM/TM; Anteil Steine: < 5%; Undrainierte Scherfestigkeit cu: ca. 50 kN/m²; Wassergehalt: ca. 15-20 %; Ortsübliche Bezeichnung: Lehm (z.B. Auelehm, Lößlehm, Hanglehm)

CEN – Crash Cushion System "VECU-STOP®"
Anchor system in pre-fabricated steel frame with reinforcement

Chapter 2
(Installation Manual)
2/7

The anchoring technology makes the difference

The VECU-STOP DBP system has been designed to form a complete functional unit consisting of crash cushion and foundation which does not only offer convincing technical but also economic advantages – especially in the area of job management and regarding final installation of the crash cushion on site.

Permanent formwork with welded reinforcement (DBP) and front and rear anchorage bushes are placed and positioned on a dimpled sheet. The location of the crash cushion and the positions of the anchorage bushes are thus clearly specified. The anchorage bushes are fastened such that they can neither change vertically nor laterally when being set in concrete.

The prefabricated anchor bushes are connected with the reinforcement. Consequently, previous preparation works for drilling and placing of dowels are no longer necessary.

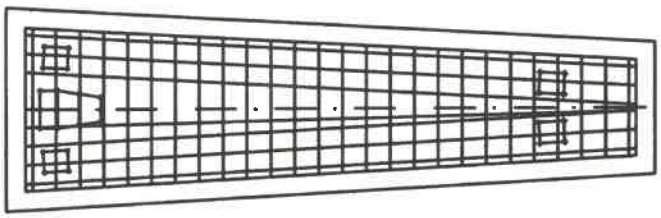
The prefabricated anchor constructions are set in concrete with their round threaded bushes without stress. Therefore, no cracks will occur in the concrete. The anchors can neither detach nor loosen so that reliable anchoring of the crash cushion system VECU-STOP® is ensured.

CEN – Crash Cushion System "VECU-STOP®"

Anchor system in prefabricated steel frame with reinforcement

Chapter 2
(Installation Manual)
2/8

1



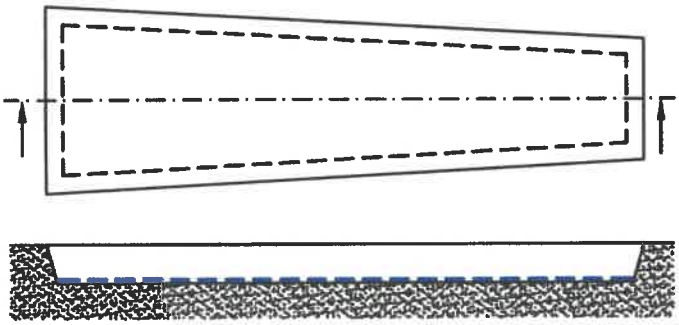
Geometrical layout

Position steel frame

Mark excavation on underground

Remove steel frame

2



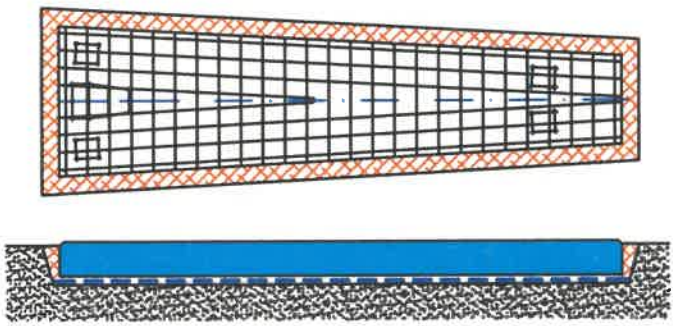
Final excavation:

Make earth excavation according to drawing

Take excavation material, remove and dispose of properly
or spread in the surroundings as appropriate

Place dimpled sheet

3



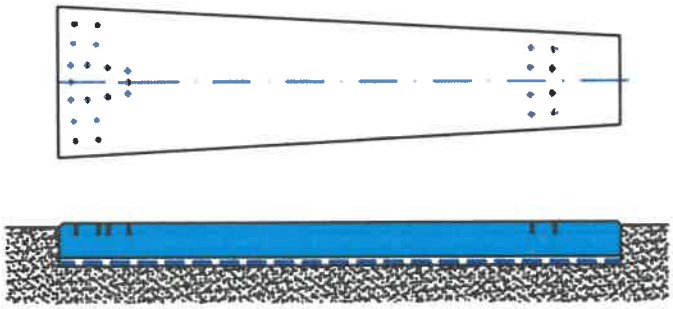
Foundation framework (FR) :

Put FR in construction pit,
align vertically and horizontally

anchor bushes max. 10 mm
underneath concrete surface

Fill open gap (joint) between FR and excavation

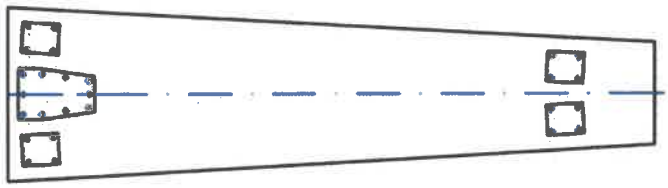
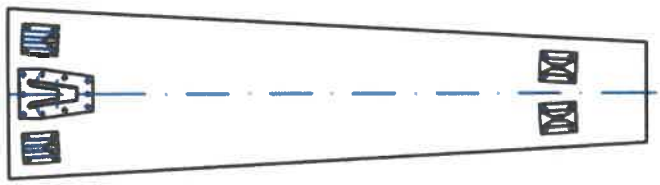
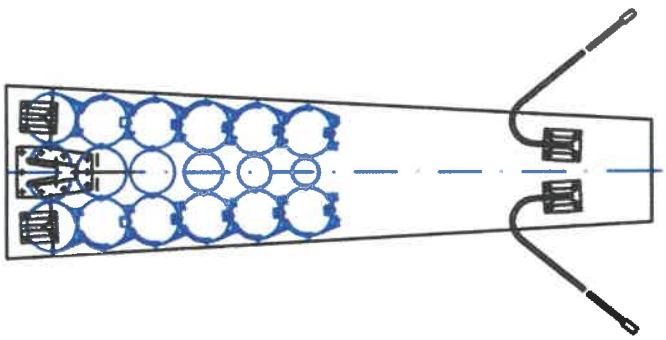
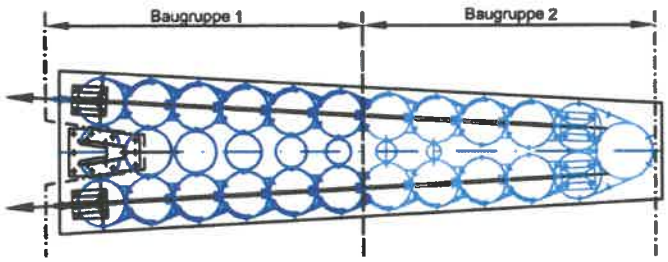
4



Setting in concrete:

Place in concrete,
shake and level

Use concrete quality
ZTV-ING or acc. to DIN EN 206/1
DIN 1045-2
C 30/37 (LP) XC4, XD3, XF4 F2
plastic graining 0-16 cement acc. to DIN EN 197-1 rock graining acc. to DIN EN 12620 and DIN V 20000-103 frost and thawing salt resistance: M 25.

CEN – Crash Cushion System "VECU-STOP®" Anchor system in prefabricated steel frame with reinforcement	**Chapter 2** **(Installation Manual)** **2/9**
	5 expose threaded bushes Before installation of the anchor plates and rear support (in case of unevenness of the anchorage surface), place neoprene plates or apply plastic mortar
	6 Install rear support and anchor plates in the rear and front area using hexagon screws M 20 x 50 quality 4.6.
	7 Move in pre-mounted assemblies using a utility truck with cargo crane (at least 1000 kg crane load) or an all-terrain forklift and fasten with screws (start with the 1st assembly at the rear.) Align both ropes
E 	8 Remove assembly 2 from lorry, move in and attach to assembly 1 with screws and align Push ropes through the sliding foot structure on both sides and pull through the rear anchor plate. At the end (E) tension via 4 pieces of spring washers and M 36 nuts.

CEN – Crash Cushion System "VECU-STOP®" Anchorage system in prefabricated steel frame with reinforcement	**Chapter 2** **(Installation Manual)** **2/10**

INSTALLATION EQUIPMENT:

A) Vehicles and equipment:

- Utility truck with cargo crane, working range 5.0 m/ 3.5 to
  (or all-terrain forklift)

B) Small tools:

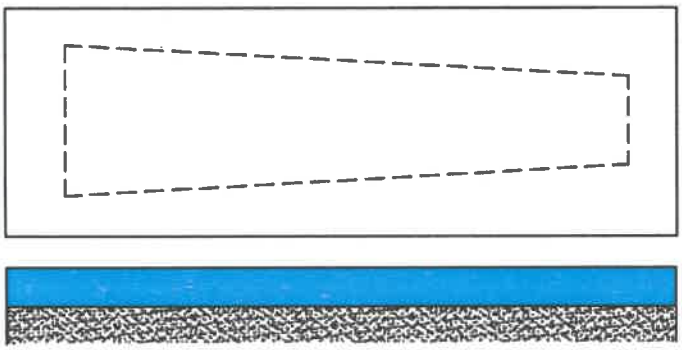
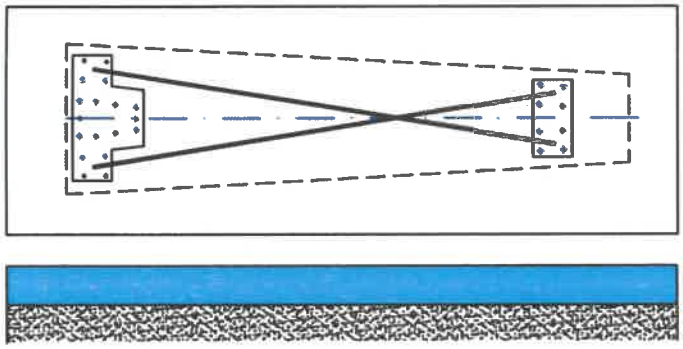
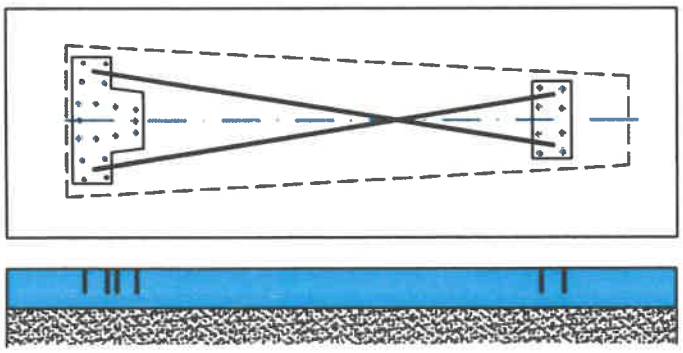
Impact wrench with socket wrench as follows:
- M 20 screw-tap
- SW 30 / ratchet wrench / for screwing M20
- SW 24 for screwing M16 VECU-STOP

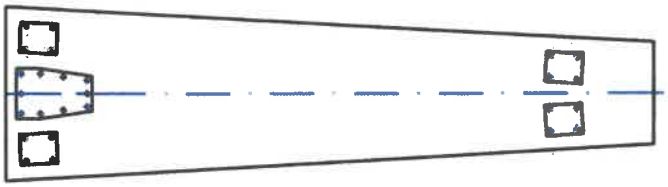
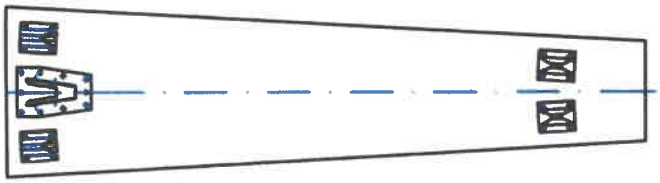
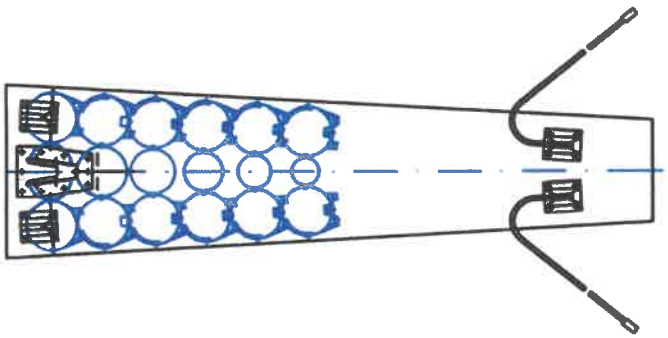
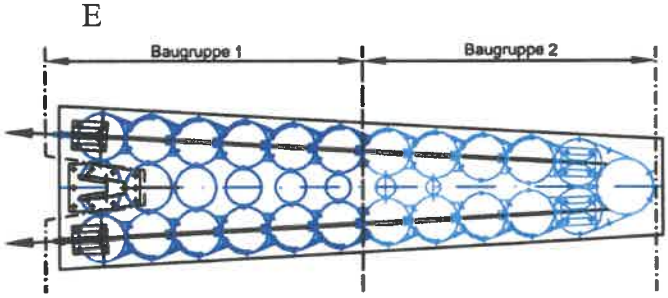
Fork wrench
- SW 24 for screwing M16, VECU-STOP
- SW 30 for screwing M20, base and anchor plates
- SW 46 for screwing M36 rope, on anchor plate
- SW 55 for screwing M36 tension rope
- Mandrel (2 pieces) of approx. 18-20 mm diameter for centring the screwing holes
- Hand-held hammer 1 x 200 g and 1 x 500 g
- Side nippers for cutting into length for edge protection (complementary)
- Chisel

C) Special tools from SPS :

- Chain sling, 4 slabs L=2.50 m / 2.0 to
- Magnetic key SW 24 (2 pieces)

The pre-mounted assemblies have a weight of max. 1000 kg.

CEN – Crash Cushion System "VECU-STOP®" Anchorage on uncracked concrete surface	**Chapter 2** (Installation Manual) **2/11**
1 	**Site conditions** Check whether the existing anchorage surface, here uncracked concrete surface, is at least 20 cm thick, perfectly compacted, and does not show any significant hollow spaces -
2 	**Geometric layout** Draw the geometry of the crash cushion on the existing anchorage field.
3 	**Place and adjust drilling jig**
4 	**Anchorage holes** Drill the anchorage holes defined through the drilling jig / bit diameter 28 mm / drilling depth 155mm Clean bore / blow out carefully to be free of dust.

CEN – Crash Cushion System "VECU-STOP®" Anchorage on uncracked concrete surface	**Chapter 2** **(Installation Manual)** **2/12**
5 	Before installation of the anchor plates and rear support, (in case there is any unevenness in the anchorage field) place neoprene plates or apply plastic mortar
6 	**Mount anchor plates** Anchor rear support and anchor plates in the rear and front area using HILTI heavy-load anchor HSL-3-G M 20 or equivalent
7 	**Install crash cushion** Move in pre-mounted assemblies using a utility truck with cargo crane (at least 1000 kg crane load) or an all-terrain forklift and fasten with screws (start with the 1st assembly at the rear.) Align both ropes
8 E 	Remove assembly 2 from lorry, move in and attach to assembly 1 with screws and align Push ropes through the sliding foot structure on both sides and pull through the rear anchor plate. At the end (E) tension via 4 pieces of spring washers and M 36 nuts.

CEN – Crash Cushion System "VECU-STOP®" Anchorage on uncracked concrete surface	**Chapter 2** **(Installation Manual)** **2/13**

Installation instructions:
HILTI heavy-load anchor

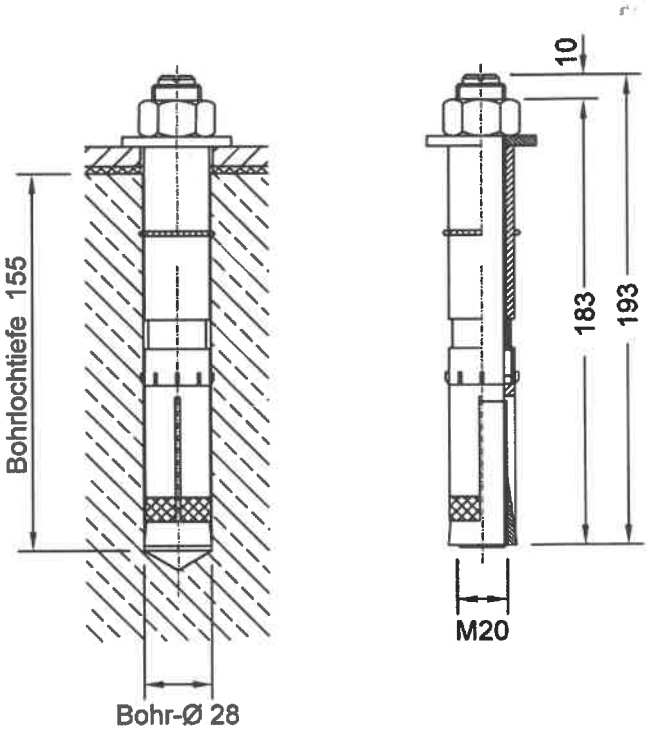
Drilling:
Drill Ø 28 mm
Drilling depth = 155 mm

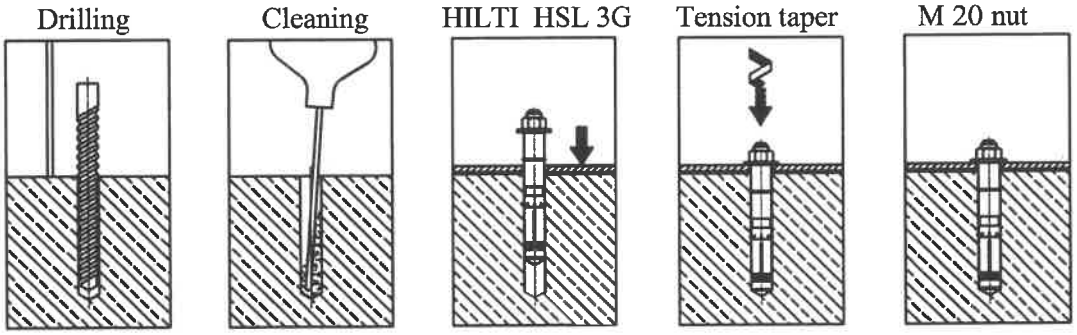
Cleaning:
Blow out bore carefully to be free of dust

Final installation /anchor:
Put HILTI heavy-load anchor with integrated washer and M 20 nut into bore and anchor through controlled bracing. Wrench width M 30
Torque at anchorage 160 KN

Make:
Hilti heavy-load anchor HSL-3-G

HILTI HSL 3G M 20





CEN – Crash Cushion System "VECU-STOP®" Anchorage on uncracked concrete surface	**Chapter 2** **(Installation Manual)** **2/14**

INSTALLATION EQUIPMENT:

A) Vehicles and devices:

- Utility truck with cargo crane, working range 5.0 m / 1.5 to
  (*or* all-terrain forklift truck)
- Compressor with air hose (2x20m) approx. 1000 l / min / 8 bar
- Power generator 3-5 KW, cable approx. 50 m
- heavy-duty hammer drill, drilling range up to 25 mm diameter
- hammer drill (boring bar), 25 mm diameter, boring depth approx. 200 mm for anchor bar M20x220

B) Small tools:

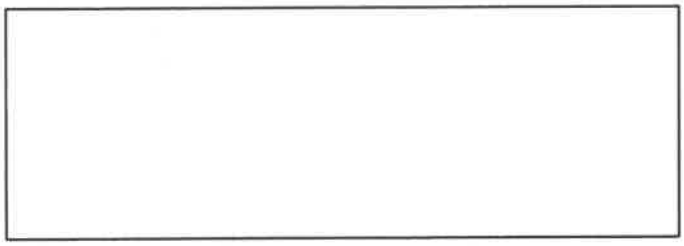
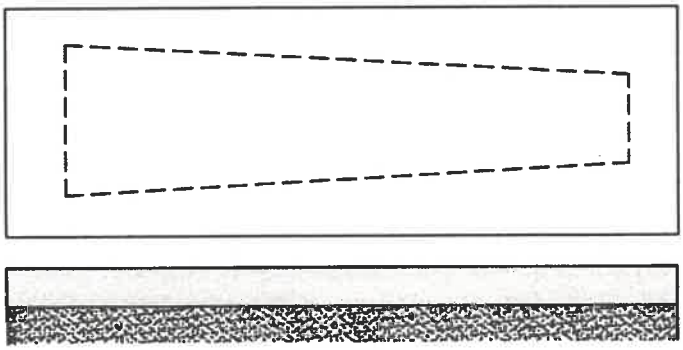
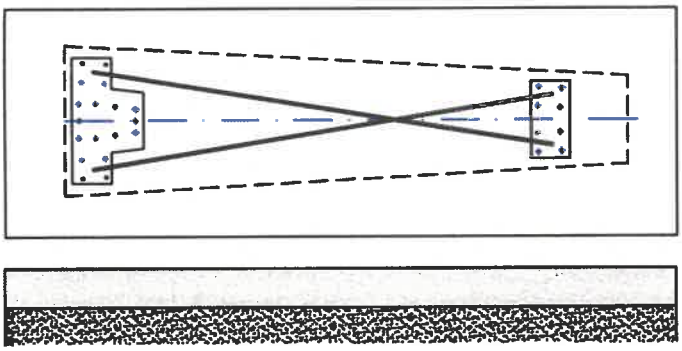
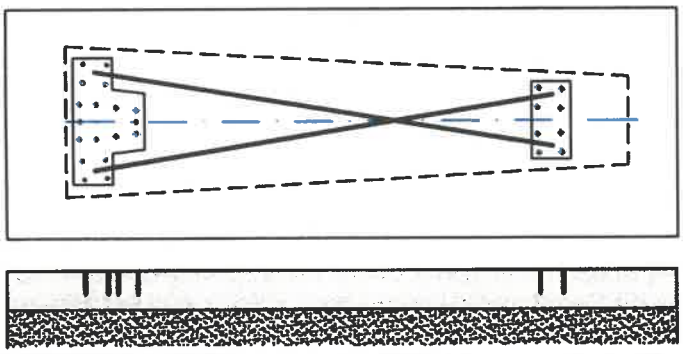
Impact wrench with socket wrench as follows:
- SW 14 for installation of anchor bars M20x220
- SW 24 for screwing M16 VECU-STOP
- SW 30 for base and anchor plate screwing M20

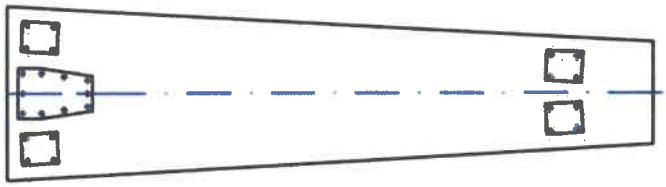
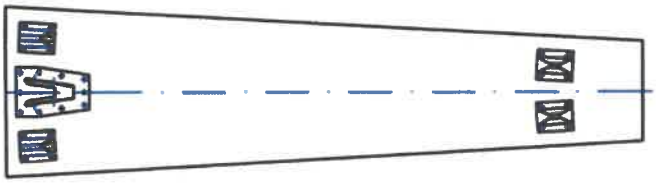
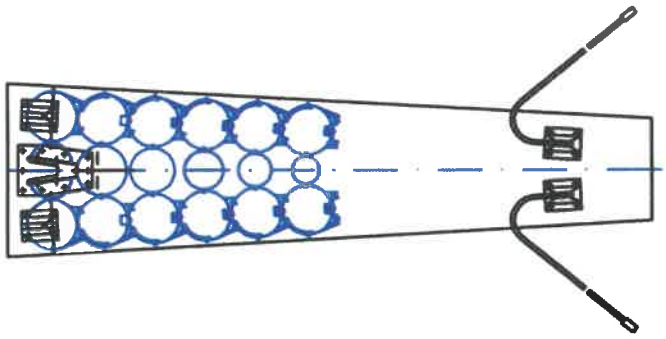
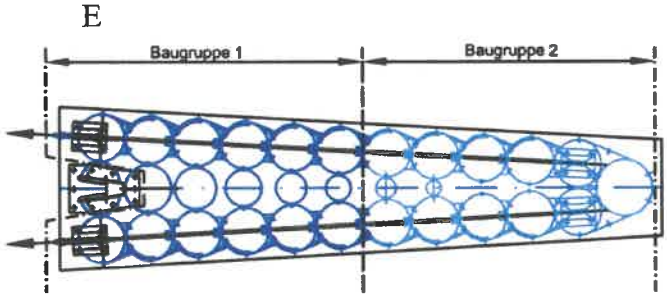
Fork wrench:
- SW 24 for screwing M16, VECU-STOP
- SW 30 for screwing M20, base and anchor plates
- SW 46 for screwing M30, rope on anchor plate
- SW 55 for screwing M36, tension rope
- Mandrel (2 pieces) of approx. 18 to 20 mm diameter for centring the screwing holes
- Hand-held hammer 1 x 200 g and 1 x 500 g
- Side nippers for cutting into length for edge protection (complementary)

C) Special tools from SPS):

- chain sling, 4 slabs L = 2.50 m / 2.0 to
- magnetic wrench SW 24 (2 pieces)
- drilling jig

The pre-mounted assemblies have a weight of max. 1000 kg.

CEN – Crash Cushion System "VECU-STOP®" Anchorage on asphalt surface	**Chapter 2** (Installation Manual) **2/15**
1 	**Site condition** Check whether the existing anchorage surface, here asphalt surface, is at least 20 cm thick.
2 	**Geometric layout** Draw the geometry of the crash cushion on the existing anchorage field.
3 	Place and align drilling jig
4 	Drill anchorage holes defined by the drilling jig, drill Ø 22 mm x 165 mm. Remove drilling jig Clean bore carefully Fill in compound mass (3 strokes) TSM B 22 x 150 M 13 x 30 Screw in anchor flush

CEN – Crash cushion System „VECU-STOP®“ Anchorage on asphalt	**Chapter 2** **(Installation Manual)** **2/16**
	5 Before installation of the anchor plates and rear support, (in case there is any unevenness in the anchorage field) place neoprene plates or apply plastic mortar
a) 	6 Install rear support and the anchor plates in the rear and front area using hexagon screw M 16x40 8.8. with Ø50x18x6 washer.
	7 Move in pre-mounted assemblies using a utility truck with cargo crane (at least 1000 kg crane load) or an all-terrain forklift and fasten with screws (start with the 1st assembly at the rear.) Align both ropes
E 	8 Remove assembly 2 from lorry, move in and attach to assembly 1 with screws and align Push ropes through the sliding foot structure on both sides and pull through the rear anchor plate. At the end (E) tension via 4 pieces of spring washers and M 36 nuts.

CEN – Crash Cushion System "VECU-STOP®" Anchorage on asphalt	**Chapter 2** **(Installation Manual)** **2/17**

Asphalt screw-in anchor e. g:
TOGE

Product name: TSM B 22 x 150 M 13 x 30
Inner thread M 16 x 30 mm
Bore Ø 22mm
Bore depth: 165 mm
Thread reach: 150 mm
Asphalt thickness ≥ 200mm
Residual thickness of asphalt : ≥ 35 mm

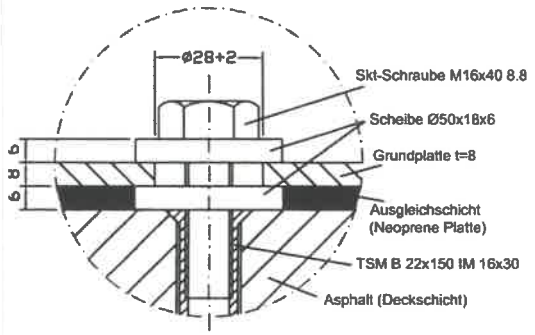
Average failure loads:
1) static tensile force: 65 KN
2) dynamic tensile force 100 KN*

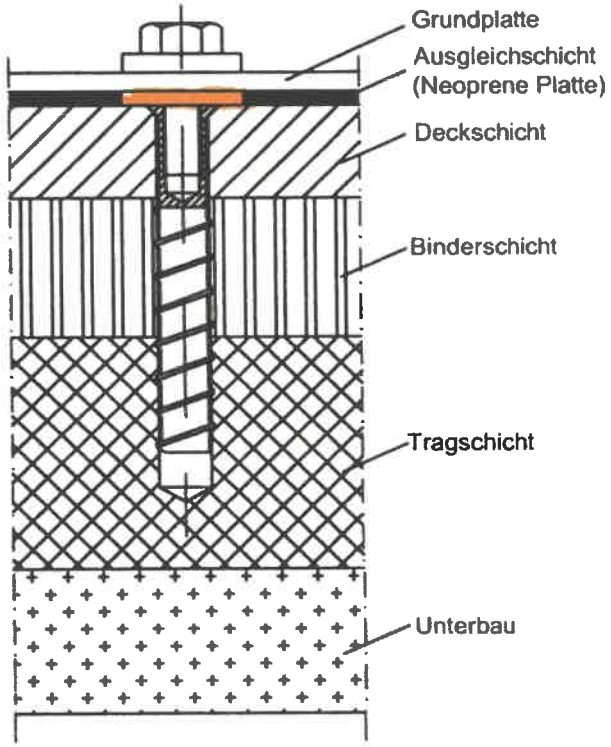
* when using a
clamping screw M 16 8.8

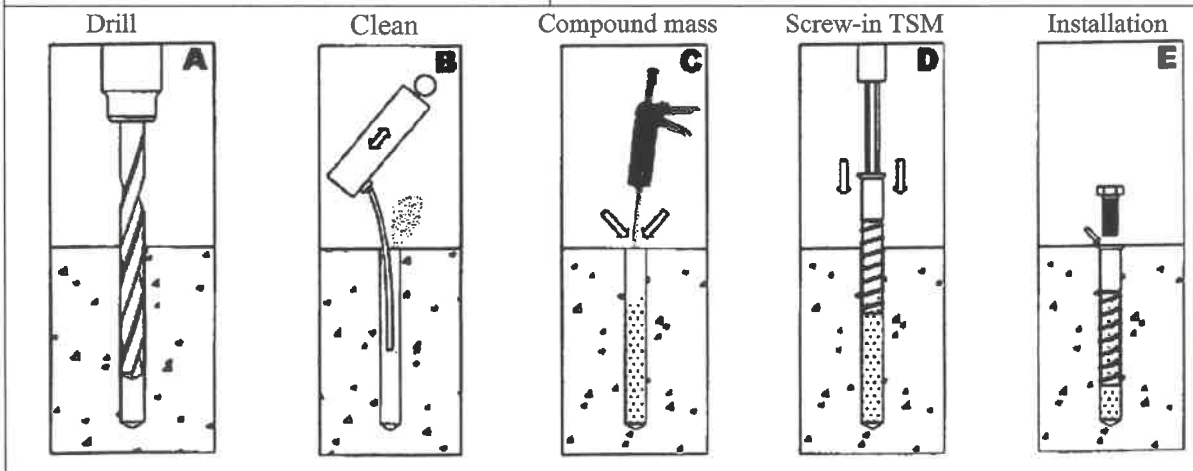
Processing:

1) Make bore 22x65mm
2) Clean bore
3) fill in compound mass (3 strokes)
4) screw in TSM tight
5) no hardening time
TSM may be loaded immediately

Attention:
Upon reaching the thread reach, the compound mass needs to project under the collar.
TSM needs to be tensioned towards the connected component. No permanent loads must be applied.







CEN – Crash Cushion System "VECU-STOP®" Anchorage on asphalt	**Chapter 2** **(Installation Manual)** **2/18**

INSTALLATION EQUIPMENT:

A) Vehicles and devices:

- Utility truck with cargo crane, working range 5.0 m / 1.5 to
  (*or* all-terrain forklift)
- Compressor with air hose (2x20m) approx. 1000 l / min / 8 bar
- Power generator 3-5 KW, cable approx. 50 m
- Heavy-duty hammer drill, drilling range up to 22 mm diameter
- Hammer drill (boring bar), 22 mm diameter, boring depth approx. 165 mm for screw-in anchor

B) Small tools:

C)

Impact wrench with socket wrench as follows:

- SW 24 for screwing M16 VECU-STOP
- SW 24 for base and anchor plate screwing ISM B22x150 / M16x30

Fork wrench:

- SW 24 for screwing M16, VECU-STOP
- SW 30 for screwing M20, base and anchor plates
- SW 46 for screwing M30, rope on anchor plate
- SW 55 for screwing M36, tension rope
- Mandrel (2 pieces) of approx. 18-20 mm diameter for centring the screwing holes
- Hand-held hammer 1 x 200 g and 1 x 500 g
- Side nippers for cutting into length for edge protection (complementary)

C) Special tools from SPS):

- chain sling, 4 ropes L = 2.50 m / 2.0 to
- magnetic wrench SW 24 (2 pieces)
- drilling jig
- TOGE compound mass cartridge with injection pistol

The pre-mounted assemblies have a weight of max. 1000 kg.

CEN – Crash Cushion System „VECU-STOP®“ Anchorage on bridges Installation on reinforced concrete top covers	**Chapter 2** **(Installation Manual)** **2/19**

Crash cushion according to DIN EN 1317-3

Even on bridges energy absorbing crash cushions can be of benefit to safety in different places.

Not only at branching points where concrete and/or steel systems begin but also in corners or niches. Where ever veering vehicles including their passengers could become damaged or cause harm to other road users, crash cushions according to DIN EN 1317 part 3 are useful, often lifesaving installations.

Crash cushions on concrete or steel top covers

A) The energy absorbing crash cushion system “VECU-STOP” according to DIN EN 1317-3 Type R (absorbing and redirecting) is appropriate for the connection of further restraint systems made of concrete or steel.

The different models of the “VECU-STOP” system may also be anchored on concrete or steel top covers of structures in order to fulfil the functions of a crash cushion on the hand and to absorb the forces of the connected restraint systems during a side impact on these systems on the other hand.

The reinforced concrete top covers normally have a thickness of 15 to 18 cm and are placed on the structure located underneath. In-between there is the insulation layer.

For measuring the structure vertical and horizontal loads as well as the substitute loads, which can reach the structure due to the side impact on the integrated vehicle restraint system, are taken into account.

The component (cover tongue) is to be measured for an effect that corresponds to 1.25 times of the local characteristic resistance of the safety device (here: crash cushion).

If the installation place of the crash cushion is on top of the structure, this value needs to be increased to 1.5 times.

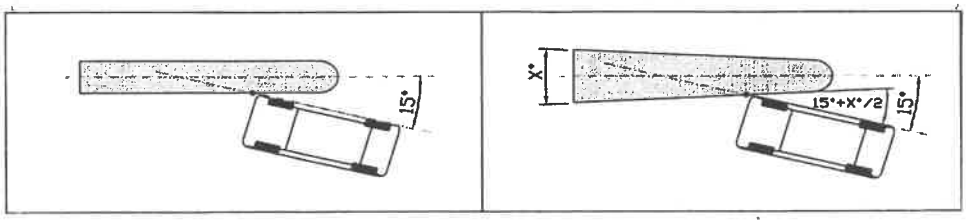
CEN – Crash Cushion System „VECU-STOP®“ Anchorage on bridges Installation on reinforced concrete top covers	**Chapter 2** **(Installation Manual)** **2/20**

Crash cushion system VECU-STOP model series and impact tests according to DIN EN 1317 part 1 and 3

During a vehicle impact on a crash cushion, the "substitute loads" are determined by the following parameters

Δs = deflection / way mF = vehicle mass mA = mass of crash cushion

System VECU-STOP Model series 100/120	mA Kg	Way m	Δs m	m/F Kg	Km/h	X 15 + 2 = sin.	
VS - P 100 / 2:10	1.267	5.67	0.50	1.300	80	15+0.0 = 15.0	✓
V 100 / 3:10	1.449	5.70	0.50	1.300	80	15+3.0 = 18.0	✓
V 100 / 4:10	1.539	5.68	0.50	1.300	80	15+6.5 = 21.5	✓
V 100 / 5:10	1.687	5.74	0.50	1.300	80	15+9.5 = 24.5	✓
VS - P 100 / 2:13	1.635	7.15	0.50	1.300	100	15+0.0 = 15.0	✓
V 100 / 3:13	1.772	7.23	0.50	1.300	100	15+2.5 = 17.5	✓
V 100 / 4:13	1.970	7.17	0.50	1.300	100	15+5.0 = 20.0	✓
VS - P 100 / 2:14	1.758	7.70	0.50	1.500	110	15+0.0 = 15.0	✓
V 100 / 3:14	1.904	7.74	0.50	1.500	110	15+2.0 = 17.0	✓
V 100 / 4:14	2.123	7.70	0.50	1.500	110	15+4.5 = 19.5	✓
VS - P 120 / 2:10	1.691	6.66	0.50	1.300	80	15+0.0 = 15.0	✓
V 120 / 3:10	1.877	6.64	0.50	1.300	80	15+3.0 = 18.0	✓
V 120 / 4:10	2.098	6.61	0.50	1.300	80	15+6.5 = 21.5	✓
V 120 / 5:10	2.337	6.62	0.50	1.300	80	15+9.5 = 24.5	✓
VS - P 120 / 2:13	2.143	8.49	0.50	1.300	100	15+0.0 = 15.0	✓
V 120 / 3:13	2.341	8.47	0.50	1.300	100	15+2.5 = 17.5	✓
V 120 / 4:13	2.383	8.49	0.50	1.300	100	15+5.0 = 20.0	✓
VS - P 120 / 2:14	2.243	9.10	0.50	1.500	110	15+0.0 = 15.0	✓
V 120 / 3:14	2.512	9.08	0.50	1.500	110	15+2.0 = 17.0	✓
V 120 / 4:14	2.821	9.08	0.50	1.500	110	15+4.5 = 19.5	✓



These are "approximate values" here because the deformation of the construction cannot be taken into account.

CEN – Crash Cushion System "VECU-STOP®" Anchorage on bridges Installation on reinforced concrete top covers	**Chapter 2** **(Installation Manual)** **2/21**

Calculation of the substitute loads:

for head-on impacts

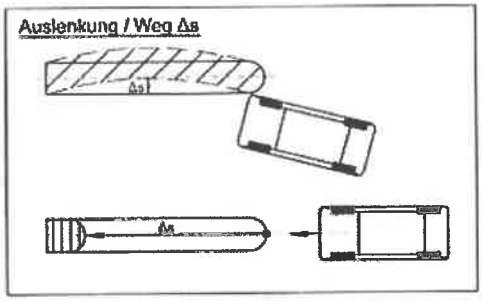
$$F = \frac{½ \, m_F^2 \times V_F^2}{(2.123 \text{ Kg}) \times \Delta s}$$

for side impacts

$$F = \frac{½ \, m_F^2 \times V_F^2 \times \sin 19.5° \text{ gross}}{(2.123 \text{ Kg}) \times (0{,}50 \text{m})}$$

System VECU-STOP Model series 100/120	Substitute load head-on kN	Substitute load lateral kN	Impact angle	Anchor M20:8.8	Safety 8.8	 4.6	
VS - P 100 / 2:10	58.08	170.44	15.0	19	12.3	4.6	
V 100 / 3:10	50.43	177.94	18.0	22	13.7	5.1	
V 100 / 4:10	47.73	198.70	21.5	22	12.3	4.6	
V 100 / 5:10	43.09	205.11	24.5	22	11.8	4.4	
VS - P 100 / 2:13	55.46	206.41	15.0	19	10.2	3.8	
V 100 / 3:13	50.89	221.16	17.5	22	11.0	4.1	
V 100 / 4:13	56.16	226.27	20.0	22	10.7	4.0	
VS - P 100 / 2:14	77.59	309.15	15.0	19	6.8	2.5	
V 100 / 3:14	71.27	322.46	17.0	22	7.5	2.8	
V 100 / 4:14	64.25	330.18	19.5	22	7.4	2.8	
VS - P 120 / 2:10	39.47	136.30	15.0	19	15.4	5.8	
V 120 / 3:10	35.52	147.96	18.0	22	16.4	6.2	
V 120 / 4:10	31.34	154.40	21.5	22	15.8	5.9	
V 120 / 5:10	23.84	137.60	24.5	22	17.7	6.6	
VS - P 120 / 2:13	37.26	165.70	15.0	19	12.7	4.7	
V 120 / 3:13	34.16	176.10	17.5	22	13.8	5.2	
V 120 / 4:13	33.27	196.50	20.0	22	12.4	4.6	
VS - P 120 / 2:14	53.42	254.50	15.0	19	8.3	3.1	
V 120 / 3:14	47.71	256.10	17.0	22	9.5	3.6	
V 120 / 4:14	42.26	259.00	19.5	22	9.4	3.5	

F = substitute load
mF = vehicle mass
VF = vehicle speed in m/sec.
mA = effective mass crash cushion
Δs = deflection / way of effective mass



These are "approximate values" here because the deformation of the construction cannot be taken into account.

CEN – Crash Cushion System „VECU-STOP®“ Anchorage on bridges Installation on the reinforced concrete top covers	**Chapter 2** **(Installation Manual)** **2/ 22**

Derivation of the substitute loads from the principle of conservation of energy

During an impact, the kinetic energy is converted into deformation work

$$Wkin = Wplast$$

The plastic deformation work depends on the absorption capacity of the cylinder bodies and their integral parts on the available deceleration distance. The vehicle experiences a counter acceleration (deceleration)

For this case the simple approximation is that the kinetic energy arising during an impact is equal to the product of the deceleration, deceleration value and the moving load. (Principle of conservation of energy).

$$\frac{1}{2} m_F \cdot v_F^2 = m_A \cdot a_F \cdot \Delta s$$

m_F = Masse Fahrzeug (kg)
v_F = Geschw. Fahrzeug (m/sec)

m_A = Masse Anpralldämpfer (kg) ohne Abstützung
Δs = Verformungsweg (m)
a_F = Gegenbeschl. Fahrzeug (m/sec^2)
$a_F = \frac{F}{m_F}$

Setzt man $a_F = \frac{F}{m_F}$ in die Formel ein ergibt sich:

$$F = \frac{\frac{1}{2} m_F^2 \cdot v_F^2}{m_A \cdot \Delta s}$$

F = Ersatzlast (N)
m_F = Masse Fahrzeug (kg)
v_F = Geschw. Fahrzeug (m/sec)
m_A = Masse Anpralldämpfer (kg)
Δs = Verformung (m) (Wirklänge)

CEN – Crash Cushion System „VECU-STOP®“ Anchorage on bridges Installation on reinforced concrete top covers	**Chapter 2** **(Installation Manual)** **2/23**

Beispiel: Anpralldämpfer VECU-STOP, VS-V100/4:14

Frontal - Anprall

$$F_{Fr} = \frac{\frac{1}{2}(1500\ kg)^2 \cdot (30{,}55 m/sec)^2}{(2123\ kg) \cdot (7{,}70 m)}$$

$$F_{Fr} = 64229{,}4\ N = \underline{64{,}2\ kN} \quad \text{(Frontal)}$$

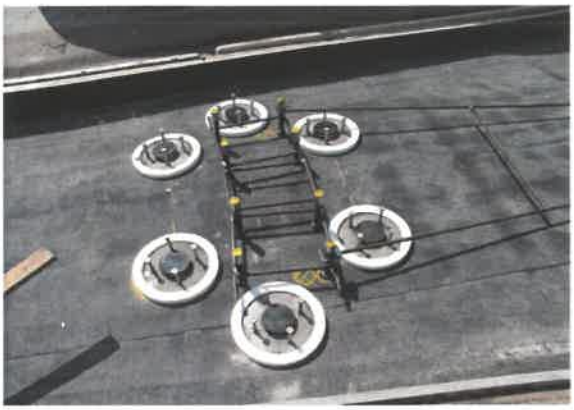
seitlicher Anprall, ∢ auf Achse 15° = 19,5° brutto
(Seitenverschiebung von 0,5m angenommen)

$$F_{se} = \frac{\frac{1}{2}(1500\ kg)^2 \cdot (30{,}55 m/sec)^2 \cdot \sin 19{,}5°}{(2123\ kg) \cdot (0{,}5 m)}$$

$$F_{se} = 330179{,}5\ N = \underline{330{,}2\ kN} \quad \text{(seitlich)}$$

Die Ersatzlasten haben die Größenordnung
$F_{(Frontal)} = 64{,}2\ kN$
$F_{(seitlich)} = 330{,}2\ kN$

Example pictures: installation of the anchorage in the structure top cover



CEN – Crash Cushion System „VECU-STOP®“ Anchorage on bridges Installation on reinforced concrete top cover	**Chapter 2** **(Installation Manual)** **2/24**

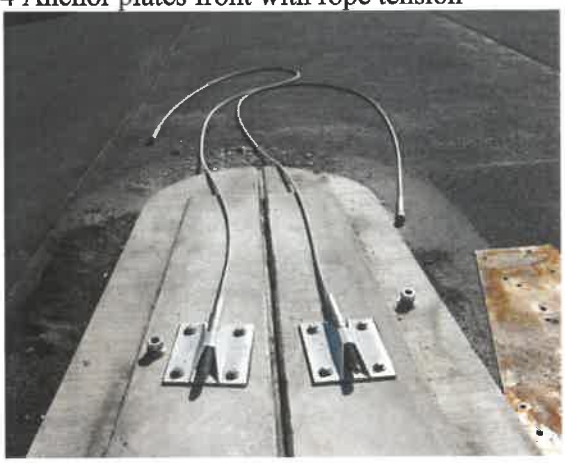
Example pictures: Installation of crash cushion system VECU STOP® on reinforced concrete top cover

1 Concrete cover

2 Anchorage holes M 20

Installation of anchor plates / front

4 Anchor plates front with rope tension



5 Crash cushion of the VECU STOP system on BW top cover

5

CEN – Crash Cushion System "VECU-STOP®" Maintenance - Repair	**Chapter 2** **(Installation Manual)** **2/25**

Maintenance

a) the service life of the entire construction is about 25 years, depending on the region where the products are installed.

b) All components of the crash cushion models
VECU-STOP DBP
are espectively maintenance-free.

Service

a) Any dirt depositing under the crash cushion should be removed by rinsing every 2 years.

Repair

a) If any damage occurs, it will be necessary to replace the components, which show a continuous plastic deformation. The damaged parts are to be noted down on the layout plan and replaced.

b) All components are easily accessible so that a damage may be stated very quickly and precisely.

c) Damages of the zinc coating shall be treated according to DIN EN ISO 1461 Section 6.3.

d) Please ask for additional information concerning individual crash cushion models.

e) Furthermore, the shifting / sliding elements underneath the pipe elements involved in the deformation must be replaced, as these were exposed to buckling and twisting stresses in the connection areas during an impact and therefore a perfect resilience can not be guaranteed.

f) The rope tensioning in longitudinal direction must also be replaced after this element/ these elements / are exposed to considerable force effects during an impact by the departing vehicle. Furthermore, it cannot be ensured that no micro-cracks or partial deformations have occurred that would prevent further safe serviceability.

g) Safety instructions:
In order to make sure that the product VECU-STOP® (Respect industrial property rights!), approved according to CEN DIN EN 1317-3, perfectly fulfills the functions allocated to the test conditions and may reduce the impact severity of a vehicle, it is always to be kept in proper condition of use. Do only use original SPS repair parts for repairs. Mechanics and users shall observe the installation and safety regulations. Non-respect and/or false use may lead to faulty product performances. Use at one's own risk!
Ask the manufacturer for product specifications and further information if necessary.

CEN – Crash Cushion System "VECU-STOP®" Reusability	**Chapter 2** **(Installation Manual)** **2/26**
e) All the components which are not deformed in an accident or during impact will be still fully functional even after about 25 years after first delivery. f) In case of repairs of accident damages, it is absolutely necessary to exclusively use new screwing materials in the area of the parts replaced. g) Construction parts that are no longer usable or screwing materials that have been removed (here: zinc-coated steel scrap) shall be consigned to recycling	Reusability of crash cushion models. It is only allowed to install unused (not yet installed) components that are not older than 5 years (in case of special components, such as e.g. cylinders, not older than 10 years) and for which the minimum zinc layer thickness is observed. In the event of modification and / or rebuilding, complete crash cushion models of the VECU STOP 100 and 120 system can be reused / re-installed during a construction measure in consultation with the customer if: - an anchorage surface for the crash cushion model is available - the individual components do not have any visible deformations and/or damages. (if damaged, these parts must be replaced) - the construction parts still have a galvanization layer thickness of at least 30µm - the components that are subject to labelling, the manufacturer's label and the inspection period label are still well recognisable - the components are not older than 15 years.

Chapter 3

QM and Factory Production Control

CEN – Crash Cushion System "VECU-STOP®" QM Manual according to DIN EN ISO 9001:2015	**Chapter 3** **(QM and Factory Production Control)** **3/1**

SPS-Schutzplanken GmbH was the first company of its business line that submitted a QM system

on 2nd August 1994

which was especially adjusted to the manufacture, transport, and installation of the

- **crash cushion VECU-STOP**
- **steel walls VECU-REC**
- **steel safety barriers.**

The QM manuals have constantly been adjusted to the respective technical state-of-the-art.

It is subdivided into:

1 **system documents**
2 **system structure**
3 **communication specifications**
4 **codes**
5 **outsourced processes**
6 **management processes**
7 **key processes**
8 **supporting processes**
9 **shipping and installation instructions**
10 **lists of forms in use**
11 **recording matrix**

QM – Standards

Bureau Veritas Quality International
2 August 1994
DIN ISO 9001 : 1990 / BS 5750: part 1: 1987
EN 9001 - 1987

continued

Bureau Veritas Certification Germany GmbH
26 June 2015
DIN EN ISO 9001 : 2008
valid until 02 August 2018

From 2018
DMSZ
Deutsche Managementsystem
Zertifizierungsgesellschaft mbH
(German Management Certifying Company Ltd.)
DIN EN ISO 9001 2015
valid until 02 August 2024

DMSZ
zertifiziert nach
ISO 9001
QM 01406

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT
DAkkS
Deutsche
Akkreditierungsstelle
D-ZM-16033-01-00

CEN – Crash Cushion System "VECU-STOP®" Factory Production Control (FPC) E – 2 Third-party Monitoring E - 3	**Chapter 3** **(QM and Factory Production Control)** **3/2**

E – 2: Production control

The production is controlled in accordance with QM- System through process description

PB S - 04 - 05 (Index 02)

as well as

production control plans.

The production is carried out by a contractually associated company where the production is controlled through

quality assurance agreement and quality process.

The individual production steps are subject to continuous internal

production control

which is documented.

Galvanizing is carried out at a galvanization workshop certified according to DIN ISO 9001.

The installations which are carried out by us on site have been specified in the shipping and installation instructions (integral part of the SPS QM System)
Installation works which are carried out on behalf of SPS or by the contractor's installation personnel have been specified:

PB U 07 - 12 Index 01
PB U 07 - 13 Index 02

E – 3 Third-party monitoring

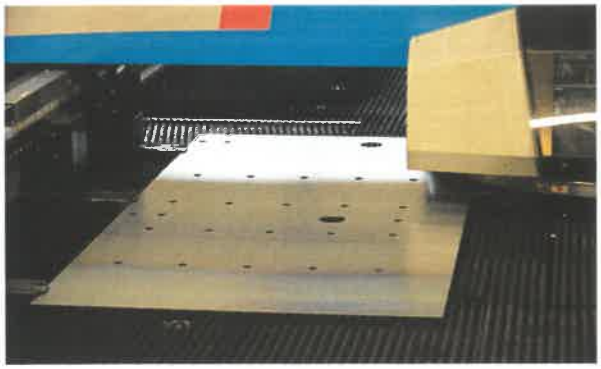
Third-party monitoring of the factory production control (FPC) based on

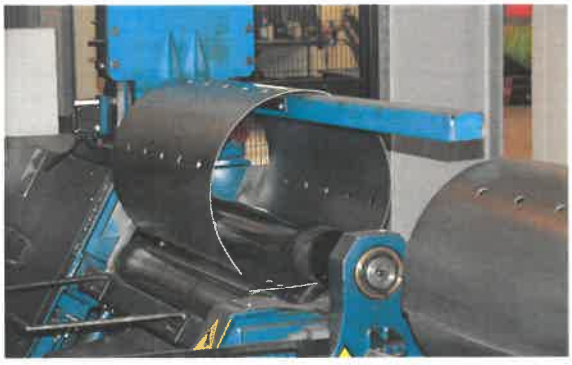
DIN EN 1317 - 5: 2007+A1:2008(D)

was carried out by Prüf-, Überwachungs- und Zertifizierungsgemeinschaft der Strassenausstatter e.V. (Testing, inspection and certification Community for Safety equipment)

Notified Body = 0780

LGA Bautechnik GmbH
90431 Nürnberg
Germany





CEN – Crash Cushion System "VECU-STOP®" Identification of the components

Chapter 3
(QM and Factory Production Control)
3/3

The test period identification label

The test period identification includes four months each according to the above-mentioned figure.

It means e.g.:

SPS / 3016

Production: in the third part of the year 2016

The period identification does not include galvanizing.

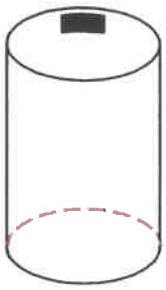
The individual components are produced in series so that components bearing previous period identification labels may have a new zinc coating.

Labelling stamp:
Manufacturer's identification with test period identification

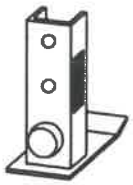
The manufacturer's identification has to be visible after installation.

Arrangement of manufacturer's identification with test period

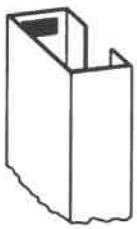
Cylinders
Rohre



Sliding feet
Gleitfüße

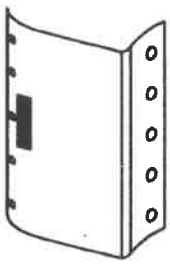


Closed and open C profiles
C-Profile

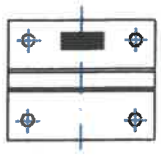


Head sheet metals
Kopfbleche

Side panels
Seitenschilde

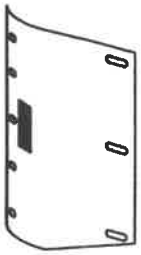


Anchor plates
Ankerplatten



Ropes with end designs
Seile mit Endausbildungen

Head connecting plates
Kopfanschluß-bleche



CEN – Crash Cushion System „VECU-STOP®“
Model Identification / Traceability

Chapter 3
(QM and Factory Production Control)
3/4

The rear support structure is provided with a

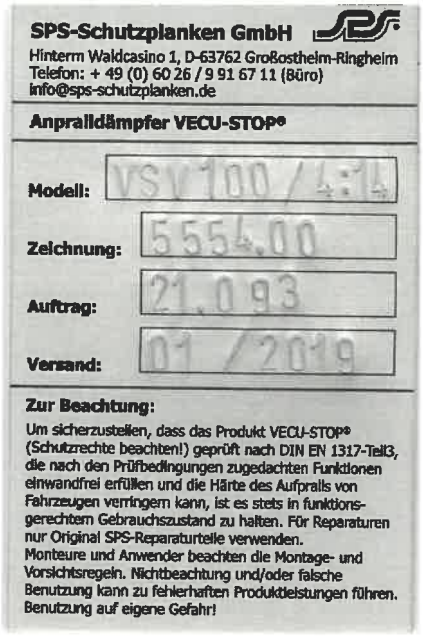
– T y p e p l a t e –

which includes the following data:

- Model
- Drawing No.
- SPS Order No.
- Date of shipment

Please see – For your attention (Zur Beachtung) – where instructions are given that:

- the product is always to be kept in proper condition of use
- only original SPS identified repair parts shall be used for repairs.
- installation mechanics and users shall observe the manufacturer's installation and safety regulations.


SPS-Schutzplanken GmbH
Hinterm Waldcasino 1, D-63762 Großostheim-Ringheim
Telefon: + 49 (0) 60 26 / 9 91 67 11 (Büro)
info@sps-schutzplanken.de

Anprallдämpfer VECU-STOP®

Modell: VSV 100 / 4:14
Zeichnung: 5554.00
Auftrag: 21.093
Versand: 01 / 2019

Zur Beachtung:
Um sicherzustellen, dass das Produkt VECU-STOP® (Schutzrechte beachten!) geprüft nach DIN EN 1317-Teil3, die nach den Prüfbedingungen zugedachten Funktionen einwandfrei erfüllen und die Härte des Aufpralls von Fahrzeugen verringern kann, ist es stets in funktionsgerechtem Gebrauchszustand zu halten. Für Reparaturen nur Original SPS-Reparaturteile verwenden.
Monteure und Anwender beachten die Montage- und Vorsichtsregeln. Nichtbeachtung und/oder falsche Benutzung kann zu fehlerhaften Produktleistungen führen.
Benutzung auf eigene Gefahr!

The rear support structure bears a

- CE Marking –

which includes the following data:

- Manufacturer
- Certificate No. of the respective system
- Make / Model series ….
- Performance data
- Durability
- Dangerous substances


CE 0780

SPS-Schutzplanken GmbH
Hinterm Waldcasino 1
D-63762 Großostheim-Ringheim
10
0780-CPR - 184018

EN 1317-5: 2007 + A2: 2012 / AC: 2012

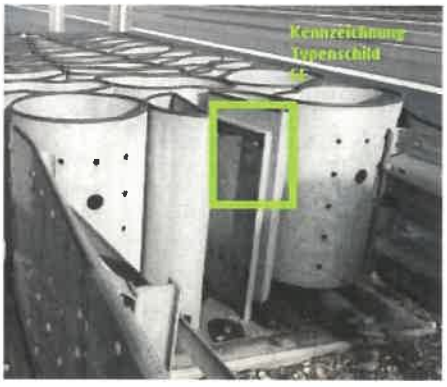
VECU-STOP®, Modellserie 100
zurückleitender Anprallдämpfer, der in Verkehrsräumen eingesetzt wird, bestehend aus den Modellen

Winkel/Breite:	Minimum	Maximum
	P100 / 2:14	V100 / 4:14

Leistungsdaten:
a) Geschwindigkeitsklasse: 110 km/h
b) Anprallheftigkeitsstufe: B
c) Klasse des Zurückleitungsbereichs: Z3
d) Klasse der dauerhaften seitlichen Verschiebung: D1

Dauerhaftigkeit:
Stahl S 235 JR, verzinkt nach EN ISO 1461

Gefährliche Substanzen:
NPD



CEN – Crash Cushion System "VECU-STOP®" Self-Monitoring / Certificate of Work Completion	**Chapter 3** **(QM and Factory Production Control)** **3/5**

	Eigenüberwachung Montage von Anpralldämpfern	Formblatt APD Index 00 (siehe Liste der Modelle)

01	Auftraggeber:	
02	Ausführende Firma:	
03	Vertrag / Auftrag-Nr. / vom:	
04	Arbeitsstelle / Prüfort:	
05	Montagefachkraft:	
06	Namen der Mitarbeiter der Montagekolonne:	
07	Gewerk: Anpralldämpfer System VECU-STOP - Modell:	
	Art der Arbeit: Lieferung ☐ Lieferung u. Montage ☐ Montage/Umbau ☐ Montage/Reparatur ☐	

Einbau gemäß Einbauanleitung und ZTV-FRS / DIN EN 1317/5

08	Witterung:						
	a) trocken ☐ b) Regen ☐ c) Schnee ☐ d) Temperatur ca. .....(+) .....(-) Celsius						
09	Materiallieferung / geprüft auf:	x	o			x	o
a)	Vollständigkeit aller Teile			c)	Übereinstimmung mit den Planunterlagen		
b)	Transportschäden: ja ☐ nein ☐			d)	Betongüte Fundament (Lieferschein)		
10	Eignungsnachweise Wahl und Aufstellung des Systems						
a)	gültiges Zertifikat vorhanden			e)	Montagehinweise beachtet (V+M / QM)		
b)	Einbauanleitung vorhanden			f)	CE-Aufkleber vorhanden		
c)	Systemzusammenbau nach b)			g)	Typenschild vorhanden (P / V ☐) (VS P / V ☐)		
d)	Einbaupläne vorhanden			h)	Anziehdrehmomente geprüft		
11	Systemzusammenbau / Prüfung						
a)	Vollständigkeit aller Teile			e)	Seillage geprüft		
b)	Lage des Fundaments			f)	Abstände z. Fahrbahnrand eingehalten		
c)	Verankerung montiert m. Zugversuch			g)	Vorgaben nach RPS 2009 beachtet		
d)	APD zusammengefügt			h)	Systemhöhe geprüft		

12	Anschlüsse herstellen (siehe Anmerkung)					x	o				
a)	Betonsystem einseitig			c)	einseitig			e)	doppelseitig		
b)	Stahlsystem einseitig			d)	einseitig			f)	doppelseitig		
13	Sonstiges										
a)	Passstücke min. Länge (750 mm) angefertigt			d)	Werkzeuge u. Material eingesammelt						
b)	Verkehrssicherung auf- u. abgebaut			e)	Notfallplan erforderlich						
c)	Arbeitsstelle: Schmutz- u. besenrein gesäubert										

Anmerkung zu 12:

Anmerkung zu ...:

Anmerkung zu ...:

Ort und Datum Der Kolonnenführer Der Auftraggeber

Prüfzeichen: x = in Ordnung / o = nicht in Ordnung / - nicht geprüft / PBS-07-04-Index 06

CEN – Crash Cushion System „VECU-STOP®“ **Certificate of Competence/Training Certificate**	**Chapter 3 (QM and Factory Production Control) 3/6**

SPS-Schutzplanken GmbH

Certificate of Competence

for the repair and installation of
the crash cushion system VECU-STOP ®
according to
ZTV-FRS: 2013/Version 2017, Annex B/e Module: Crash Cushions.

* * * * *

SPS-Schutzplanken GmbH conducted

a training course for examined safety barrier installation specialists of the Gütegemeinschaft Stahlschutzplanken e. V. (a – Basic training ZTV-FRS: 2013) in accordance with ZTV-FRS: 2013/Version 2017, Annex B/e, Module: crash cushion system VECU-STOP ®
on

_____

Participant who attended this training:

Mr.: _____
born on: _____
employed by: _____
_____

Großostheim/Ringheim, in _____2022

SPS-Schutzplanken GmbH, Hinterm Waldcasino 1, 63762 Großostheim/Ringheim

_____ _____

SPS-Schutzplanken GmbH, Hinterm Waldcasino 1, D-63762 Großostheim/Ringheim Telefon ++49 6026 9916711
Telefax ++49 6026 9916712 e-mail: urlberger@sps-schutzplanken.de

Chapter 4

Information / Miscellaneous

Road Crash Cushions Types - Functions - Tests	**Chapter 4** **(Information/Miscellaneous)** **4/1**

Introduction

Crash cushions (CC) are constructions, which reduce the severity of vehicle impacts on a resistant object and mitigate a danger zone where protection can only be provided insufficiently or not at all.

Passengers shall be exposed to supportable accelerations here.

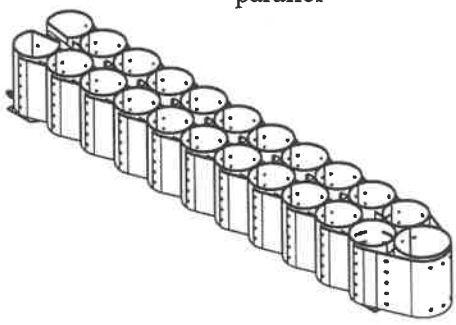
Crash cushions cannot only be installed as stand-alone system but also in connection with the following vehicle restraint systems.

The functional properties of the systems combined in such a way are to be proved by the manufacturer.
In this respect see the enclosed drawings for connections to :

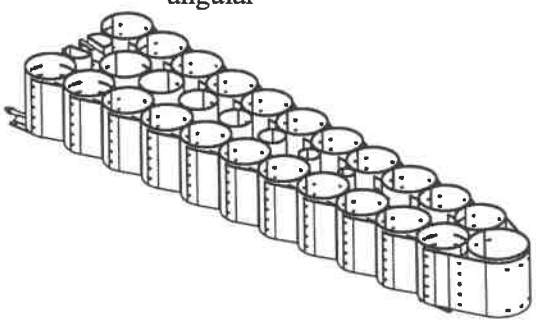
a) steel systems
b) concrete barriers
c) tunnel walls

Type R
Energy absorbing and redirecting crash cushion systems (R), which also include the "VECU-STOP" system, have been designed such that they will stop vehicles during a head-on impact over a certain deceleration length and redirect and forward vehicles impacting on the side without making these penetrate the crash cushion.

Crash cushion system VECU STOP Type R
parallel



Crash cushion system VECU-STOP Type R
angular



CEN- Crash Cushion System "VECU-STOP®" Description of the System	**Chapter 4 (Information/Miscellaneous) 4/2**

The result of intensive research and development work

In good time, employees of SPS-Schutzplanken GmbH started to tackle the problem of impact protection for dangerous obstacles on roads and thoroughly searched for technical solutions to provide effective mitigation.

Based on the knowledge gained from literature (1908-2009) and practice (1958-2009) the progressive concept of the crash cushion system

V E C U – S T O P ®

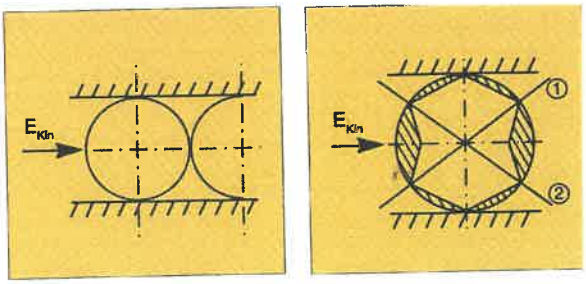
was developed, a new generation of highly effective, energy absorbing vehicle restraint structures which cannot only absorb and stop vehicles during a head-on impact but also redirect vehicles impacting on the side in compliance with the impact test regulations of DIN EN 1317 Parts 1, 3 and 5.

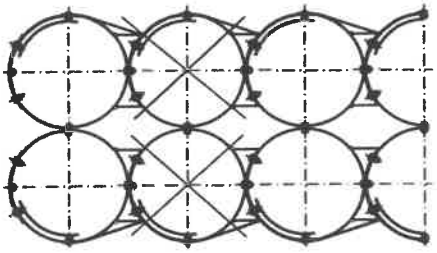
In this respect the conditions prevailing in the surrounding area of the roads had to be taken into consideration in order to find mainly simple and maintenance-free structures without:
– mobile parts
– material aging
– intense maintenance requiring elements
– different materials
– complicated damage detection
– inaccessible repair parts
and much more

The construction was based on the sum of deformation properties of a number of pipe shaped cylinders arranged in parallel or one after the other.

In a model calculation it was therefore necessary to take the plastic work of deformation of the deformable cylinders, being affected by an impact, into consideration. The amount of work of deformation accumulated therein resulted from the indentation volume of each cylinder to be theoretically produced.

The sum of all works of deformation occurring on the compound of cylinders – of a number ***i*** opposes the kinetic energy of an impacting vehicle with a defined resistance which is expressed in the plastic, irreversible deformation of a number of cylinders. The possible resilience of the cylinders induced due to the plastic proportion of deformation was not taken into consideration here.





Crash Cushion System "VECU-STOP®" Description of the System	**Chapter 4** **(Information/Miscellaneous)** **4/3**

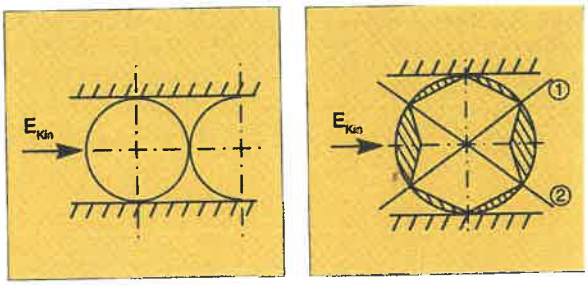
In order to generate the theoretical indentation volume *V* it is necessary to do work of deformation. In this respect, the work of deformation corresponds to the amount of energy that is led into the system because of the vehicle impact. The work of deformation done also depends on the contact tensions prevailing in the deformation zones as function of the change of volume arising accordingly. In this case it plays an essential role which deformation property forms the basis of each individual cylinder.

In the present case it was assumed that the deforming cylinder would get an embossed deformation property due to the intermediate bars arranged in impact direction which had to be taken into consideration when the attenuation system was designed.

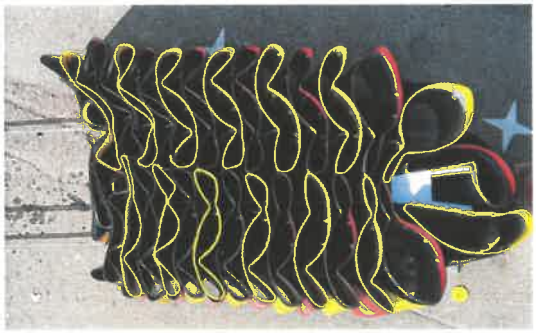
Furthermore, in practice, the timely sequence of the deformation processes occurring on the individual cylinder during an impact plays an important role for the absorbing properties of the entire system.

The amount of work of deformation, existing and/or actually stored in the system, always had to be at least equal to or bigger than the energy to be transmitted onto the crash cushion by the impacting vehicle which can be equated with the amount of kinetic energy of the vehicle just before impacting on the system.

Each cylinder can be considered as being ideally installed in the system between two plates; this results from lateral fixation. Each cylinder is then furnished with the maximum amount of work of deformation hereby induced while being impacted at one level. Due to the inserted connecting pieces a maximum of eight bending points may occur per cylinder, but always two bending zones will bear maximal deformations.



Based on the afore-mentioned details the figure below shows the ideal deformation of each cylinder affected by an impact.



CEN- Crash Cushion System "VECU-STOP®" Performance range of the VECU-STOP ® crash cushion	**Chapter 4** **(Information/Miscellaneous)** **4/4**

In addition to the afore-mentioned facts, the relevant dimensions and material-based technical parameters were also taken into account with the pre-design. Frictional conditions as well as lateral movements of the system during impact were not included in the approach.

Finally, a simple formula could be derived from the calculation approach for the pre-design of requirements which have been illustrated and indicated in the graphic charts below.

Performance range of the crash cushion system VECU-STOP ®

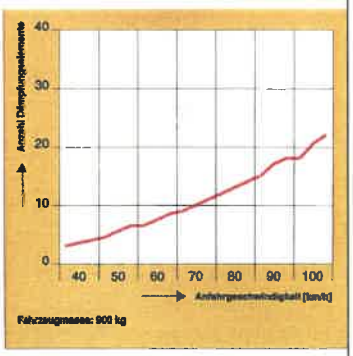
As a rule, crash cushions are designed for impacts of passenger cars.
The essential influencing variables are there the mass and speed of the vehicle crashing into the structure. The higher the vehicle mass and impacting speed, the higher the absorbing capacity (performance range) of the crash cushion required – or, with reference to the crash cushion system VECU-STOP ®, the higher the number of energy absorbing tubular cylinders.

The test conditions of the European standard draft DIN EN 1317-Part 3 which apply to the assessment of the efficiency of crash cushions in case of head-on or side impacts for example refer to vehicles of a mass of 900, 1300 and 1500 kg and/or to impact speeds of 50, 80 100 and 110 km/h.

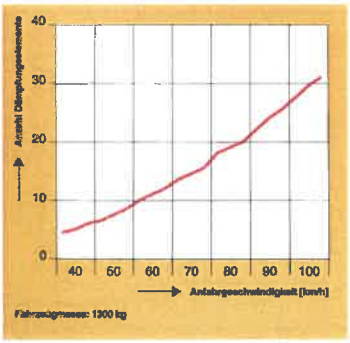
The graphic charts show how the required number of energy absorbing tubular cylinders of the VECU-STOP® crash cushion will rise for these values when the vehicle mass and impact speed increase.

The following figures show mass and speed of the impacting vehicle, which determine the number of energy absorbing cylinders of crash cushion system VECU-STOP ®. They demonstrate the range of CEN values here.
The diagrams apply to 3 mm wall thickness of the cylinders

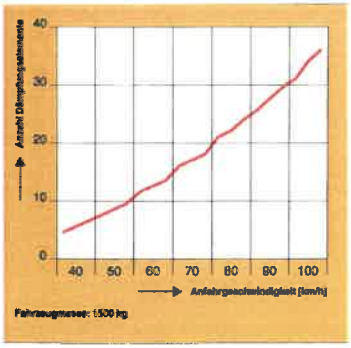
Mass 500 Kg



Mass 1,300 Kg



Mass 1,500 Kg



Annexes

-System drawings model group 100
-System drawings model group 120
with parts list
(The component part drawings have been deposited at the certifying body)

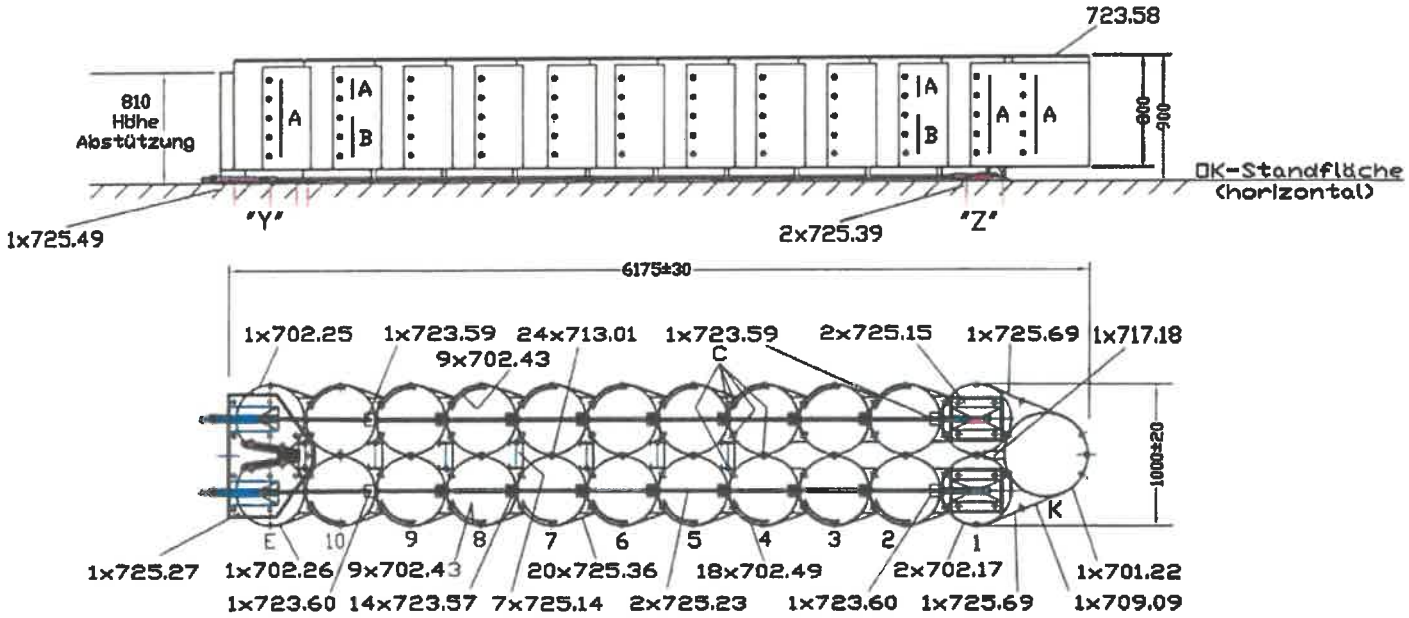
CEN- Crash Cushion System "VECU-STOP ®"
Model Group VS-100

Level	Model	Draw. No.	Shape	Angle	L	W (H)	W (B)
			Parallel Design VS-P 100				
80	VS - P 100 / 2:10	5002.02		0	6,1	1,0	1,0
100	VS - P 100 / 2:13	5001.02		0	7,6	1,0	1,0
110	VS - P 100 / 2:14	4995.02		0	8,2	1,0	1,0
			Angular Design VS-V 100				
80	VS - V 100 / 3:10	5196.00		6	6,2	1,0	1,5
	VS - V 100 / 4:10	5190.00		13	6,1	1,0	2,0
	VS - V 100 / 5:10	5003.04		19	6,2	1,0	2,5
100	VS - V 100 / 3:13	5093.01		5	7,7	1,0	1,5
	VS - V 100 / 4:13	5004.02		10	7,6	1,0	2,0
110	VS - V 100 / 3:14	5179.00		4	8,2	1,0	1,5
	VS - V 100 / 4:14	4992.02		9	8,2	1,0	2,0

P = parallel V = angular L = Length(m) W(H) = Head width W(B) = Basic width

Exemplary Connecting Construction Crash Cushion System VECU – STOP Systems 100 and 120

Anpralldämpfer VECU-STOP VS-P100/2:10



		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	268	723.01/718.13/718.15

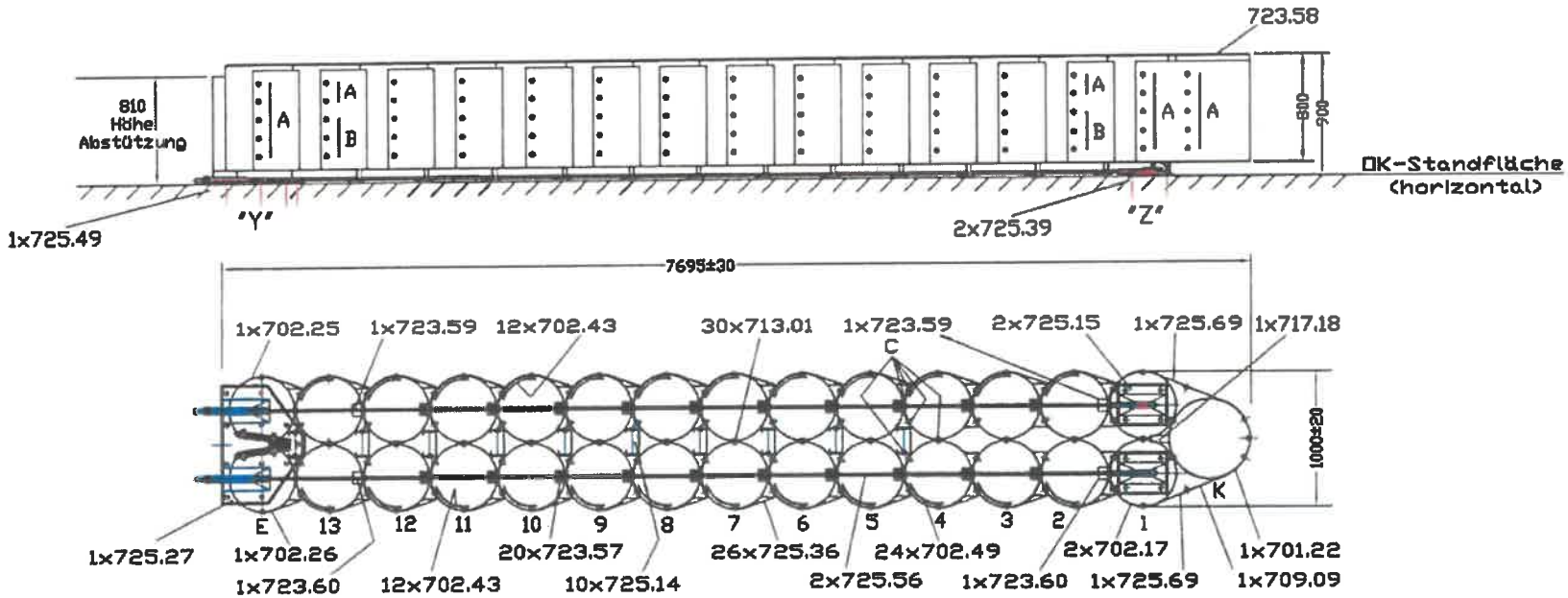
Anpralldämpfer VECU-STOP
VS-P100/2:10 Übersicht

SPS-Nr.5002.02

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-P100/2:10**	page 1 from 1 Partlist-No.5162.01 02.04.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	DIMENSIONS Ø mm	DIMENSIONS L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-P 100/2:10 General drawing					5002.02			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	18	36,50	657,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.25	Segment-CylinderVS-P100 ri	3,5	500	800	S235JR	4302.01	1	39,00	39,00
702.26	Segment-CylinderVS-P100 le	3,5	500	800	S235JR	4302.01	1	39,00	39,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	18	3,50	63,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	20	11,00	220,00
725.14	C-profil VS 100	2,5	183x100		S235JR	4277.01	7	6,00	42.00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	14	1,80	25,20
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	24	0,30	7,20
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	105	0,25	26,25
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	268	0,15	40,20
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	268	0,07	18,76
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	394	0,02	7,88
725.27	Steel-End-unit VS-100 P	6.8		620	S235JR	4309.01	1	60,00	60,00
725.23	Steel-wire-rope VS-100/10		20	5620	see drawing	5024.01	2	9,40	18,80
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.49	Neoprene plate VS P+V	752x505x8			see drawing	5030.01	1	0,80	0,80
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	2	0,15	0,30
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								1445,67

Anpralldämpfer VECU-STOP VS-P100/2:13



siehe Zeichnung Nr.5025.01

		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	84	723.02/718.11/718.15
B	72	723.03/718.11/718.15
C	346	723.01/718.13/718.15

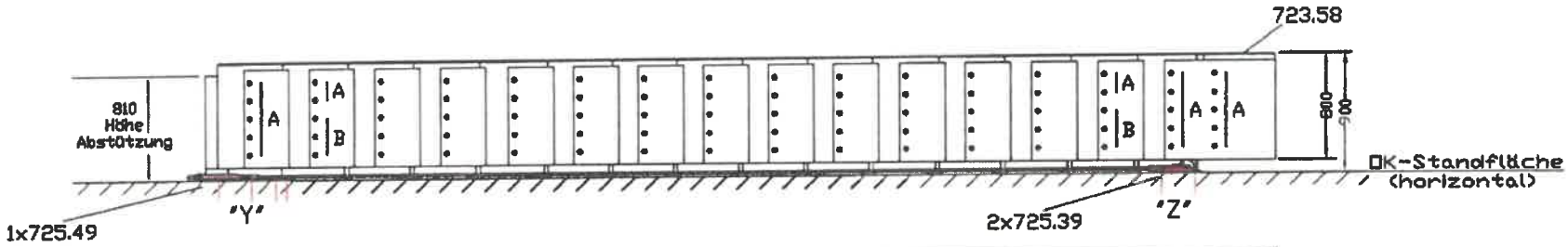
Anpralldämpfer VECU-STOP
VS-P100/2:13 Übersicht

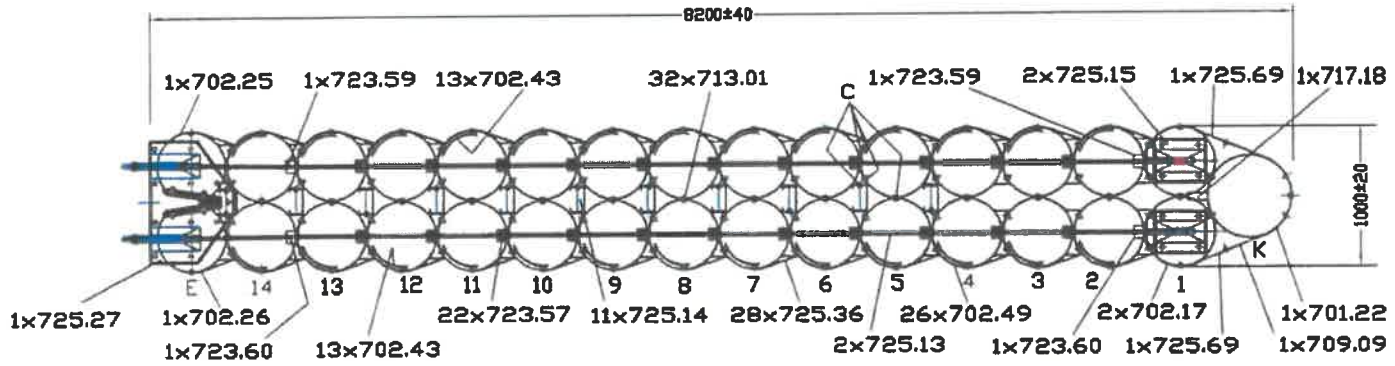
SPS-Nr.5001.02

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-P100/2:13**	page 1 from 1 Partlist-No.5163.01 02.04.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-P 100/2:13 General drawing					5001 .02			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	24	36,50	876,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.25	Segment-CylinderVS-P100 ri	3,5	500	800	S235JR	4302.01	1	39,00	39,00
702.26	Segment-CylinderVS-P100 le	3,5	500	800	S235JR	4302.01	1	39,00	39,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	24	3,50	84,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	26	11,00	286,00
725.14	C-profil VS 100	2,5	183x100		S235JR	4277.01	10	6,00	60,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	20	1,80	36,00
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	30	0,30	9,00
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	108	0,25	27,00
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	346	0,15	51,90
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	84	0,18	15,12
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	72	0,20	14,40
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	156	0,07	10,92
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	346	0,07	24,22
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	502	0,02	10,04
725.27	Steel-End-unit VS-100 P	6.8		620	S235JR	4309.01	1	60,00	60,00
725.23	Steel-wire-rope VS-100/13		20	7140	see drawing	5025.01	2	11,00	22,00
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.49	Neoprene plate VS P+V	752x505x8			see drawing	5030.01	1	0,80	0,80
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	2	0,15	0,30
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								1813,40

Anpralldämpfer VECU-STOP VS-P100/2:14





		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	88	723.02/718.11/718.15
B	78	723.03/718.11/718.15
C	372	723.01/718.13/718.15

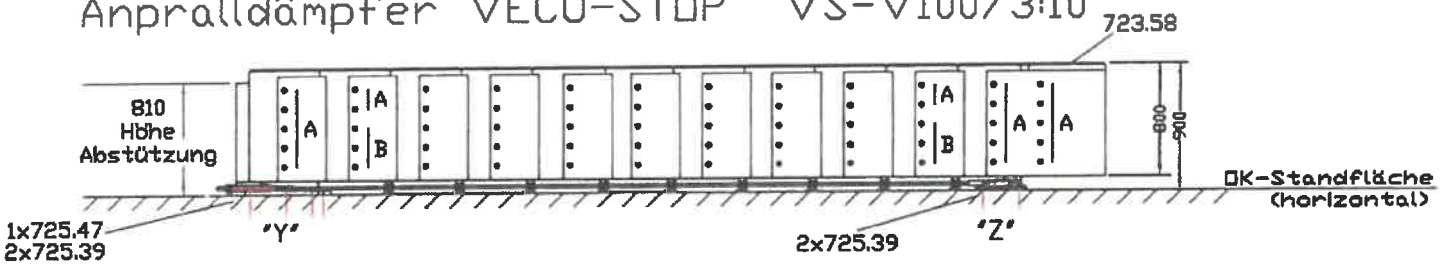
Anpralldämpfer VECU-STOP
VS-P100/2:14 Übersicht

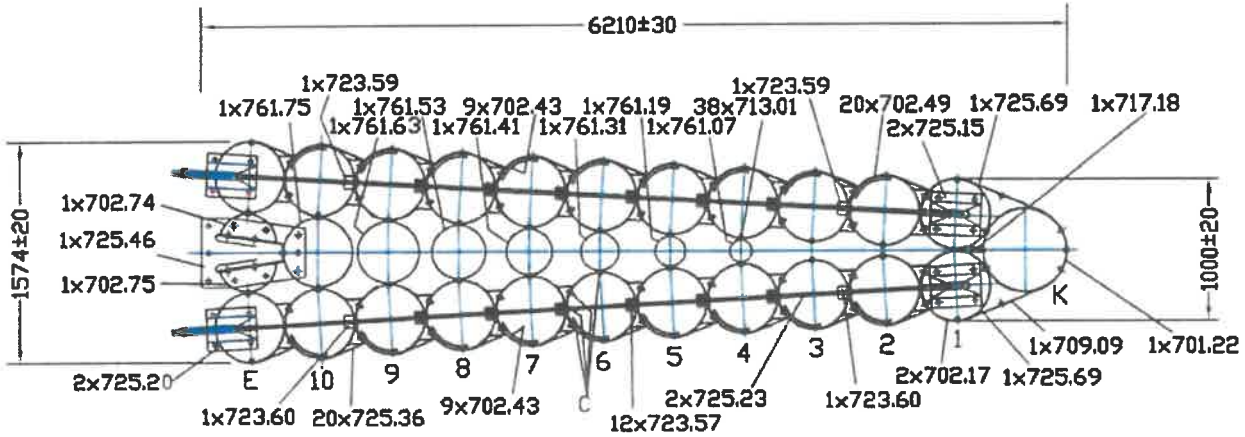
SPS-Nr.4995.02

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-P100/2:14**	page 1 from 1 Partlist-No.5164.01 02.04.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-P 100/2:14 General drawing					4995.02			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	26	36,50	949,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.25	Segment-CylinderVS-P100 ri	3,5	500	800	S235JR	4302.01	1	39,00	39,00
702.26	Segment-CylinderVS-P100 le	3,5	500	800	S235JR	4302.01	1	39,00	39,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	26	3,50	91,00
725.36	Side-panel	3.5	500	750	S235JR	4394.02	28	11,00	308,00
725.14	C-profil VS 100	2,5	183x100		S235JR	4277.01	11	6,00	66,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	22	1,80	39,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	32	0,30	9,60
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	111	0,25	27,75
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	372	0,15	55,80
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	88	0,18	15,84
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	78	0,20	15,60
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	166	0,07	11,62
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	372	0,07	26,04
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	538	0,02	10,72
725.27	Steel-End-unit VS-100 P	6.8		620	S235JR	4309.01	1	60,00	60,00
725.23	Steel-wire-rope VS-100/14		20	7650	see drawing	5026.01	2	11,80	23,60
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.49	Neoprene plate VS P+V	752x505x8			see drawing	5030.01	1	0,80	0,80
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	2	0,15	0,30
	Anchorings				see drawing Nr. 5197.00				
	TOTAL WIGHT CRASH-CUSHION in Kg:								1936,97

Anpralldämpfer VECU-STOP VS-V100/3:10





		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	262	723.01/718.13/718.15

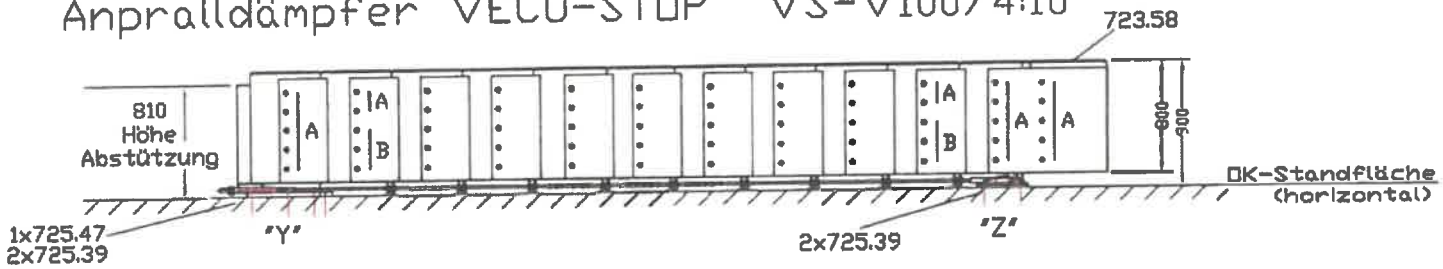
Anpralldämpfer VECU-STOP
VS-V100/310 Übersicht

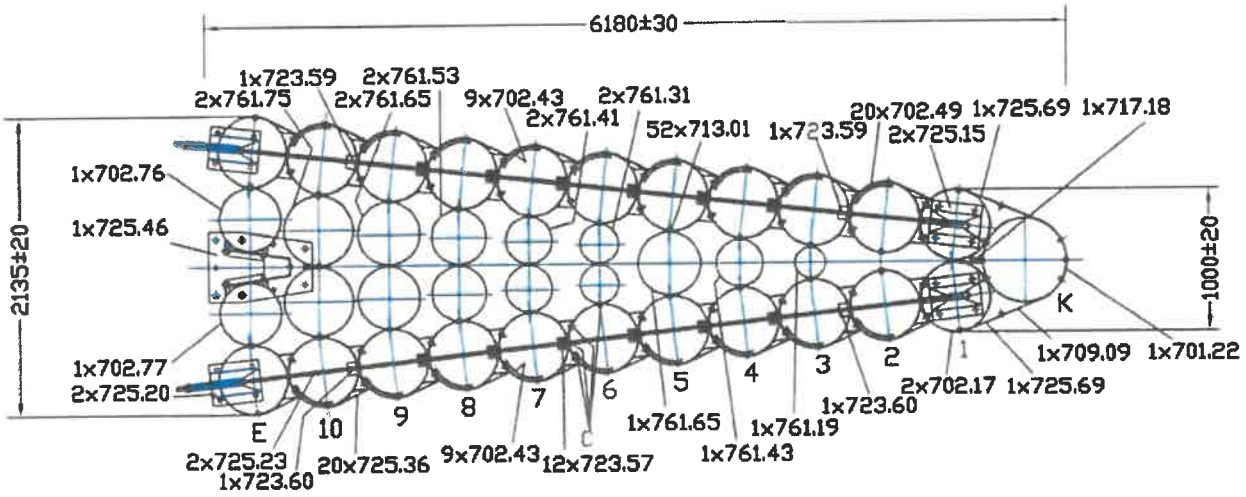
SPS-Nr.5196.00

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V100/3:10**	page 1 from 1 Partlist-No.5198.00 07.05.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V 100/3:10 General drawing					5196.00			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	20	36,50	730,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.74	Segment-CylinderVS-V100/3:10 ri	3,5	500	800	S235JR	5199.00	1	22,00	22,00
702.75	Segment-CylinderVS-V100/3:10 le	3.5	500	800	S235JR	5199.00	1	22.00	22,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	18	3,50	63,00
761.07	Inside-cylinder 160	3,0	160	800	S235JR	5174.00	1	9,00	9,00
761.19	Inside-cylinder 220	3,0	220	800	S235JR	5186.00	1	13,00	13,00
761.31	Inside-cylinder 280	3,0	280	800	S235JR	5194.00	1	16,00	16,00
761.41	Inside-cylinder 330	3,0	330	800	S235JR	5122.01	1	19,00	19,00
761.53	Inside-cylinder 390	3,0	390	800	S235JR	5155.01	1	23,00	23,00
761.63	Inside-cylinder 440	3,0	440	800	S235JR	5200.00	1	26,00	26,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5125.01	1	29,00	29,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	20	11,00	220,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	12	1,80	21,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	38	0,30	11,40
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	90	0,25	22,50
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	262	0,15	39,30
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	262	0,07	18,34
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	388	0,02	7,76
725.46	Steel-End-unit VS-100/120 V	6.8		747	S235JR	4859.02	1	56,00	56,00
725.23	Steel-wire-rope		20	5620	see drawing	5024.01	2	9,40	18,80
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside	300x360x8			see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V	752x505x8			see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								1588,68

Anpralldämpfer VECU-STOP VS-V100/4:10





siehe Zeichnung Nr.5024.01

		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	276	723.01/718.13/718.15

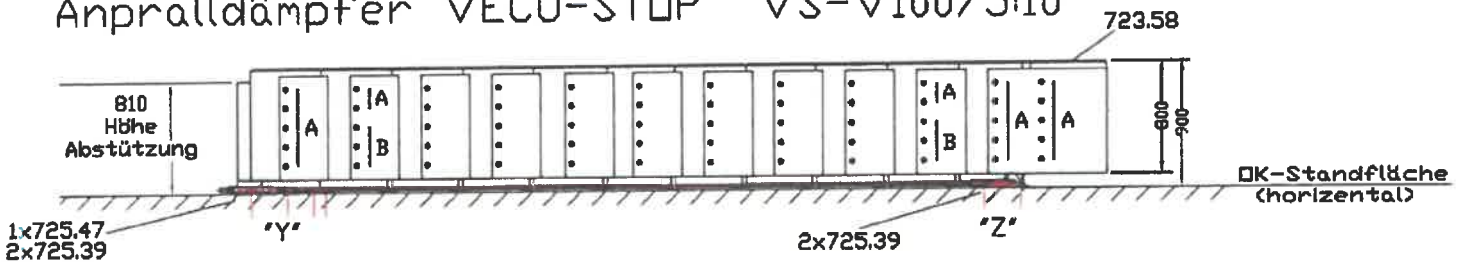
Anpralldämpfer VECU-STOP
VS-V100/410 Übersicht

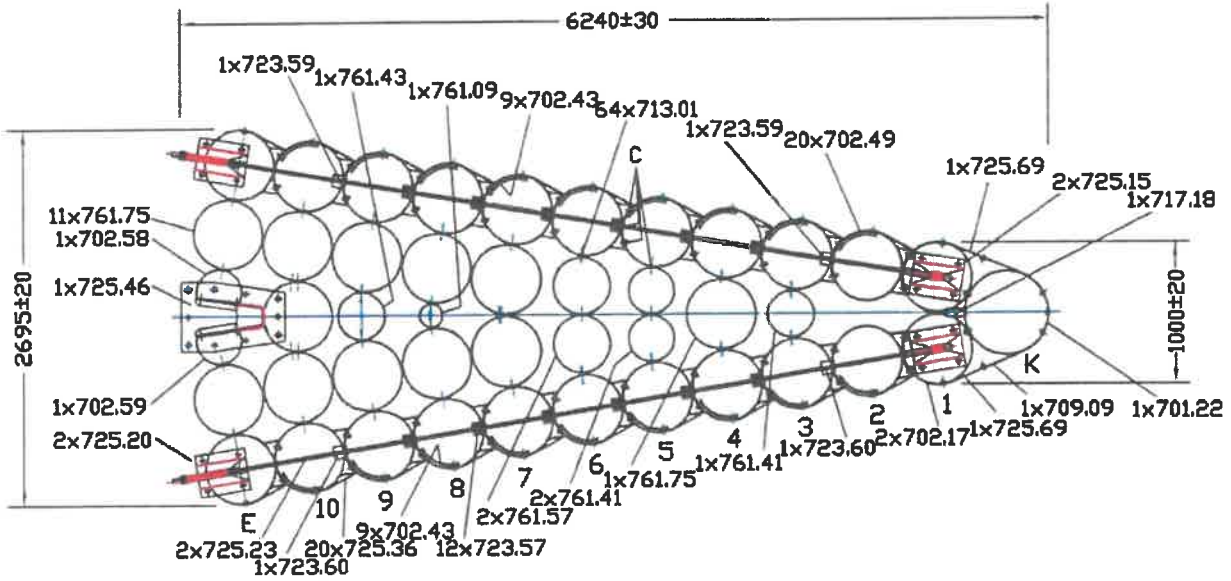
SPS-Nr.5190.00

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V100/4:10**	page 1 from 1 Partlist-No.5191.00 07.05.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V 100/4:10 General drawing					5190.00			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	20	36,50	730,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.74	Segment-CylinderVS-V100/4:10 ri	3,5	500	800	S235JR	5192.00	1	39,00	39,00
702.75	Segment-CylinderVS-V100/4:10 le	3,5	500	800	S235JR	5192.00	1	39,00	39,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	18	3,50	63,00
761.19	Inside-cylinder 220	3,0	220	800	S235JR	5186.00	1	13,00	13,00
761.31	Inside-cylinder 280	3,0	280	800	S235JR	5194.00	2	16,00	32,00
761.41	Inside-cylinder 330	3,0	330	800	S235JR	5122.01	2	19,00	38,00
761.43	Inside-cylinder 340	3,0	340	800	S235JR	5123.01	1	20,00	20,00
761.53	Inside-cylinder 390	3,0	390	800	S235JR	5155.01	2	23,00	46,00
761.65	Inside-cylinder 450	3,0	450	800	S235JR	5193.00	3	26,00	78,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5125.01	2	29,00	58,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	20	11,00	220,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	12	1,80	21,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	52	0,30	15,60
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	110	0,25	27,50
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	276	0,15	41,40
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	276	0,07	19,32
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	402	0,02	8,04
725.46	Steel-End-unit VS-100/120 V	6.8		747	S235JR	4859.02	1	56,00	56,00
725.23	Steel-wire-rope		20	5620	see drawing	5024.01	2	9,40	18,80
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside	300x360x8			see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V	752x505x8			see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								1785,24

Anpralldämpfer VECU-STOP VS-V100/5:10





siehe Zeichnung Nr.5024.01

		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	286	723.01/718.13/718.15

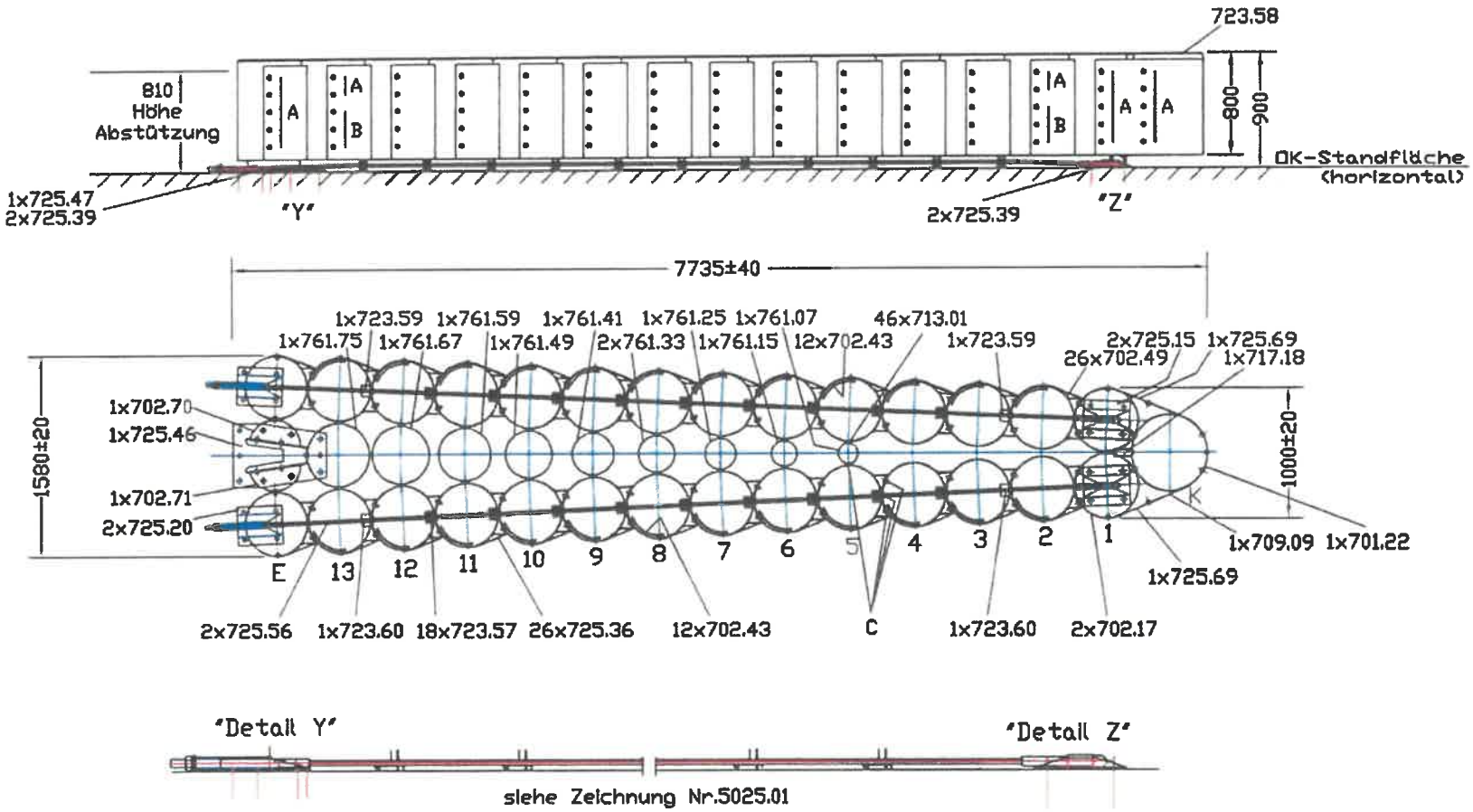
Anpralldämpfer VECU-STOP
VS-V100/5:10 Übersicht

SPS-Nr.5003.04

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V100/5:10**	page 1 from 1 Partlist-No.5115.04 19.02.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V 100/5:10 General drawing					5003.04			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	20	36,50	730,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.58	Segment-CylinderVS-V100/5:10 ri	3,5	500	800	S235JR	5114.02	1	21,00	21,00
702.59	Segment-CylinderVS-V100/5:10 le	3,5	500	800	S235JR	5114.02	1	21,00	21,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	18	3,50	63,00
761.09	Inside-cylinder 170	3,0	170	800	S235JR	5116.02	1	10,00	10,00
761.41	Inside-cylinder 330	3,0	330	800	S235JR	5122.01	3	19,00	57,00
761.43	Inside-cylinder 340	3,0	340	800	S235JR	5123.01	1	20,00	20,00
761.57	Inside-cylinder 410	3,0	410	800	S235JR	5124.01	2	24,00	48,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5125.01	12	29,00	348,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	20	11,00	220,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	12	1,80	21,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	64	0,30	19,20
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	120	0,25	30,00
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	286	0,15	42,90
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40.			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	286	0,07	20,02
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	412	0,02	8,24
725.46	Steel-End-unit VS-100/120 V	6.8		747	S235JR	4859.02	1	56,00	56,00
725.23	Steel-wire-rope		20	5620	see drawing	5024.01	2	9,40	18,80
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside	300x360x8			see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V	752x505x8			see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								1955,74

Anpralldämpfer VECU-STOP VS-V100/3:13



		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	84	723.02/718.11/718.15
B	72	723.03/718.11/718.15
C	336	723.01/718.13/718.15

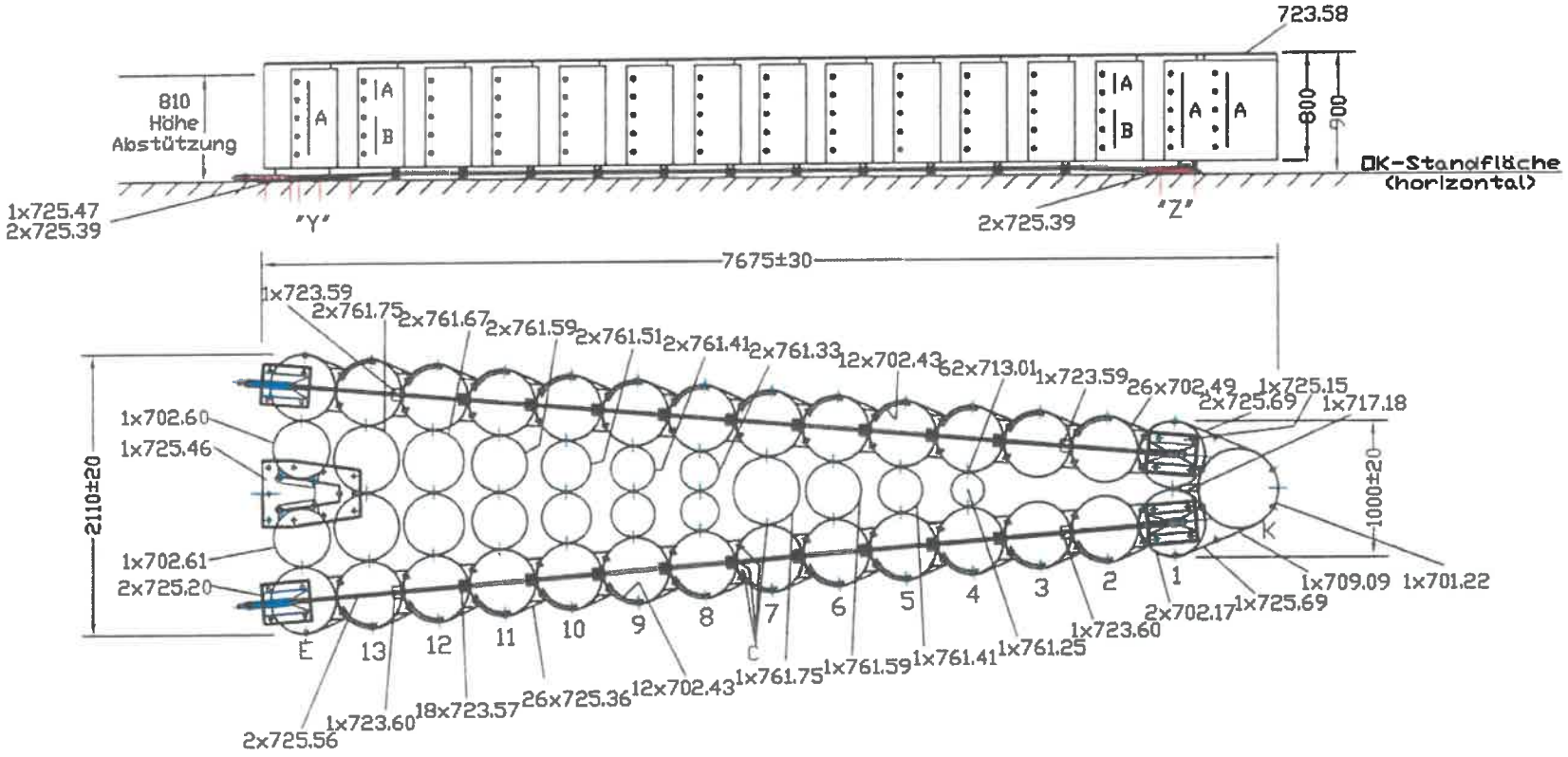
Anpralldämpfer VECU-STOP
VS-V100/3:13 Übersicht

SPS-Nr.5093.01

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V100/3:13**	page 1 from 1 Partlist-No.5171.01 01.04.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V 100/3:13 General drawing					5093.01			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	26	36,50	949,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.70	Segment-CylinderVS-V100/3:13ri	3,5	500	800	S235JR	5175.00	1	22,00	22,00
702.71	Segment-CylinderVS-V100/3:13 le	3,5	500	800	S235JR	5175.00	1	22,00	22,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	24	3,50	84,00
761.07	Inside-cylinder 160	3,0	160	800	S235JR	5174.00	1	9,00	9,00
761.15	Inside-cylinder 200	3,0	200	800	S235JR	5173.00	1	12,00	12,00
761.25	Inside-cylinder 250	3,0	250	800	S235JR	5151.01	1	14,00	14,00
761.33	Inside-cylinder 290	3,0	290	800	S235JR	5152.01	1	17,00	17,00
761.41	Inside-cylinder 330	3,0	330	800	S235JR	5122.01	1	19,00	19,00
761.49	Inside-cylinder 370	3,0	370	800	S235JR	5172.00	1	22,00	22,00
761.59	Inside-cylinder 420	3,0	420	800	S235JR	5156.01	1	24,00	24,00
761.67	Inside-cylinder 460	3,0	460	800	S235JR	5157.01	1	27,00	27,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5125.01	1	29,00	29,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	26	11,00	286,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	18	1,80	32,40
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	46	0,30	13,80
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	127	0,25	31,75
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	336	0,15	50,40
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	84	0,18	15,12
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	72	0,20	14,40
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	156	0,07	10,92
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	336	0,07	23,52
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	492	0,02	9,84
725.46	Steel-End-unit VS-100/120 V	6.8		747	S235JR	4859.02	1	56,00	56,00
725.56	Steel-wire-rope		20	7140	see drawing	5025.01	2	11,80	22,00
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside	300x360x8			see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V	752x505x8			see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								1984,55

Anpralldämpfer VECU-STOP VS-V100/4:13



siehe Zeichnung Nr.5025.01

		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	84	723.02/718.11/718.15
B	72	723.03/718.11/718.15
C	350	723.01/718.13/718.15

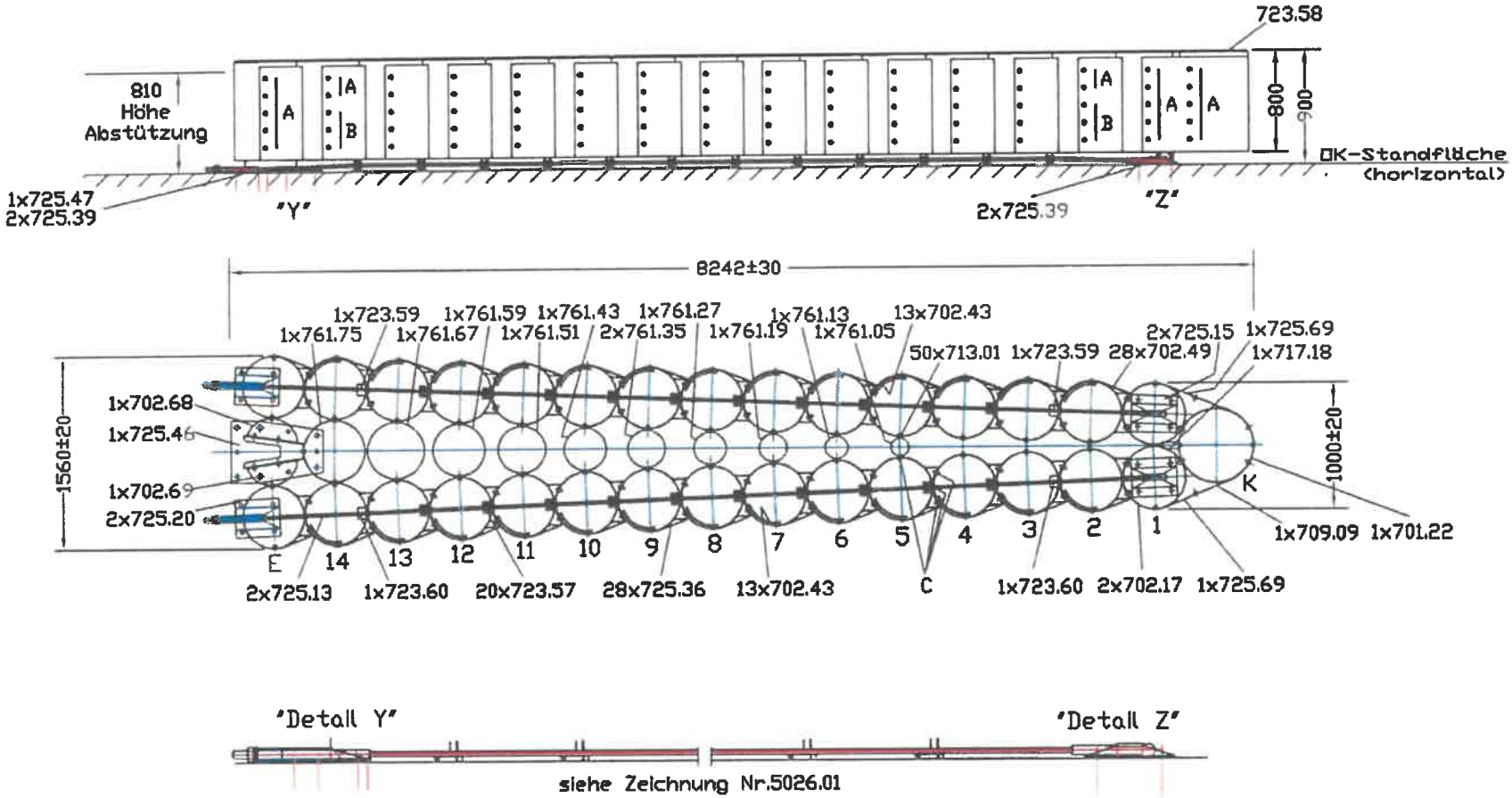
Anpralldämpfer VECU-STOP
VS-V100/4:13 Übersicht

SPS-Nr.5004.02

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V100/4:13**	page 1 from 1 Partlist-No.5160.01 01.04.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V 100/4:13 General drawing					5004.02			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	26	36,50	949,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.60	Segment-CylinderVS-V100/4:13 ri	3,5	500	800	S235JR	5020.01	1	39,00	39,00
702.61	Segment-CylinderVS-V100/4:13 le	3,5	500	800	S235JR	5020.01	1	39,00	39,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	24	3,50	84,00
761.25	Inside-cylinder 250	3,0	250	800	S235JR	5151.01	1	14,00	14.00
761.33	Inside-cylinder 290	3,0	290	800	S235JR	5152.01	2	17,00	34,00
761.41	Inside-cylinder 330	3,0	330	800	S235JR	5122.01	3	19,00	57,00
761.51	Inside-cylinder 380	3,0	380	800	S235JR	5154.01	2	22,00	44,00
761.59	Inside-cylinder 420	3,0	420	800	S235JR	5156.01	3	24,00	72,00
761.67	Inside-cylinder 460	3,0	460	800	S235JR	5157.01	2	27,00	54,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5125.01	3	29,00	87,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	26	11,00	286,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	18	1,80	32,40
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	62	0,30	18,60
723.58	Edge-Protector	meter			PVC+Metallkl	4406.02	130	0,25	32,50
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	350	0,15	52,80
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	84	0,18	15,12
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	72	0,20	14,40
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	156	0,07	10,92
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	350	0,07	24,50
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	506	0,02	10,12
725.46	Steel-End-unit VS-100/120 V	6.8		747	S235JR	4859.02	1	56,00	56,00
725.56	Steel-wire-rope VS-100/13		20	7140	see drawing	5025.01	2	11,00	22,00
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside	300x360x8			see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V	752x505x8			see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								2216,76

Anpralldämpfer VECU-STOP VS-V100/3:14



		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	88	723.02/718.11/718.15
B	78	723.03/718.11/718.15
C	362	723.01/718.13/718.15

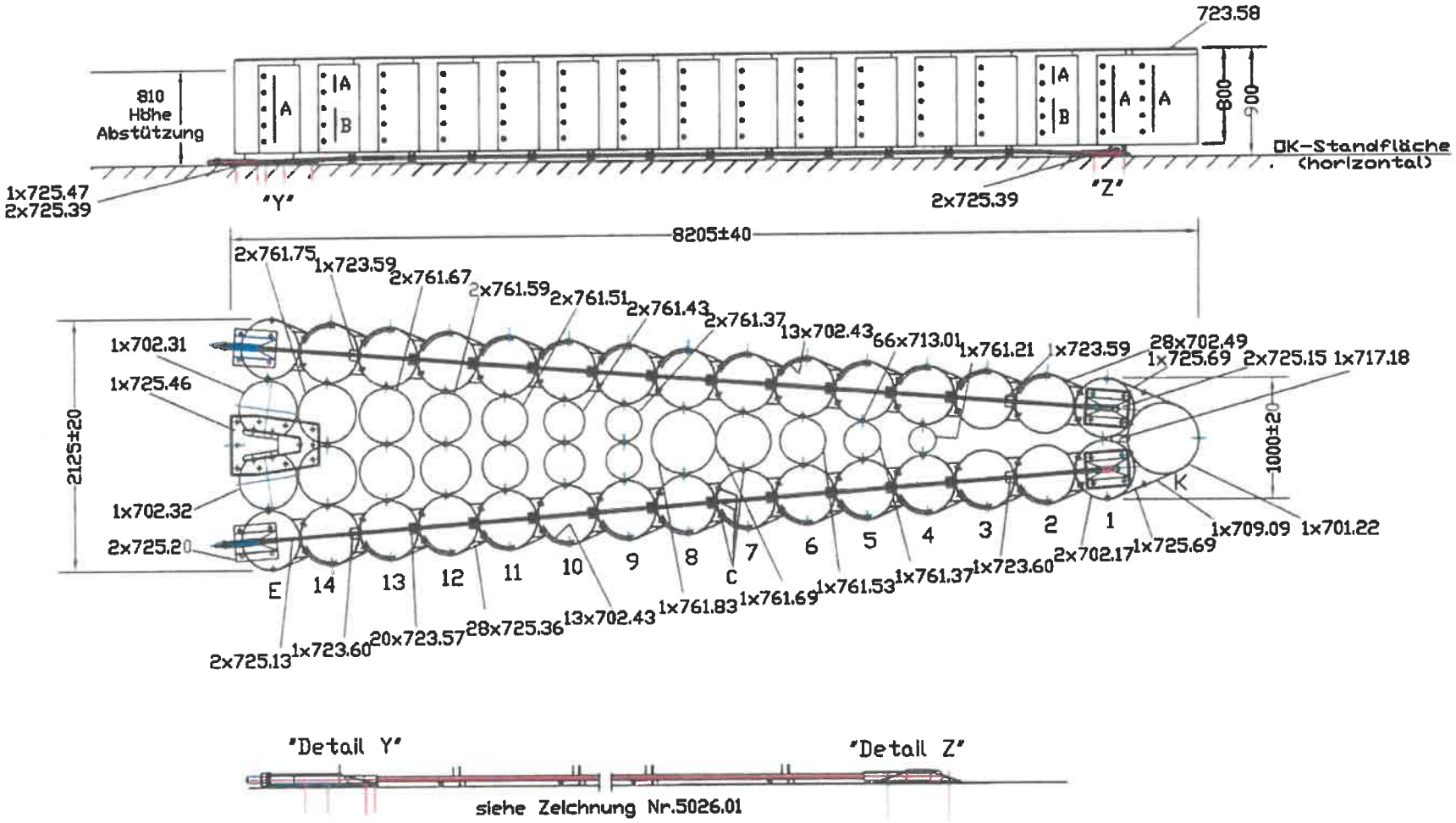
Anpralldämpfer VECU-STOP
VS-V100/3:14 Übersicht

SPS-Nr.5179.00

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V100/3:14**	page 1 from 1 Partlist-No.5182.00 01.04.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V 100/3:14 General drawing					5179.00			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	28	36,50	1022,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.68	Segment-CylinderVS-V100/3:14 re	3,5	500	800	S235JR	5183.01	1	22,00	22,00
702.69	Segment-CylinderVS-V100/3:14 li	3,5	500	800	S235JR	5183.01	1	22,00	22,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	26	3.50	91,00
761.05	Inside-cylinder 150	3,0	150	800	S235JR	5184.00	1	9,00	9,00
761.13	Inside-cylinder 190	3,0	190	800	S235JR	5185.00	1	11,00	11,00
761.19	Inside-cylinder 220	3,0	220	800	S235JR	5186.00	1	13,00	13,00
761.27	Inside-cylinder 260	3,0	260	800	S235JR	5187.00	1	15,00	15,00
761.35	Inside-cylinder 300	3,0	300	800	S235JR	5188.00	1	17,00	17,00
761.43	Inside-cylinder 340	3,0	340	800	S235JR	5123.01	1	20,00	20,00
761.51	Inside-cylinder 380	3,0	380	800	S235JR	5154.01	1	22,00	22,00
761.59	Inside-cylinder 420	3,0	420	800	S235JR	5156.01	1	24,00	24,00
761.67	Inside-cylinder 460	3,0	460	800	S235JR	5157.01	1	27,00	27,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5125.01	1	29,00	29,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	28	11,00	308,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	20	1,80	36,00
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	50	0,30	15,00
723.58	Edge-Protector	meter			PVC+Mctallkl	4406.02	130	0,25	32,50
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	362	0,15	54,30
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	88	0,18	15,84
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	78	0,20	15,60
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	166	0,07	11,62
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	362	0,07	25,34
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	528	0,02	10,56
725.46	Steel-End-unit VS-100/120 V	6.8		747	S235JR	4859.02	1	56,00	56,00
725.13	Steel-wire-rope		20	7650	see drawing	5026.01	2	11,80	23,60
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside	300x360x8			see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V	752x505x8			see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								2116,76

Anpralldämpfer VECU-STOP VS-V100/4:14



siehe Zeichnung Nr.5026.01

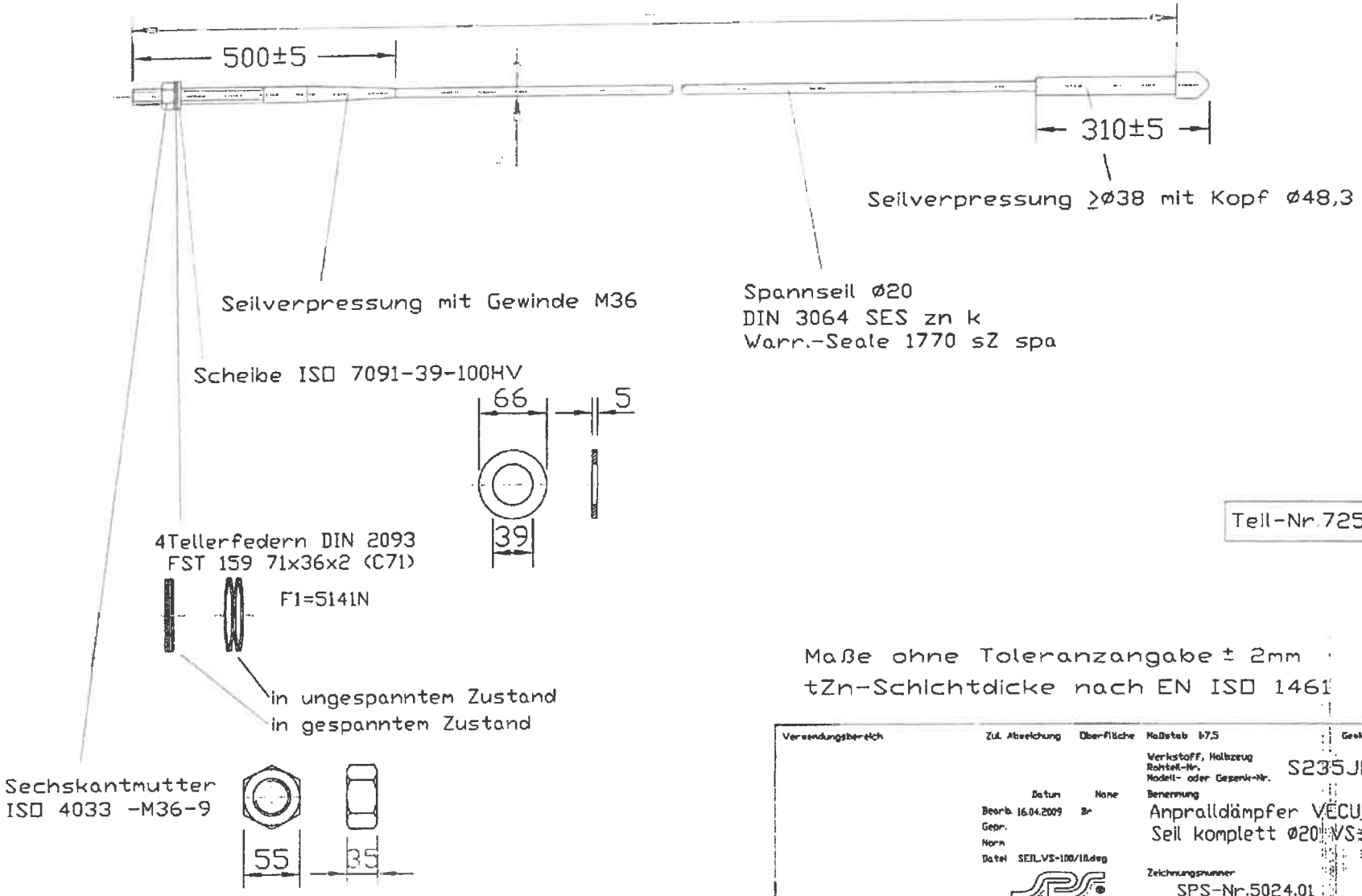
		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	88	723.02/718.11/718.15
B	78	723.03/718.11/718.15
C	376	723.01/718.13/718.15

Anpralldämpfer VECU-STOP
VS-V100/4:14 Übersicht

SPS-Nr.4992.02

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V100/4:14**	page 1 from 1 Partlist-No.5161.01 01.04.2009

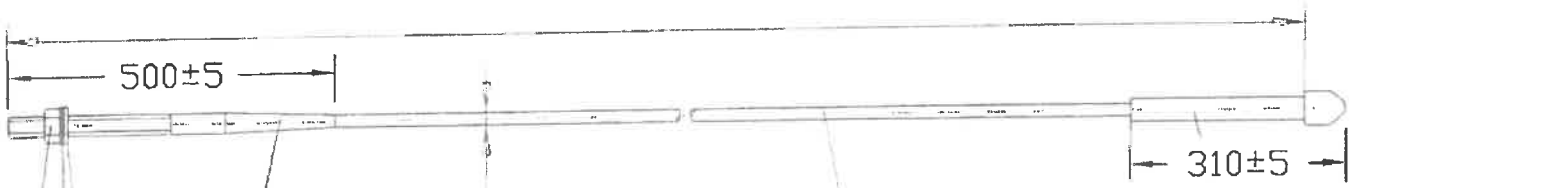
ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V 100/4:14 General drawing					4992.02			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
702.17	Cylinder 500 VS-100	3,0	500	800	S235JR	4402.02	2	28,00	56,00
702.49	Standard Cylinder 500	3,0	500	800	S253JR	4399.02	28	36,50	1022,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
725.69	Lead-connection-sheet 500 VS-100 ri/le	2,0		750	S235JR	5117.02	2	5,50	11,00
702.31	Segment-CylinderVS-V100/4:14 ri	3,5	600	800	S235JR	4314.01	1	35,00	35,00
702.32	Segment-CylinderVS-V100/4:14 le	3,5	600	800	S235JR	4314.01	1	35,00	35,00
702.43	Segment-sheet 100 ri/le	3,5		400	S235JR	4401.03	26	3,50	91,00
761.21	Inside-cylinder 230	3,0	230	800	S235JR	5150.01	1	13,00	13,00
761.37	Inside-cylinder 310	3,0	310	800	S235JR	5153.00	3	18,00	54,00
761.43	Inside-cylinder 340	3,0	340	800	S235JR	5123.01	2	20,00	40,00
761.51	Inside-cylinder 380	3,0	380	800	S235JR	5154.01	2	22,00	44,00
761.59	Inside-cylinder 420	3,0	420	800	S235JR	5156.01	2	24,00	48,00
761.67	Inside-cylinder 460	3,0	460	800	S235JR	5157.01	2	27,00	54,00
761.75	Inside-cylinder 500	3,0	460	800	S235JR	5125.01	2	29,00	58,00
761.83	Inside-cylinder 540	3,0	540	800	S235JR	5159.01	1	32,00	32,00
761.69	Inside-cylinder 470	3,0	470	800	S235JR	5158.00	1	27,00	27,00
761.53	Inside-cylinder 390	3,0	390	800	S235JR	5155.01	1	23,00	23,00
725.36	Side-panel	3,5	500	750	S235JR	4394.02	28	11,00	308,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	20	1,80	36,00
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	66	0,30	19,80
723.58	Edge-Protector	meter			PVC+Metallkl	4406.02	135	0,25	33,75
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	384	0,15	57,60
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	88	0,18	15,84
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	78	0,20	15,60
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	166	0,07	11,62
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	400	0,07	28,00
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	550	0,02	11,00
725.46	Steel-End-unit VS-100/120 V	6.8		747	S235JR	4859.02	1	56,00	56,00
725.13	Steel-wire-rope		20	7650	see drawing	5026.01	2	11,80	23,60
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside	300x360x8			see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V	752x505x8			see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								2.361,21



Teil-Nr.725.23

Maße ohne Toleranzangabe ± 2mm
tZn-Schichtdicke nach EN ISO 1461

Verwendungsbereich	Zul. Abweichung	Oberfläche	Maßstab 1:7,5	Gewicht
			Werkstoff, Halbzeug Rohteil-Nr. Modell- oder Gesenk-Nr.	S235JR tZn
	Datum Name		Benennung	
	Bearb. 16.04.2009 Br		Anpralldämpfer VECU-STOP Seil komplett ø20 VS-100/10	
	Gepr.			
	Norm			
	Datei SEIL_VS-100/10.dwg		Zeichnungsnummer	Blatt
			SPS-Nr.5024.01	1
01 Anpassung 14.05.09 Br				1 Bl.
Zust. Änderung	Datum Name Urspr		Ers. f.	Ers. d.

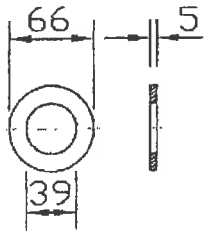


Seilverpressung ≥ø38 mit Kopf ø48,3

Seilverpressung mit Gewinde M36

Spannseil ø20
DIN 3064 SES zn k
Warr.-Seale 1770 sZ spa

Scheibe ISO 7091-39-100HV

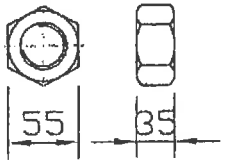


4Tellerfedern DIN 2093
FST 159 71x36x2 (C71)

F1=5141N

in ungespanntem Zustand
in gespanntem Zustand

Sechskantmutter
ISO 4033 -M36-9

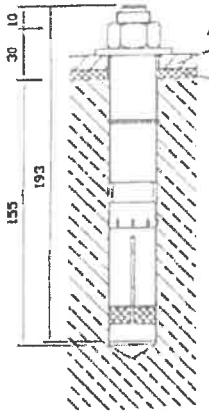


Teil-Nr.725.56

Maße ohne Toleranzangabe ± 2mm
tZn-Schichtdicke nach EN ISO 1461

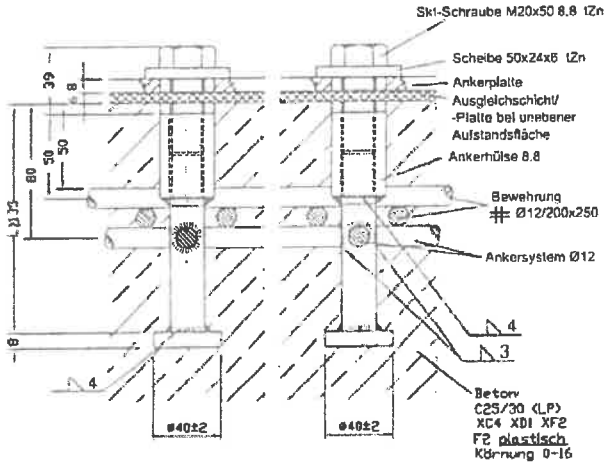
Versendungsbereich	Zul. Abweichung	Oberfläche	Maßstab 1:7,5	Gewicht	
			Verkstoff, Halbzeug Rohteil-Nr. Modell- oder Gesenk-Nr.	S235JR tZn	
	Datum	Name	Benennung		
	Bearb. 16.04.2009	Br	Anpralldämpfer VECU-STOP Seil komplett ø20 VS-100/13		
	Gepr.				
	Norm				
	Datei SEIL_VS-100/13.dwg				
			Zeichnungsnummer SPS-Nr.5025.01		Blatt 1 1 Bl.
01 Anpassung 14.05.09 Br					
Zust. Änderung Datum Name Urspr.			Ers. f.:	Ers. d.:	

A
Verankerung auf vorh. Beton
HILTI Schwerlastanker
HSL-3-G M20/30



Bohrlochtiefe ≥155mm
Bohrloch-Ø 28mm

B
Verankerung auf Fundament SPS-Ankersystem DBP. M20 8.8



C
Verankerung auf Asphalt
TOGE TSM B22x150 IM16x30

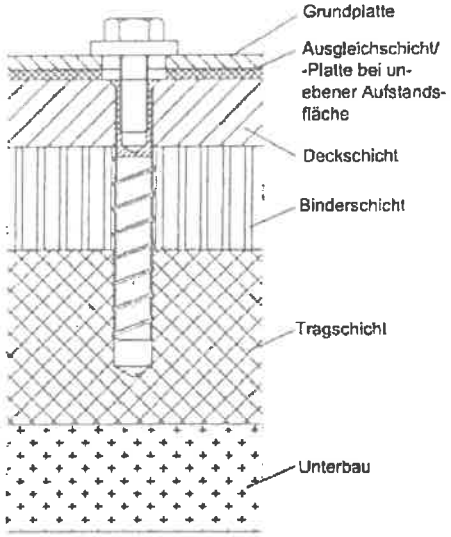
Asphalt-Einschraubanker, z.B.:
TOGE

Produktname:	TSM B 22x150 IM 16x30
Innengewinde:	M16x30mm
Bohrloch-Ø :	22mm
Bohrlochtiefe :	165mm
Einschraubtiefe :	150mm
Asphaltstärke :	≥200mm
Restdicke Asphalt :	≥ 35mm

Durchschnittliche Versagenslasten:
1) statischer Zug: 65KN
2) dynamischer Zug: 100KN*

*bei Verwendung eine
Anschlußschraube M16 8.8

Verarbeitung:
1) Bohrloch 22x165mm erstellen
2) Bohrloch reinigen
3) Verbundmasse einfüllen (3 Hub)
4) TSM bündig einschrauben
5) keine Aushärtezeit
Die TSM kann sofort belastet erden.



ACHTUNG:
Nach Erreichen der Einschraubtiefe muß die Verbundmasse unter dem Kragen hervortreten! Die TSM muß gegen das anzuschließende Bauteil verspannt werden, Es dürfen keine permanenten Lasten aufgebracht werden!

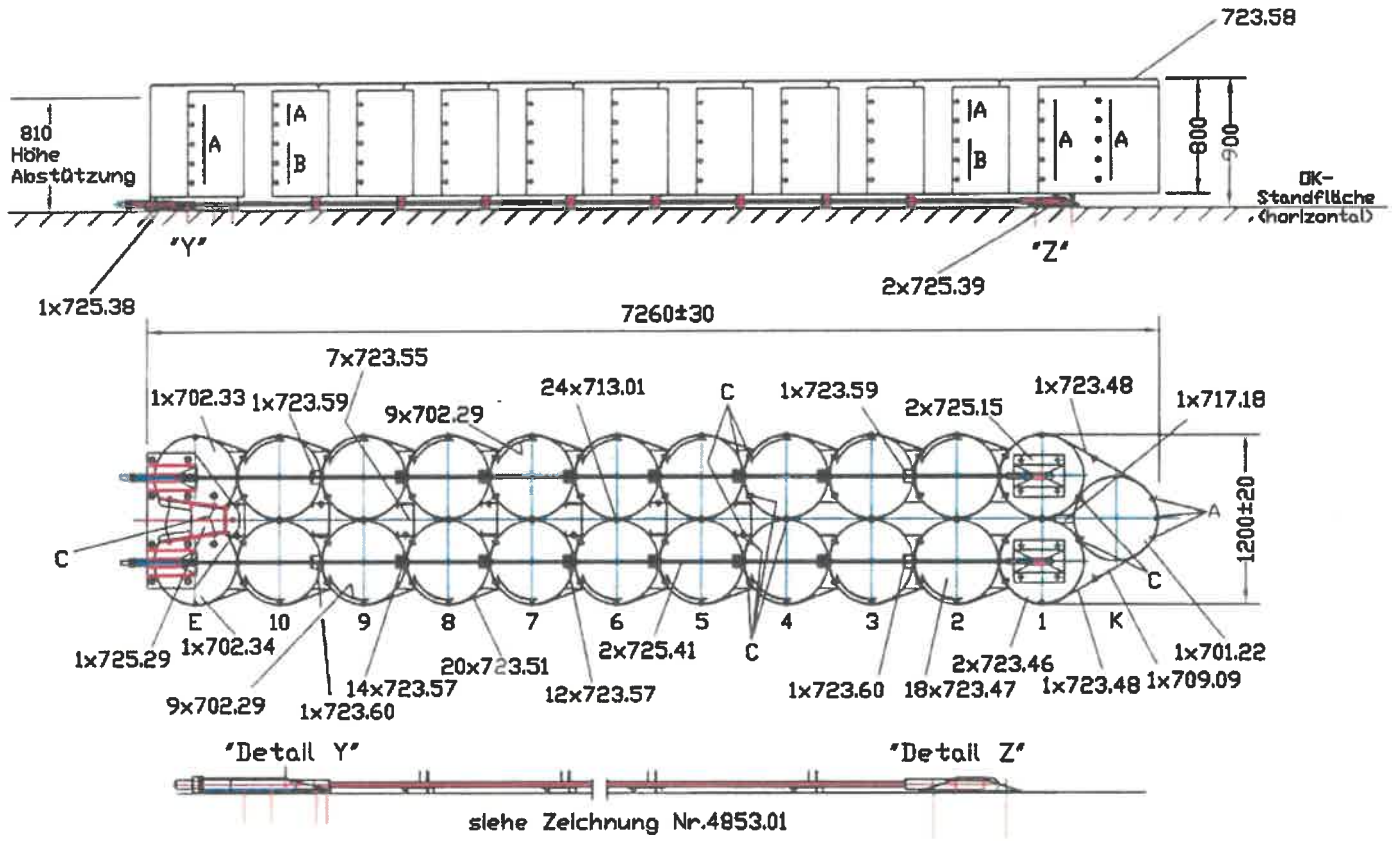
Versendungsbereich	Zul. Abweichung	Oberfläche	Maßstab		Gewicht
			Werkstoff, Halbzeug Rohteil-Nr. Modell- oder Gesenk-Nr.		
	Datum	Name	Benennung		
	Bearb. 18.05.2009	Br	Anpralldämpfer VECU-STOP DBP		
	Gepr.		Verankerungen		
	Norm				
	Detail Verankerungen		Zeichnungsnummer		Blatt
			SPS-Nr.5197.00		1
Zust. Änderung Datum Name Ursprung			Ers. für	Ers. d.	Bl.

CEN- Crash Cushion System "VECU-STOP ®"
Model Group VS-120

Level	Model	Draw. No.	Shape	Angle	L	W (H)	W (B)
Parallel Design VS-P 120							
80	VS - P 120 / 2:10	4772.01		0	7,2	1,2	1,2
100	VS - P 120 / 2:13	4851.01		0	9,0	1,2	1,2
110	VS - P 120 / 2:14	5232.00		0	9,7	1,2	1,2
Angular Design VS-V 120							
80	VS - V 120 / 3:10	5281.00		6	7,2	1,2	1,8
	VS - V 120 / 4:10	5294.00		13	7,2	1,2	2,4
	VS - V 120 / 5:10	4842.02		19	7,2	1,2	3,2
100	VS - V 120 / 3:13	5272.01		5	9,0	1,2	1,8
	VS - V 120 / 4:13	4993.01		10	9,0	1,2	2,4
110	VS - V 120 / 3:14	5289.00		4	9,6	1,2	1,8
	VS - V 120 / 4:14	5005.01		9	9,6	1,2	2,4

P = parallel V = angular L = Length(m) W(H) = Head width W(B) = Basic width

Anpralldämpfer VECU-STOP VS-P120/2:10



Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	264	723.01/718.13/718.15

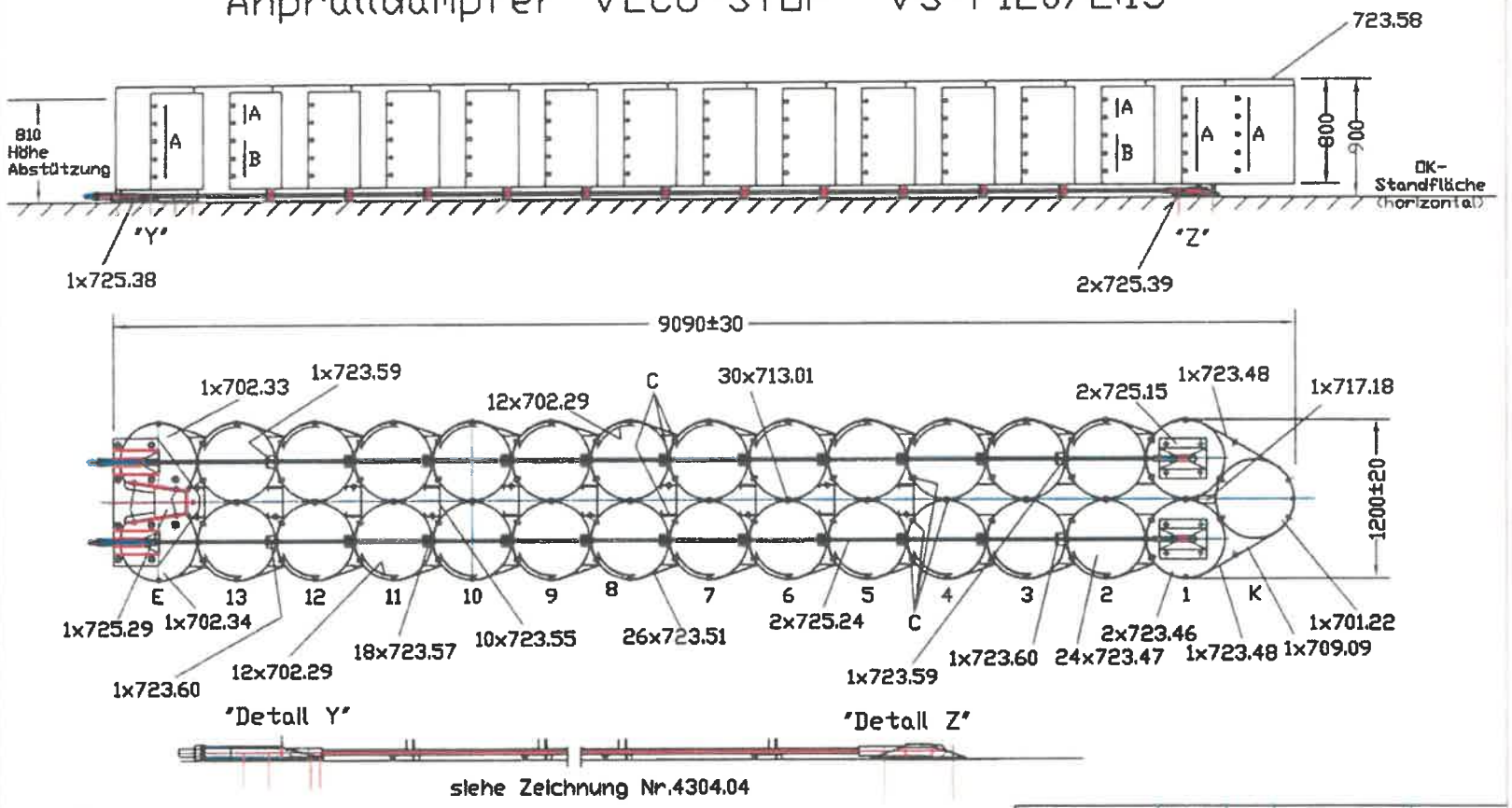
Anpralldämpfer VECU-STOP
VS-P120/2:10 Übersicht

SPS-Nr.4772.01

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-P120/2:10**	page 1 from 1 Partlist-No.4784.01 20.06.2007

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE Kg	WEIGHT TOTAL kg
	VS-P 120/2:10 General drawing					4772.01			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	18	46,00	828,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet 600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.33	Segment-CylinderVS-P120 ri	3,5	600	800	S235JR	4315.05	1	33,83	33,83
702.34	Segment-CylinderVS-P120 le	3,5	600	800	S235JR	4315.05	1	33,83	33,83
702.29	Segment-sheet 120 ri/le	3,5		400	S235JR	4308.03	18	4,20	75,60
723.51	Side-panel 600	3,5	600	750	S235JR	4236.05	20	13,00	260,00
723.55	C-profil VS 120	2,5	225x120		S235JR	4225.04	7	8,00	56,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	12	1,80	21,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	24	0,30	7,20
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	78	0,25	19,50
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	264	0,15	39,60
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	264	0,07	18,48
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	390	0,02	7,80
725.29	Steel-End-unit VS-120 P	6.8		970	S235JR	4320.05	1	60,00	60,00
725.42	Steel-wire-rope VS-120/10		20	6640	see drawing	4853.01	2	12,60	25,20
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.38	Neoprene plate VS P+V	752x505x8			see drawing	4591.03	1	0,80	0,80
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4591.03	2	0,15	0,30
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								1691,02

Anpralldämpfer VECU-STOP VS-P120/2:13



Pos.	Stck.	Artikel-Nr.
A	84	723.02/718.11/718.15
B	72	723.03/718.11/718.15
C	342	723.01/718.13/718.15

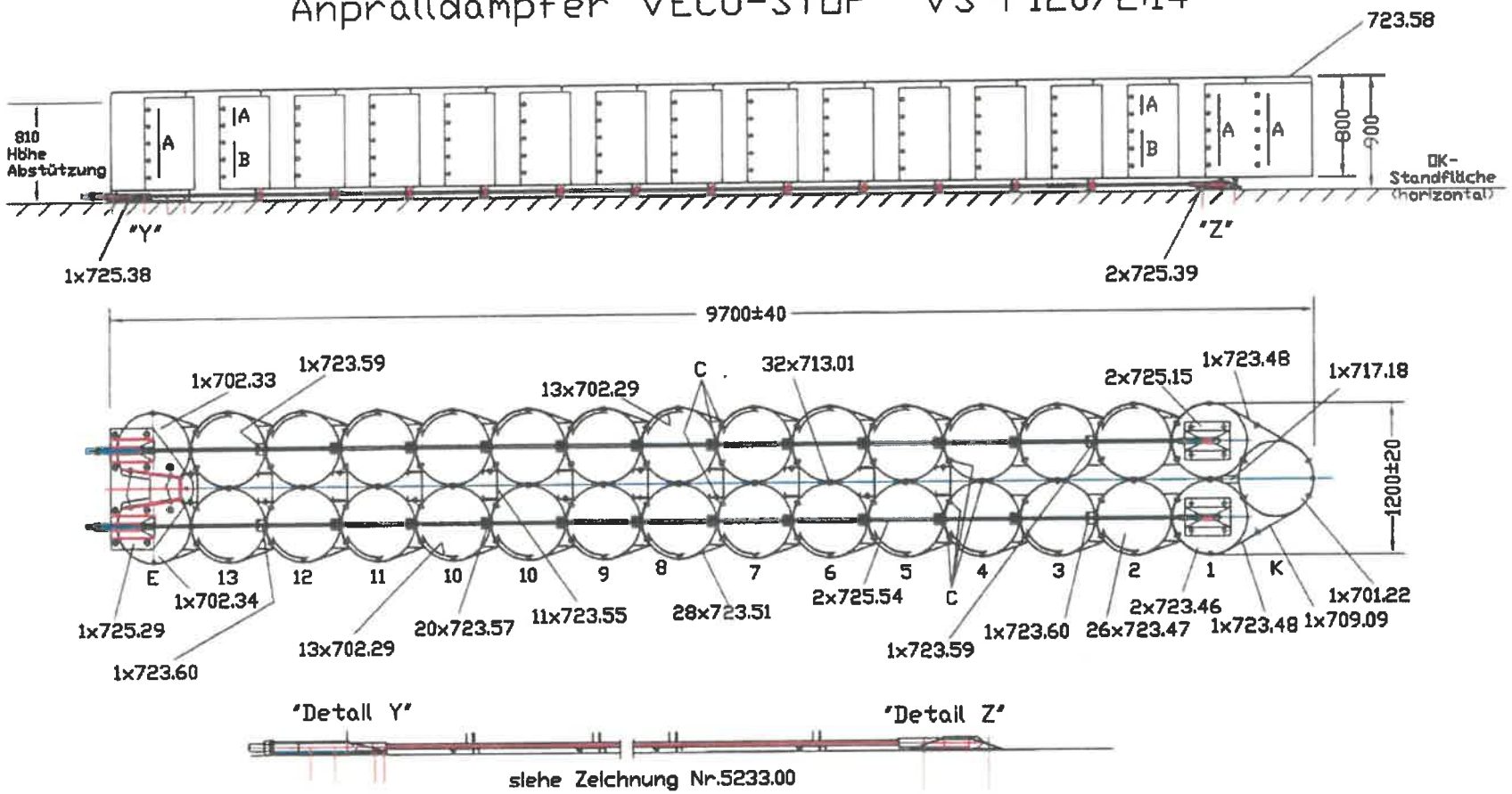
Anpralldämpfer VECU-STOP
VS-P120/213 Übersicht

SPS-Nr.4951.01

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-P120/2:13**	page 1 from 1 Partlist-No.4850.04 11.10.2007

ITEM No.	DESCRIPTION	DIMENSIONS t mm	DIMENSIONS Ø mm	DIMENSIONS L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE Kg	WEIGHT TOTAL kg
	VS-P 120/2:13 General drawing					4851.01			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	24	46,00	1104,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet 600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.33	Segment-CylinderVS-P120 ri	3,5	600	800	S235JR	4315.05	1	33,83	33,83
702.34	Segment-CylinderVS-P120 le	3,5	600	800	S235JR	4315.05	1	33,83	33,83
702.29	Segment-sheet 120 ri/le	3.5		400	S235JR	4308.03	24	4,20	100,80
723.51	Side-panel 600	3,5	600	750	S235JR	4236.05	26	13,00	338,00
723.55	C-profil VS 120	2,5	225x120		S235JR	4225.04	10	8,00	80,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	18	1,80	32,40
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	30	0,30	9,00
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	83	0,25	20,75
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	342	0,15	51,30
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	84	0,18	15,20
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	72	0,20	14,40
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	156	0,07	10,92
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	342	0,07	23,94
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	498	0,02	9,96
725.29	Steel-End-unit VS-120 P	6.8		970	S235JR	4320.05	1	60,00	60,00
725.42	Steel-wire-rope VS-120/13		20	8470	see drawing	4304.04	2	15,60	33,46
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.38	Neoprene plate VS P+V	752x505x8			see drawing	4591.03	1	0,80	0,80
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4591.03	2	0,15	0,30
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								2143,59

Anpralldämpfer VECU-STOP VS-P120/2:14



Pos.	Stck.	Artikel-Nr.
A	88	723.02/718.11/718.15
B	78	723.03/718.11/718.15
C	368	723.01/718.13/718.15

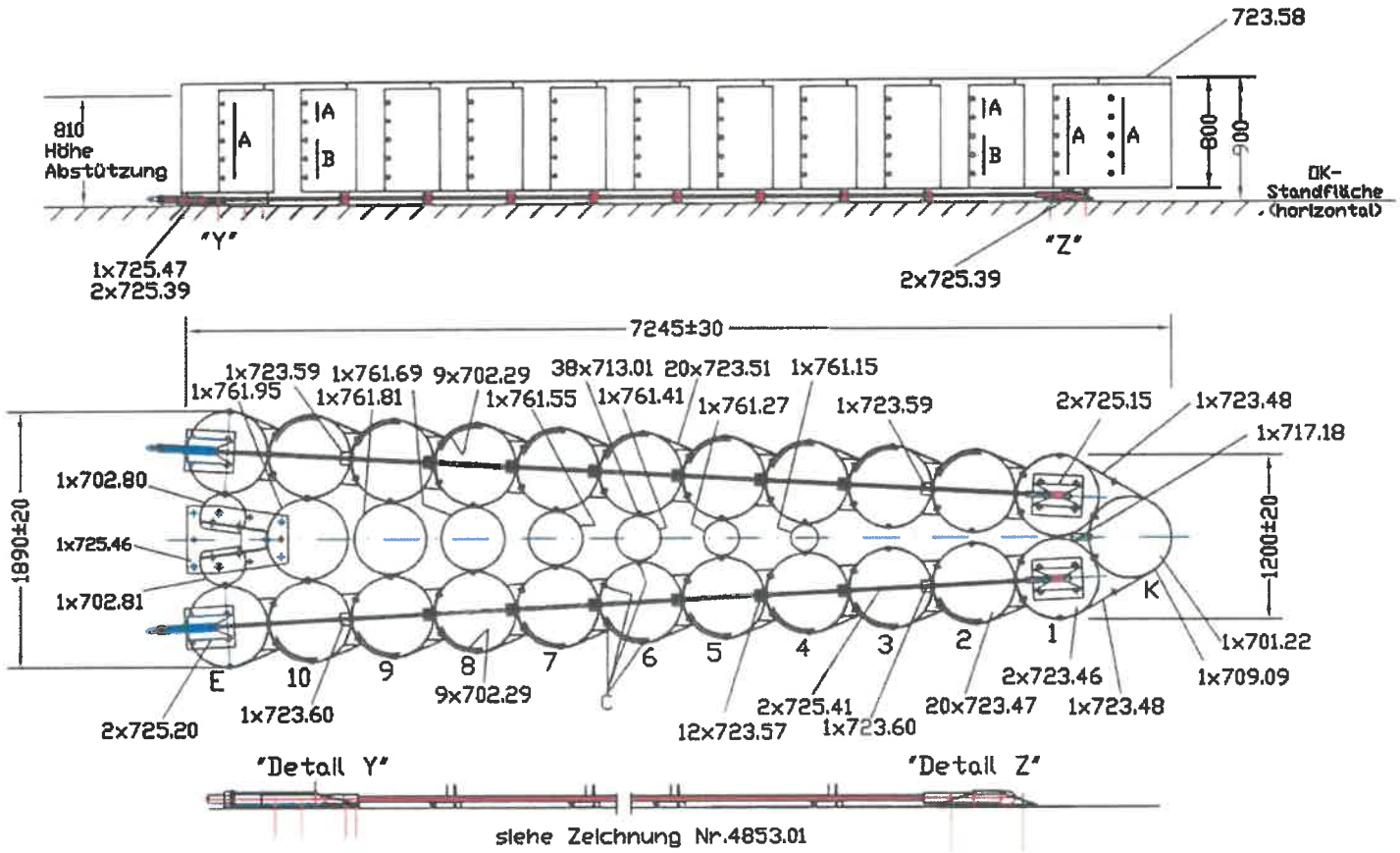
Anpralldämpfer VECU-STOP
VS-P120/214 Übersicht

SPS-Nr.5232.00

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-P120/2:14**	page 1 from 1 Partlist-No.5234.00 11.10.2007

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE Kg	WEIGHT TOTAL kg
	VS-P 120/2:14 General drawing					5232.00			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	26	46,00	1196,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet 600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.33	Segment-CylinderVS-P120 ri	3,5	600	800	S235JR	4315.05	1	33,83	33,83
702.34	Segment-CylinderVS-P120 le	3,5	600	800	S235JR	4315.05	1	33,83	33,83
702.29	Segment-sheet 120 ri/le	3,5		400	S235JR	4308.03	26	4,20	109,20
723.51	Side-panel 600	3,5	600	750	S235JR	4236.05	28	13,00	364,00
723.55	C-profil VS 120	2.5	225x120		S235JR	4225.04	11	8,00	88,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	20	1,80	36,00
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	32	0,30	9,60
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	85	0,25	21,25
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	368	0,15	55,20
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	88	0,18	15,84
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	78	0,20	15,60
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	166	0,07	11,62
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	368	0,07	25,76
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	534	0,02	10,68
725.29	Steel-End-unit VS-120 P	6.8		804	S235JR	4320.05	1	60,00	60,00
725.54	Steel-wire-rope VS-120/14		20	9085	see drawing	5233.00	2	17,50	35,00
725.15	Anchor plate frontside	300x360x8			see drawing	4278.04	2	9,80	19,60
725.38	Neoprene plate VS P+V	752x505x8			see drawing	4591.03	1	0,80	0,80
725.39	Neoprene plate VS P+V	365x305x8			see drawing	4591.03	2	0,15	0,30
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								2243,21

Anpralldämpfer VECU-STOP VS-V120/3:10



Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	262	723.01/718.13/718.15

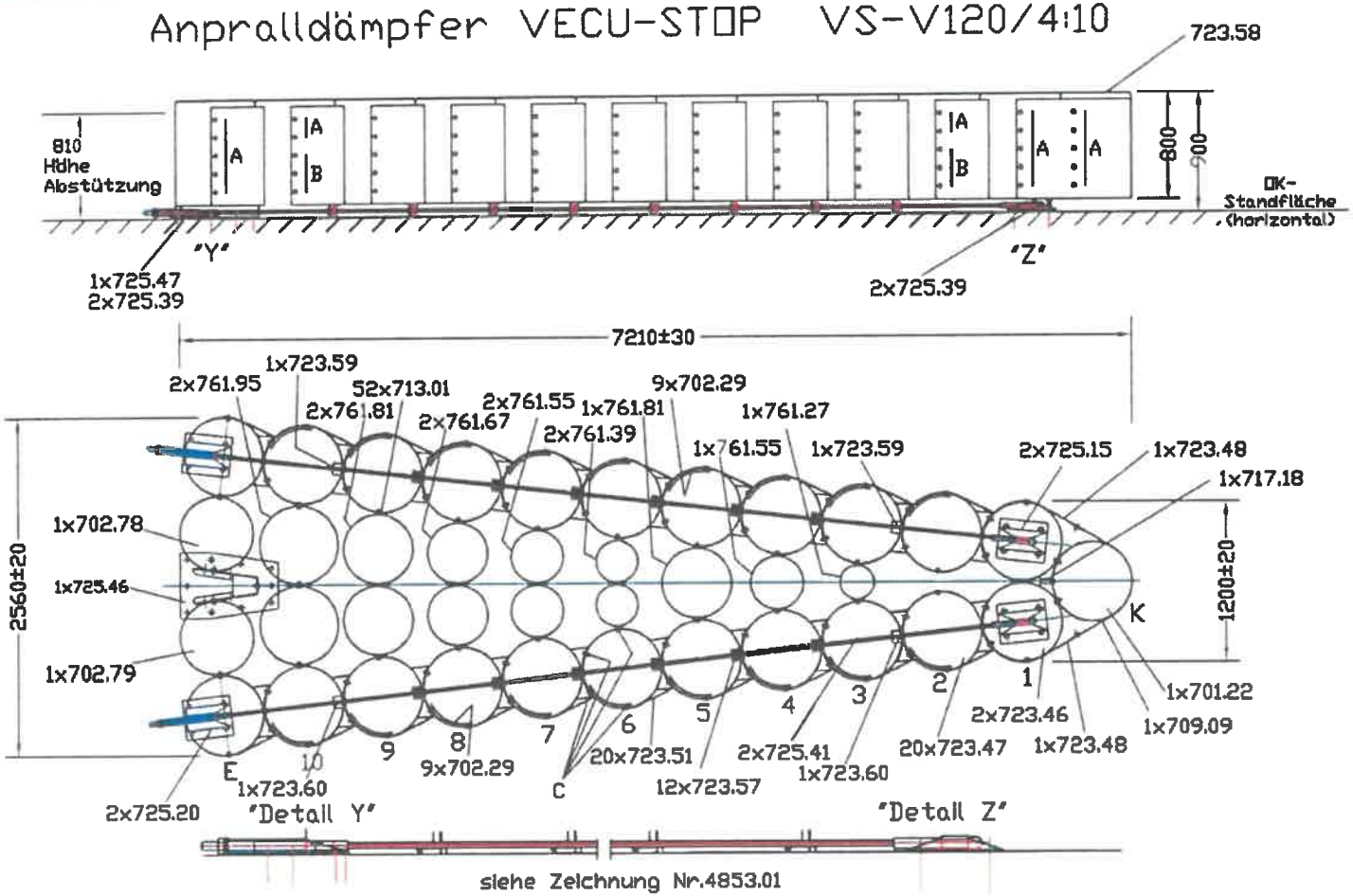
Anpralldämpfer VECU-STOP
VS-V120/3:10 Übersicht

SPS-Nr.5281.00

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V120/3:10**	page 1 from 1 Partlist-No.5285.00 01.09.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V120/3:10 General drawing					5281.00			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	20	46,00	920,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.80	Segment-CylinderVS-V120/3:10 ri	3,5	600	800	S235JR	5286.00	1	20,00	20,00
702.81	Segment-CylinderVS-V120/3:10 le	3,5	600	800	S235JR	5286.00	1	20,00	20,00
702.29	Segment-sheet ri/le	3,0		400	S235JR	4308.03	18	4,20	75,60
761.15	Inside-cylinder 200	3,0	200	800	S235JR	5173.00	1	12,00	12,00
761.27	Inside-cylinder 260	3,0	260	800	S235JR	5187.00	1	15,00	15,00
761.41	Inside-cylinder 330	3,0	330	800	S235JR	5122.01	1	19,00	19,00
761.55	Inside-cylinder 400	3,0	400	800	S235JR	5235.00	1	23,00	23,00
761.69	Inside-cylinder 470	3,0	470	800	S235JR	5258.01	1	27,00	27,00
761.81	Inside-cylinder 530	3,0	530	800	S235JR	5284.00	1	31,00	31,00
761.95	Inside-cylinder 600	3,0	600	800	S235JR	5236.00	1	35,00	35,00
723.51	Side-panel	3,0	600	750	S235JR	4236.05	20	13,00	260,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	12	1,80	21,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	38	0,30	11,40
723.58	Edge-Protector	Meter			PVC+Metallki	4406.02	92	0,25	23,00
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	262	0,15	39,30
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	262	0,07	18,34
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	388	0,02	7,76
725.46	Steel-End-unit VS-100/120 V	6,8		747	S235JR	4859.02	1	56,00	56,00
725.41	Steel-wire-rope		20	6640	see drawing	4853.01	2	9,40	18,80
725.15	Anchor plate frontside				see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside				see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V				see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V				see drawing	4862.01	4	0,15	0,60
	Anchorings				see drawing Nr. 5197.00				
	TOTAL WIGHT CRASH-CUSHION in Kg:								1877,78

Anpralldämpfer VECU-STOP VS-V120/4:10



siehe Zeichnung Nr.4853.01

Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	270	723.01/718.13/718.15

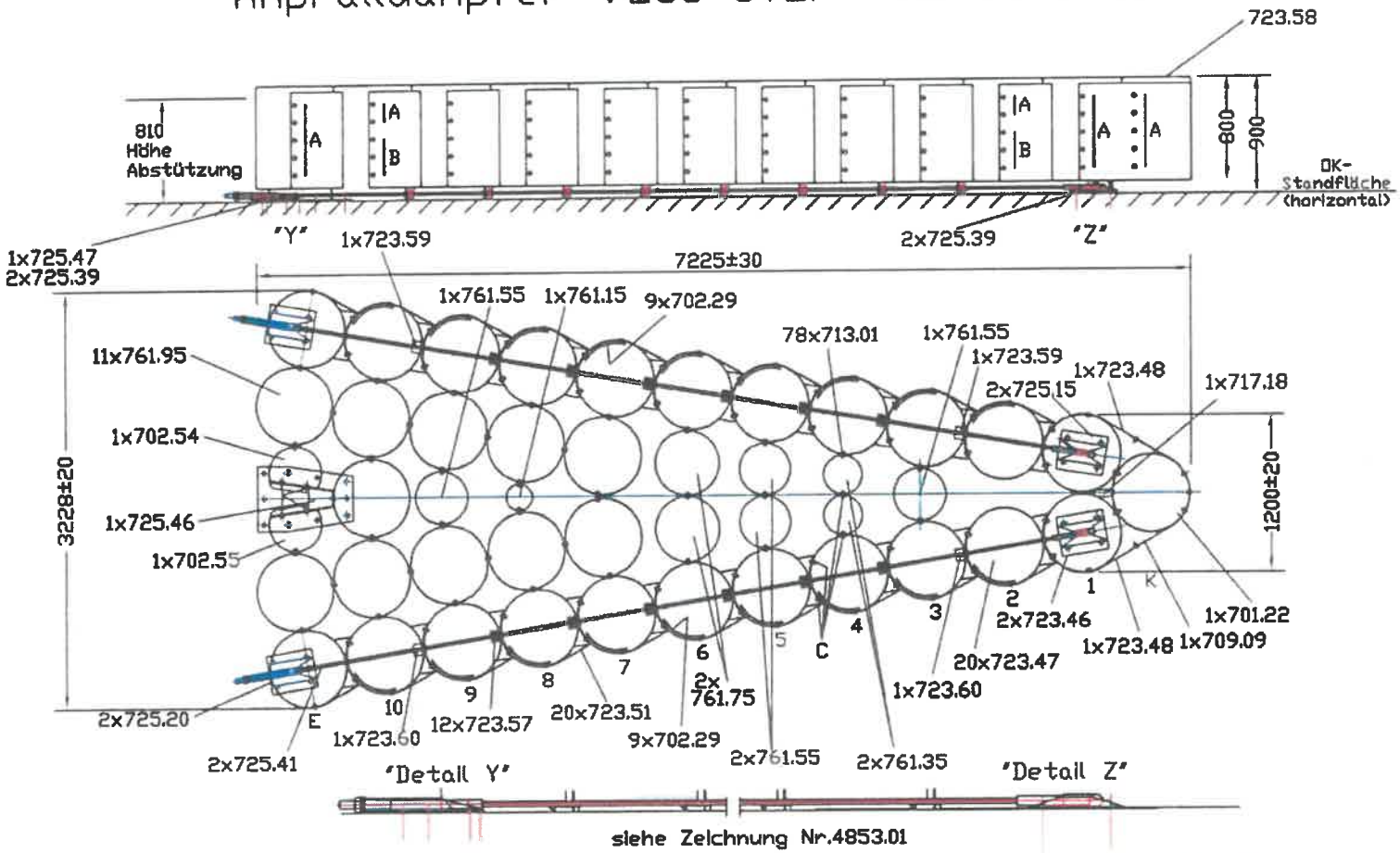
Anpralldämpfer VECU-STOP
VS-V120/410 Übersicht

SPS-Nr.5294.00

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V120/4:10**	page 1 from 1 Partlist-No.5391.00 05.10.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	DIMENSIONS Ø mm	DIMENSIONS L Mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V120/4:10 General drawing					5294.00			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	20	46,00	920,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.78	Segment-CylinderVS-V120/4:10 ri	3,5	600	800	S235JR	5299.00	1	34,00	34,00
702.79	Segment-CylinderVS-V120/4:10 le	3,5	600	800	S235JR	5299.00	1	34,00	34,00
702.29	Segment-sheet ri/le	3,0		400	S235JR	4308.03	18	4,20	75,60
761.27	Inside-cylinder 260	3,0	260	800	S235JR	5187.00	1	15,00	15,00
761.39	Inside-cylinder 320	3,0	320	800	S235JR	5191.00	2	19,00	38,00
761.55	Inside-cylinder 400	3,0	400	800	S235JR	5235.01	3	23.00	69,00
761.67	Inside-cylinder 460	3,0	460	800	S235JR	5157.01	2	27,00	54,00
761.81	Inside-cylinder 530	3,0	530	800	S235JR	5284.00	3	31,00	93,00
761.95	Inside-cylinder 600	3,0	600	800	S235JR	5236.00	2	35,00	70,00
723.51	Side-panel	3,0	600	750	S235JR	4236.05	20	13,00	260,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	12	1,80	21,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	52	0,30	15,60
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	132	0,25	33,00
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	270	0,15	40,50
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	270	0,07	18,90
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	396	0,02	7,92
725.46	Steel-End-unit VS-100/120 V	6,8		747	S235JR	4859.02	1	56,00	56,00
725.41	Steel-wire-rope		20	6640	see drawing	5853.01	2	9,40	18,80
725.15	Anchor plate frontside				see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside				see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V				see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V				see drawing	4862.01	4	0,15	0,60
	Anchorings				see drawing Nr. 5197.00				
					TOTAL WIGHT CRASH-CUSHION in Kg:				2098,90

Anpralldämpfer VECU-STOP VS-V120/5:10



siehe Zeichnung Nr.4853.01

Pos.	Stck.	Artikel-Nr.
A	72	723.02/718.11/718.15
B	54	723.03/718.11/718.15
C	306	723.01/718.13/718.15

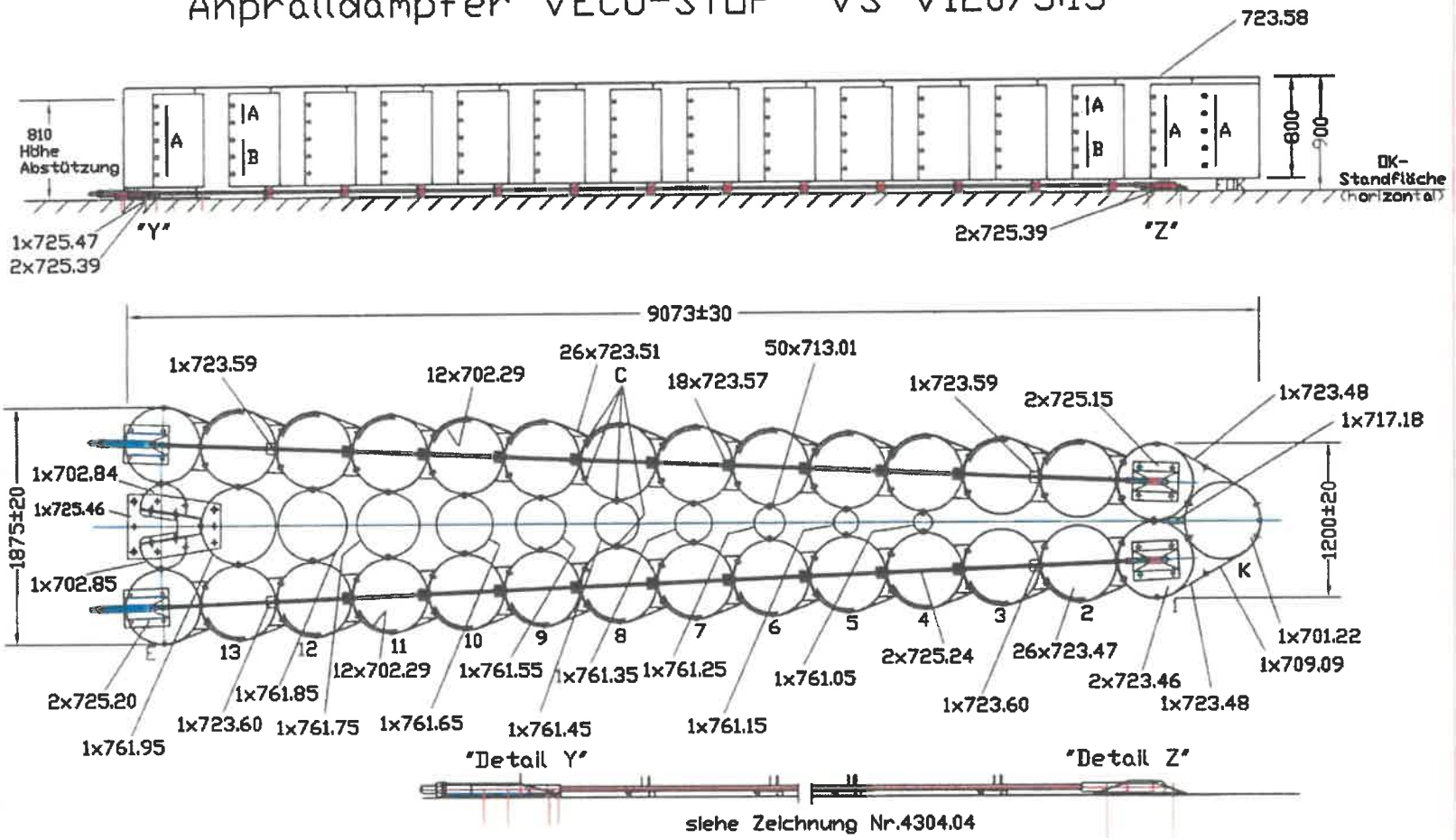
Anpralldämpfer VECU-STOP
VS-V120/5:10 Übersicht

SPS-Nr.4842.02

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V120/5:10**	page 1 from 1 Partlist-No.4856.03 16.06.2007

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V120/5:10 General drawing					4842.02			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	20	46,00	920,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.54	Segment-CylinderVS-V120/5:10 ri	3,5	600	800	S235JR	4858.01	1	22,60	22,60
702.55	Segment-CylinderVS-V120/5:10 le	3,5	600	800	S235JR	4858.01	1	22,60	22,60
702.29	Segment-sheet ri/le	3.0		400	S235JR	4308.03	18	4,20	75,60
761.15	Inside-cylinder 200	3.0	200	800	S235JR	5173.00	1	12,00	12,00
761.35	Inside-cylinder 300	3,0	300	800	S235JR	5188.00	2	17,00	34,00
761.55	Inside-cylinder 400	3,0	400	800	S235JR	5235.00	3	23,00	69,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5152.01	2	29,00	58,00
761.95	Inside-cylinder 600	3,0	600	800	S235JR	5236.00	11	35,00	385,00
723.51	Side-panel	3,0	600	750	S235JR	4236.05	20	13,00	260,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	12	1,80	21,60
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	78	0,30	23,40
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	120	0,25	30,00
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	306	0,15	45,90
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	72	0,18	12,96
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	54	0,20	10,80
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	126	0,07	8,82
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	306	0,07	21,42
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	432	0,02	8,64
725.46	Steel-End-unit VS-100/120 V	6,8		747	S235JR	4859.02	1	56,00	56,00
725.41	Steel-wire-rope		20	6640	see drawing	4853.01	2	12,60	25,20
725.15	Anchor plate frontside				see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside				see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V				see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V				see drawing	4862.01	4	0,15	0,60
	Anchorings				see drawing Nr. 5197.00				
	TOTAL WIGHT CRASH-CUSHION in Kg:								2314,94

Anpralldämpfer VECU-STOP VS-V120/3:13



Pos.	Stck.	Artikel-Nr.
A	84	723.02/718.11/718.15
B	72	723.03/718.11/718.15
C	340	723.01/718.13/718.15

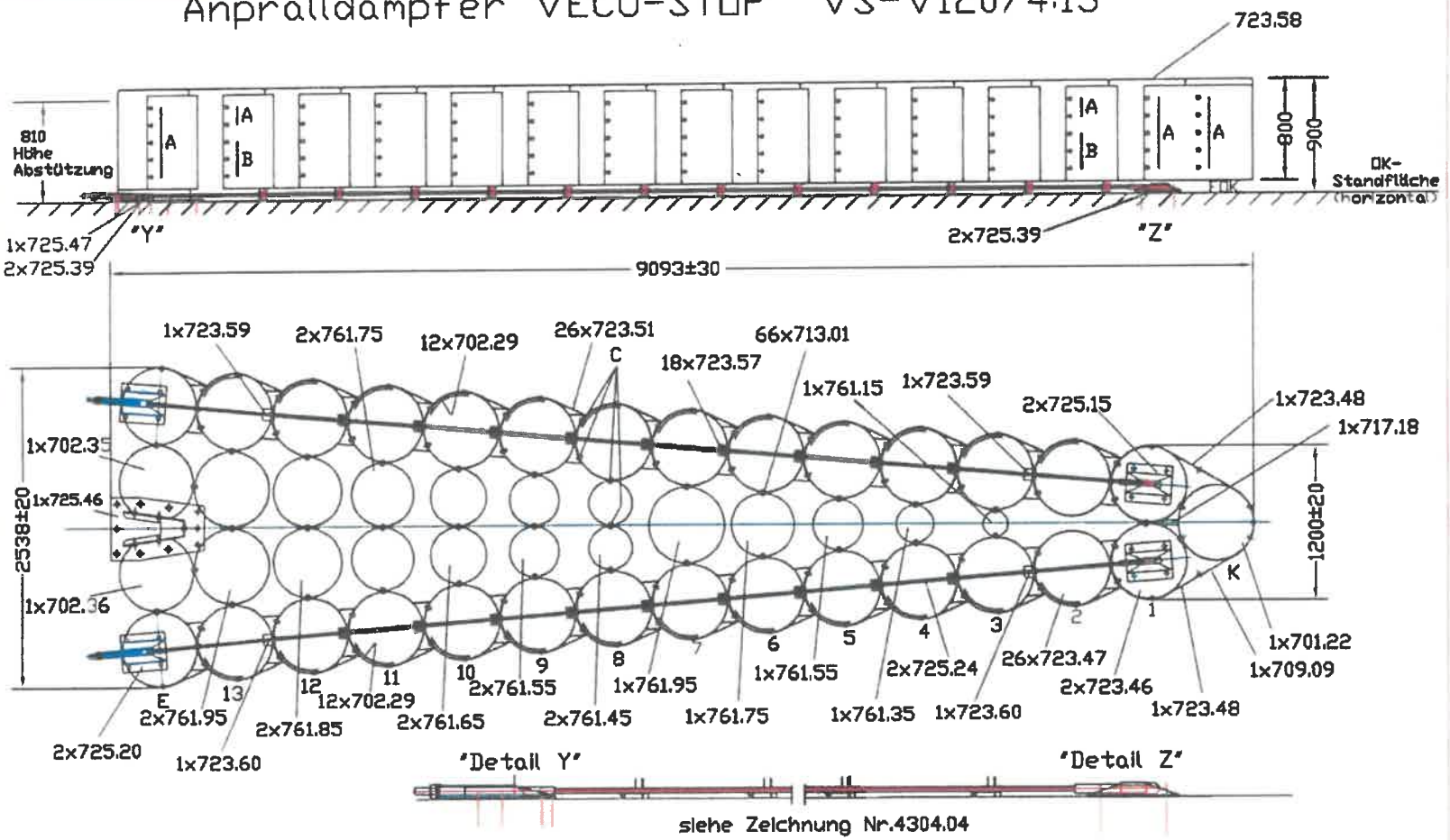
Anpralldämpfer VECU-STOP
VS-V120/313 Übersicht

SPS-Nr.5272.01

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V120/3:13**	page 1 from 1 Partlist-No.5278.01 27.08.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	DIMENSIONS Ø mm	DIMENSIONS L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V120/3:13 General drawing					5272.01			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	26	46,00	1196,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.84	Segment-CylinderVS-V120/3:13 ri	3,5	600	800	S235JR	5279.00	1	20,00	20,00
702.85	Segment-CylinderVS-V120/3:13 le	3,5	600	800	S235JR	5279.00	1	20,00	20,00
702.29	Segment-sheet ri/le	3,0		400	S235JR	4308.03	24	4,20	100,80
761.05	Inside-cylinder 150	3,0	150	800	S235JR	5184.00	1	9,00	9,00
761.15	Inside-cylinder 200	3,0	200	800	S235JR	5173.00	1	12,00	12.00
761.25	Inside-cylinder 250	3,0	250	800	S235JR	5151.01	1	14,00	14,00
761.35	Inside-cylinder 300	3,0	300	800	S235JR	5188.00	1	17,00	17,00
761.45	Inside-cylinder 350	3,0	350	800	S235JR	5244.00	1	20,00	20,00
761.55	Inside-cylinder 400	3,0	400	800	S235JR	5235.00	1	23,00	23,00
761.65	Inside-cylinder 450	3,0	450	800	S235JR	5193.00	1	26,00	26,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5152.01	1	29,00	29,00
761.85	Inside-cylinder 550	3,0	550	800	S235JR	5245.00	1	32,00	32,00
761.95	Inside-cylinder 600	3,0	600	800	S235JR	5236.00	1	35,00	35,00
723.51	Side-panel	3,0	600	750	S235JR	4236.05	26	13,00	338,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	18	1,80	32,40
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	50	0,30	15,00
723.58	Edge-Protector	Meter			PVC+Metallkl	4406.02	120	0,25	30,00
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	340	0,15	51,00
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	84	0,18	15,12
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	72	0,20	14,40
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	156	0,07	10,92
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	340	0,07	23,80
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	496	0,02	9,92
725.46	Steel-End-unit VS-100/120 V	6,8		747	S235JR	4859.02	1	56,00	56,00
725.24	Steel-wire-rope		20	8470	see drawing	4304.04	2	11,00	22,00
725.15	Anchor plate frontside				see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside				see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V				see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V				see drawing	4862.01	4	0,15	0,60
	Anchorings				see drawing Nr. 5197.00				
	TOTAL WIGHT CRASH-CUSHION in Kg:								2341,76

Anpralldämpfer VECU-STOP VS-V120/4:13



siehe Zeichnung Nr.4304.04

Pos.	Stck.	Artikel-Nr.
A	84	723.02/718.11/718.15
B	72	723.03/718.11/718.15
C	354	723.01/718.13/718.15

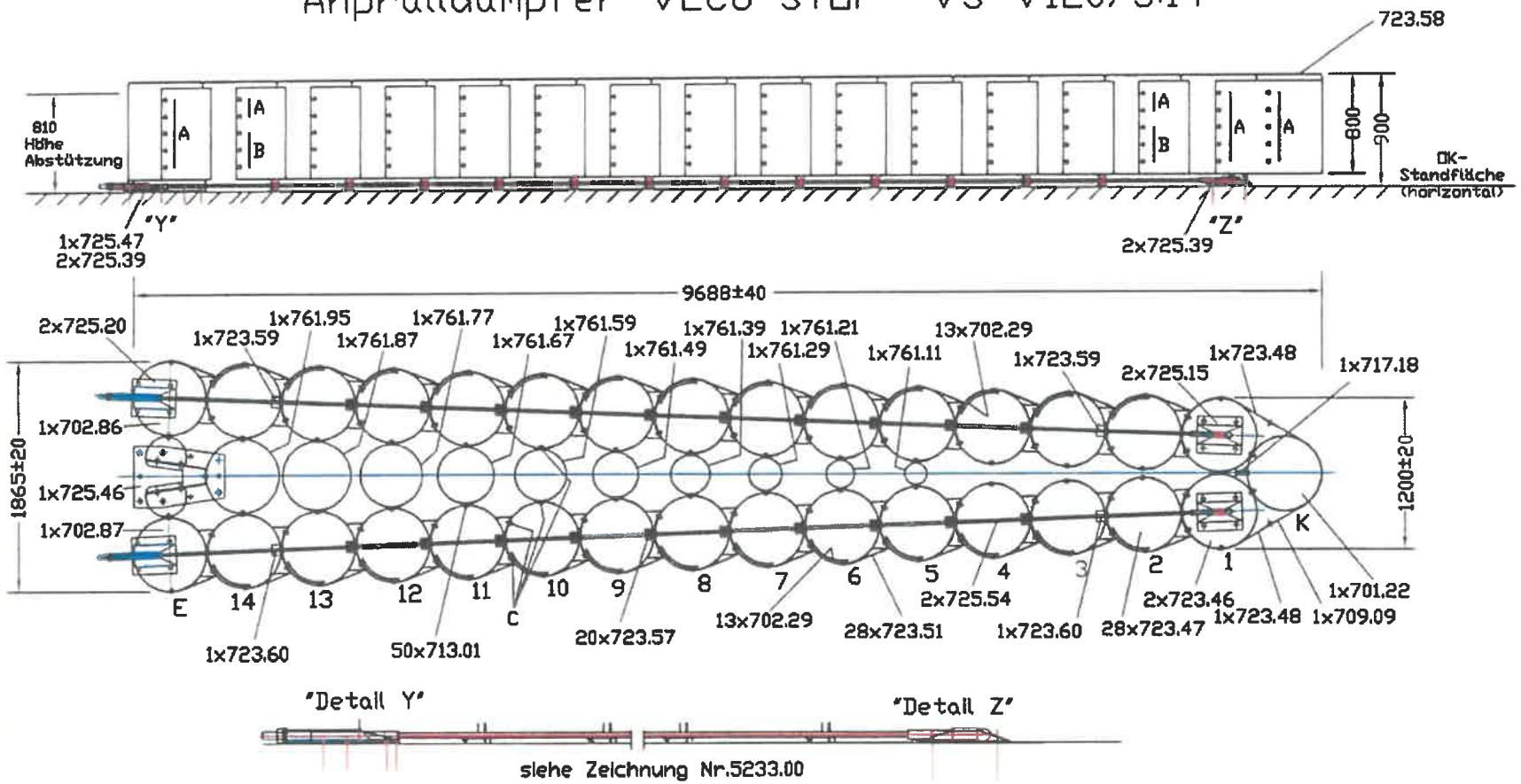
Anpralldämpfer VECU-STOP
VS-V120/4:13 Übersicht

SPS-Nr.4993.01

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V120/4:13**	page 1 from 1 Partlist-No.5243.00 09.07.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	DIMENSIONS Ø mm	DIMENSIONS L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V120/4:13 General drawing					5005.01			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	26	46,00	1196,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.35	Segment-CylinderVS-V120/4:13 ri	3,5	600	800	S235JR	5260.00	1	38,00	38,00
702.36	Segment-CylinderVS-V120/4:13 le	3,5	600	800	S235JR	5260.00	1	38,00	38,00
702.29	Segment-sheet ri/le	3,0		400	S235JR	4308.03	24	4,20	100,80
761.15	Inside-cylinder 200	3,0	200	800	S235JR	5173.00	1	12,00	12,00
761.35	Inside-cylinder 300	3,0	300	800	S235JR	5188.00	1	17,00	17,00
761.45	Inside-cylinder 350	3,0	350	800	S235JR	5244.00	2	20,00	40,00
761.55	Inside-cylinder 400	3,0	400	800	S235JR	5235.00	3	23,00	69,00
761.65	Inside-cylinder 450	3,0	450	800	S235JR	5193.00	2	26,00	52,00
761.75	Inside-cylinder 500	3,0	500	800	S235JR	5125.01	3	29,00	87,00
761.85	Inside-cylinder 550	3,0	550	800	S235JR	5245.00	2	32,00	64,00
761.95	Inside-cylinder 600	3,0	600	800	S235JR	5236.00	3	35,00	105,00
723.51	Side-panel 600	3,0	600	750	S235JR	4236.05	26	13,00	338,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	18	1,80	32,40
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	66	0,30	19,30
723.58	Edge-Protector 320 K61	meter			PVC+Metallkl	4406.02	126	0,25	31,50
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	354	0,15	53,10
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	84	0,18	15,12
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	72	0,20	14,40
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	156	0,07	10,92
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	354	0,07	24,78
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	510	0,02	10,20
725.46	Steel-End-unit VS-100/120 V	6,8		747	S235JR	4859.02	1	56,00	56,00
725.24	Steel-wire-rope VS-120/13		20	8470	see drawing	5233.00	2	16,00	32,00
725.15	Anchor plate frontside				see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside				see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V				see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V				see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								2.638,92

Anpralldämpfer VECU-STOP VS-V120/3:14



Pos.	Stck.	Artikel-Nr.
A	88	723.02/718.11/718.15
B	78	723.03/718.11/718.15
C	362	723.01/718.13/718.15

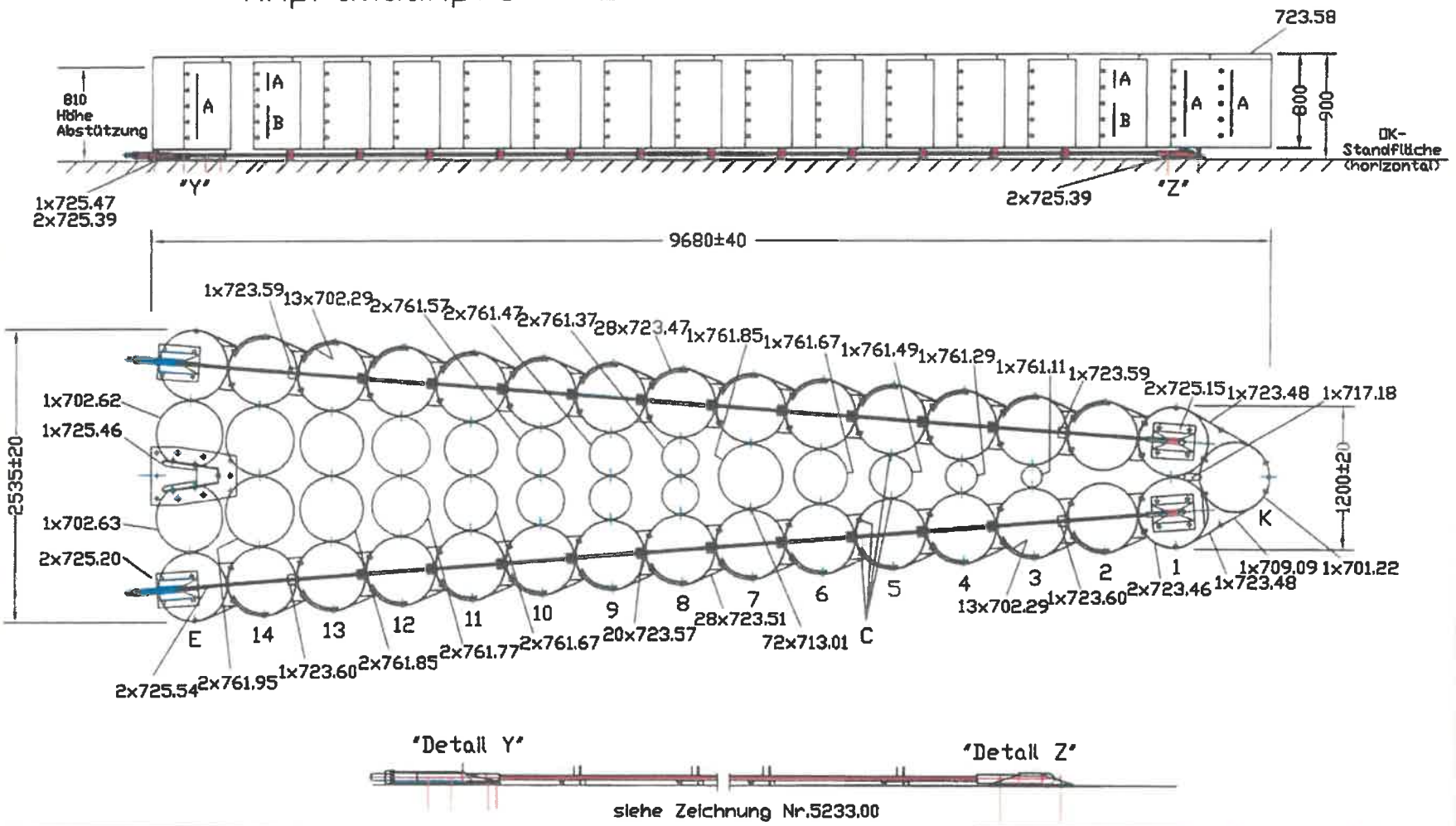
Anpralldämpfer VECU-STOP
VS-V120/3:14 Übersicht

SPS-Nr.5289.00

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V120/3:14**	page 1 from 1 Partlist-No.5293.00 03.09.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	Ø mm	L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V120/3:14 General drawing					5289.00			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	28	46,00	1288,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.86	Segment-CylinderVS-V120/3:14 ri	3,5	600	800	S235JR	5292.00	1	18,00	18,00
702.87	Segment-CylinderVS-V120/3:14 le	3,5	600	800	S235JR	5292.00	1	18,00	18,00
702.29	Segment-sheet ri/le	3,0		400	S235JR	4308.03	26	4,20	109,20
761.11	Inside-cylinder 180	3,0	180	800	S235JR	5249.00	1	10,00	10,00
761.21	Inside-cylinder 230	3,0	230	800	S235JR	5150.00	1	13,00	13,00
761.29	Inside-cylinder 270	3,0	270	800	S235JR	5250.00	1	16,00	16,00
761.39	Inside-cylinder 320	3,0	320	800	S235JR	5291.00	1	19,00	19,00
761.49	Inside-cylinder 370	3,0	370	800	S235JR	5172.00	1	22,00	22,00
761.59	Inside-cylinder 420	3,0	420	800	S235JR	5156.01	1	24,00	24,00
761.67	Inside-cylinder 460	3,0	460	800	S235JR	5157.01	1	27,00	27,00
761.77	Inside-cylinder 510	3,0	510	800	S235JR	5252.00	1	30.00	30,00
761.87	Inside-cylinder 560	3,0	560	800	S235JR	5290.00	1	33,00	33,00
761.95	Inside-cylinder 600	3,0	600	800	S235JR	5236.00	1	35,00	35,00
723.51	Side-panel	3,0	600	750	S235JR	4236.05	28	13,00	364,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	20	1,80	36,00
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	50	0,30	15,00
723.58	Edge-Protector	meter			PVC+Metallkl	4406.02	125	0,25	31,25
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	362	0,15	54,30
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	88	0,18	15,84
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	78	0,20	15,60
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	166	0,07	11,62
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	362	0,07	25,34
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02	528	0,02	10,56
725.46	Steel-End-unit VS-100/120 V	6,8		747	S235JR	4859.02	1	56,00	56,00
725.54	Steel-wire-rope		20	9085	see drawing	5233.00	2	11,80	23,60
725.15	Anchor plate frontside				see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside				see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V				see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V				see drawing	4862.01	4	0,15	0,60
	Anchorings				see drawing Nr. 5197.00				
	TOTAL WIGHT CRASH-CUSHION in Kg:								2512,71

Anpralldämpfer VECU-STOP VS-V120/4:14



"Detail Y" "Detail Z"

siehe Zeichnung Nr.5233.00

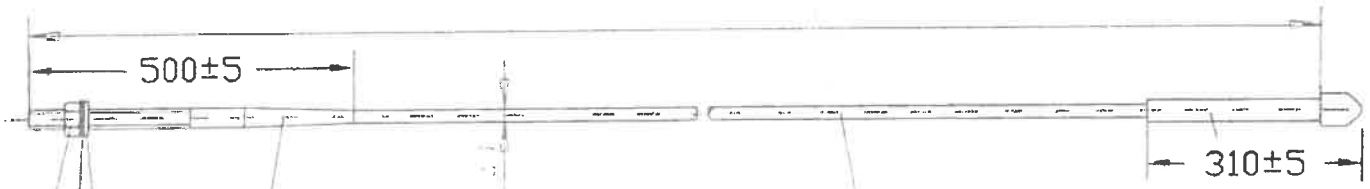
		M16 / M / Sch
Pos.	Stck.	Artikel-Nr.
A	88	723.02/718.11/718.15
B	78	723.03/718.11/718.15
C	400	723.01/718.13/718.15

Anpralldämpfer VECU-STOP
VS-V120/414 Übersicht

SPS-Nr.5005.01

SPS Schutzplanken GmbH Aschaffenburg	**PART LIST** **CRASH-CUSHION SYSTEM VECU-STOP** **MODEL VS-V120/4:14**	page 1 from 1 Partlist-No.5248.00 10.07.2009

ITEM No.	DESCRIPTION	DIMENSIONS t mm	DIMENSIONS Ø mm	DIMENSIONS L mm	MATERIAL QUALITY	DRAWIN No.	PC	WEIGHT SINGLE kg	WEIGHT TOTAL kg
	VS-V120/4:14 General drawing					5005.01			
701.22	Lead-cylinder VS-100/120	2,5	600	800	S235JR	4299.04	1	37,00	37,00
723.46	Cylinder 600 VS-120	3,0	600	800	S235JR	4235.05	2	38,00	76,00
723.47	Standard Cylinder 600	3,0	600	800	S253JR	4234.06	28	46,00	1288,00
709.09	Lead-plate 600 VS-100/120	2,0		750	S235JR	4257.03	1	16,00	16,00
723.48	Lead-connection-sheet600 VS-120 ri/le	2,0		750	S235JR	4239.05	2	7,00	14,00
702.62	Segment-CylinderVS-V120/4:14 ri	3,5	600	800	S235JR	5260.00	1	38,00	38,00
702.63	Segment-CylinderVS-V120/4:14 le	3,5	600	800	S235JR	5260.00	1	38,00	38,00
702.29	Segment-sheet ri/le	3,0		400	S235JR	4308.03	26	4.20	109,20
761.11	Inside-cylinder 180	3,0	180	800	S235JR	5249.00	1	10,00	10.00
761.29	Inside-cylinder 270	3,0	270	800	S235JR	5250.00	1	16,00	16,00
761.37	Inside-cylinder 310	3,0	310	800	S235JR	5153.01	2	18,00	36.00
761.47	Inside-cylinder 360	3,0	360	800	S235JR	5251.00	2	21,00	42,00
761.49	Inside-cylinder 370	3,0	370	800	S235JR	5172.00	1	22,00	22,00
761.57	Inside-cylinder 410	3,0	410	800	S235JR	5124.00	2	24,00	48,00
761.67	Inside-cylinder 460	3,0	460	800	S235JR	5157.01	3	27,00	81,00
761.77	Inside-cylinder 510	3,0	510	800	S235JR	5252.00	2	30,00	60,00
761.85	Inside-cylinder 550	3,0	550	800	S235JR	5245.00	3	32,00	96,00
761.95	Inside-cylinder 600	3,0	560	800	S235JR	5236.00	2	35,00	70,00
723.51	Side-panel	3,0	600	750	S235JR	4236.05	28	13,00	364,00
723.57	Standard-slider A	230x90x90			S235JR	4677.02	20	1,80	36,00
723.59	Open-slider VS/B ri	230x90x90			S235JR	4614.03	2	1,70	3,40
723.60	Open-slider VS/B le	230x90x90			S235JR	4396.03	2	1,70	3,40
717.18	Roller with shaft and connector	200x70x36			look drawing	1683.03	1	1,30	1,30
713.01	Distance-plate	140x35x6			S235JR	2104.03	72	0,30	21,60
723.58	Edge-Protector	meter			PVC+Metallkl	4406.02	130	0,25	32,50
723.01	Hex-bolt + N +W	M 16x35			4.6/tZn	4642.02	400	0,15	60,00
723.02	Mushroom-bolts	M 16x27			4.6/tZn	4641.02	88	0,18	15,84
723.03	Mushroom-bolts	M 16x40			4.6/tZn	4641.02	78	0,20	15,60
718.11	Nut ISO 4032	M 16			4.6/tZn	4641.02	166	0,07	11,62
718.13	Nut DIN 555	M 16			4.6/tZn	4642.02	400	0,07	28,00
718.15	Washer	17,5x30x3			tZn	4642.02 4641.02			
725.46	Steel-End-unit VS-100/120 V	6,8		747	S235JR	4859.02	1	56,00	56,00
725.54	Steel-wire-rope		20	9085	see drawing	5233.00	2	17,50	35,00
725.15	Anchor plate frontside				see drawing	4278.04	2	9,80	19,60
725.20	Anchor plate backside				see drawing	4370.03	2	9,80	19,60
725.47	Neoprene plate VS P+V				see drawing	4862.01	1	0,50	0,50
725.39	Neoprene plate VS P+V				see drawing	4862.01	4	0,15	0,60
	Anchorings	see drawing Nr. 5197.00							
	TOTAL WIGHT CRASH-CUSHION in Kg:								2.821,76

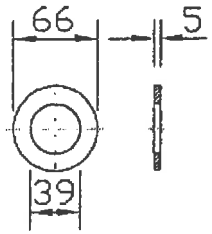


Seilverpressung ≥ø38 mit Kopf ø48,3

Seilverpressung mit Gewinde M36

Spannseil ø20
DIN 3064 SES zn k
Warr.-Seale 1770 sZ spa

Scheibe ISO 7091-39-100HV



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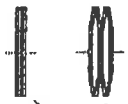
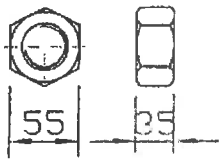
FST 159 71x36x2 (C71)

F1=5141N



in ungespanntem Zustand
in gespanntem Zustand

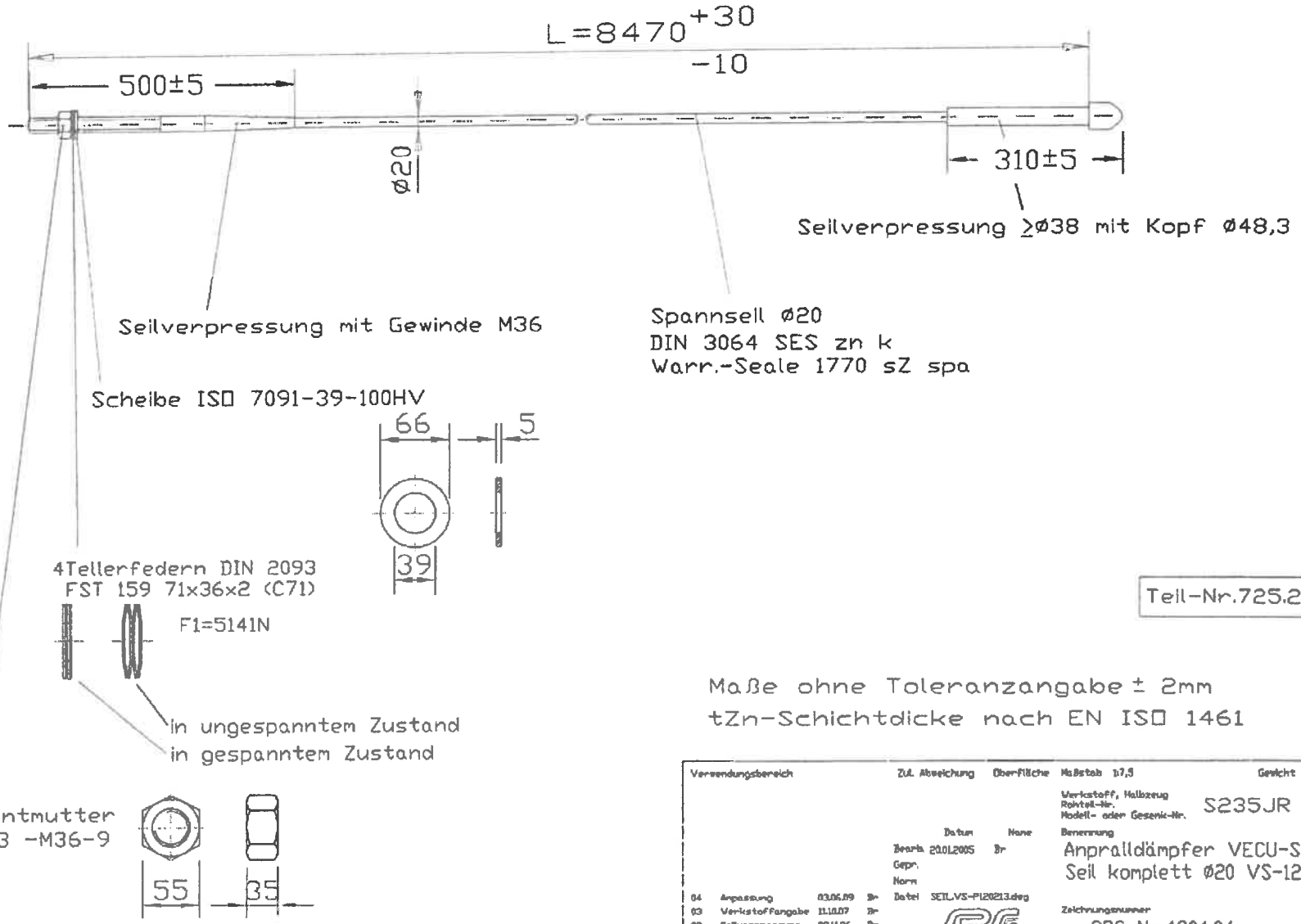
Sechskantmutter
ISO 4033 -M36-9



Teil-Nr. 725.41

Maße ohne Toleranzangabe ± 2mm
tZn-Schichtdicke nach EN ISO 1461

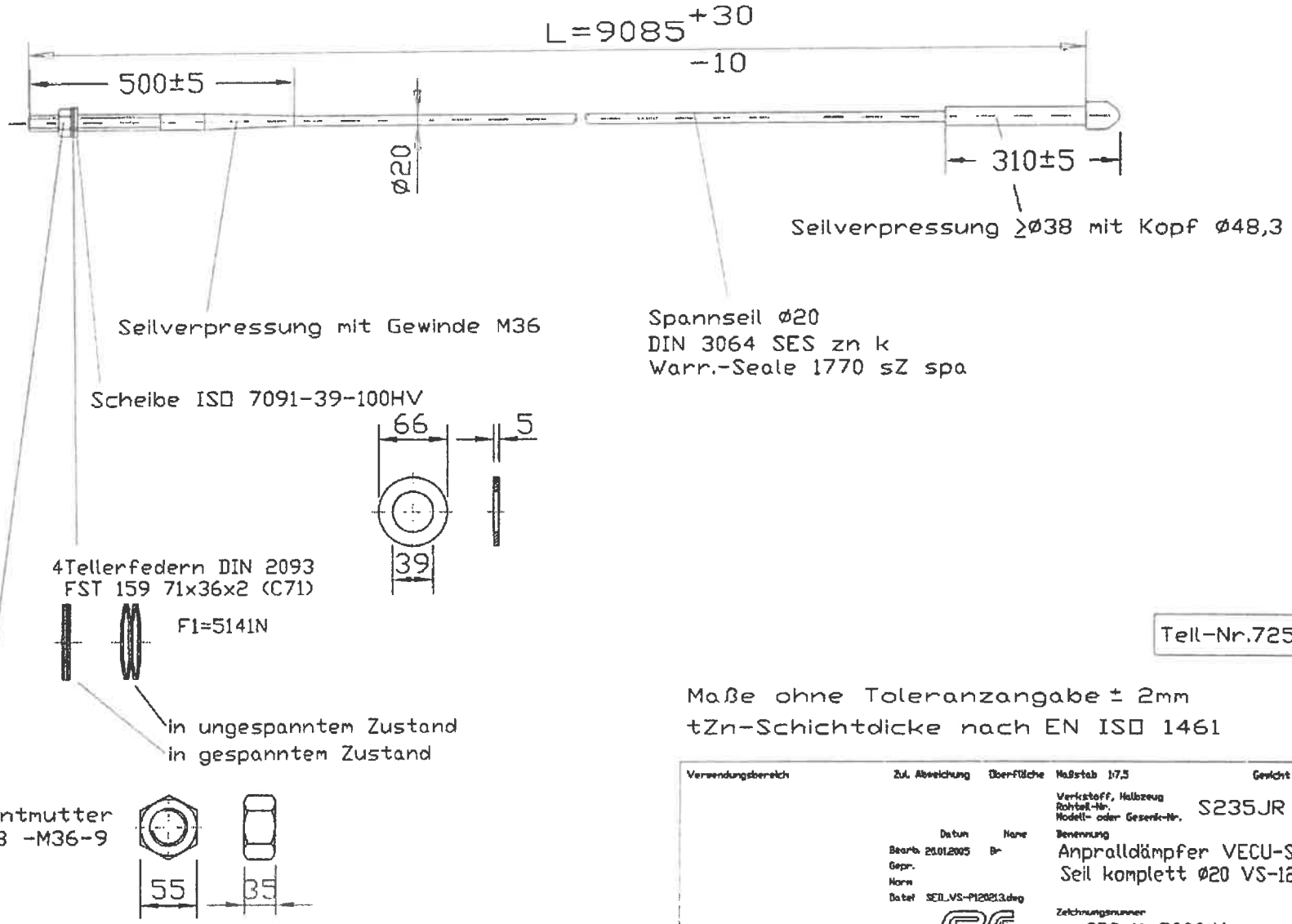
Verwendungsbereich	Zul. Abweichung	Oberfläche	Maßstab 1:7,5	Gewicht
			Werkstoff, Halbzeug Rohteil-Nr. Modell- oder Gesenk-Nr.	S235JR tZn
	Datum	Name	Benennung	
	Bearb. 11.10.2007	Br	Anpralldämpfer VECU-STOP Seil komplett ø20 VS-120/10	
	Gepr.			
	Norm			
	Datei SEIL_P120210.0205.dwg		Zeichnungsnummer SPS-Nr.4853.01	Blatt 1 1 Bl.
Zust. Änderung	Datum Name Urspr.		Ers. f.	Ers. d.



Teil-Nr.725.24

Maße ohne Toleranzangabe ± 2mm
tZn-Schichtdicke nach EN ISO 1461

Verwendungsbereich				Zul. Abweichung	Oberfläche	Maßstab 1:7,5	Gewicht
						Werkstoff, Halbzeug Roh-Teil-Nr. Modell- oder Gesenk-Nr.	S235JR tZn
				Datum	Name	Benennung	
				Bearb. 20.01.2005	Br	Anpralldämpfer VECU-STOP Seil komplett ø20 VS-120/13	
				Gepr.			
				Norm			
04	Anpassung	03.06.09	Br	Datei	SEIL_VS-P120213.dwg		
03	Werkstoffangabe	11.10.07	Br			Zeichnungsnummer	Blatt
02	Seilverpressung	08.11.06	Br			SPS-Nr.4304.04	1
01	Länge	27.07.06	Br				1 Bl.
Zust.	Änderung	Datum	Name	Ursprung		Ers. f.:	Ers. d.:



Teil-Nr.725.54

Maße ohne Toleranzangabe ± 2mm
tZn-Schichtdicke nach EN ISO 1461

Verwendungsbereich	Zul. Abweichung	Oberfläche	Maßstab 1:7,5		Gewicht
			Werkstoff, Halbzeug Rohteil-Nr. Modell- oder Gesenk-Nr.	S235JR tZn	
	Datum	Name	Benennung		
	Bearb. 20.01.2005	Br	Anpralldämpfer VECU-STOP Seil komplett ø20 VS-120/14		
	Gepr.				
	Norm				
	Datei SEIL_VS-P120213.dwg		Zeichnungsnummer SPS-Nr.5233.00		Blatt 1 1 Bl.
Zust. Änderung	Datum Name Urspr.		Ers. f.		Ers. d.

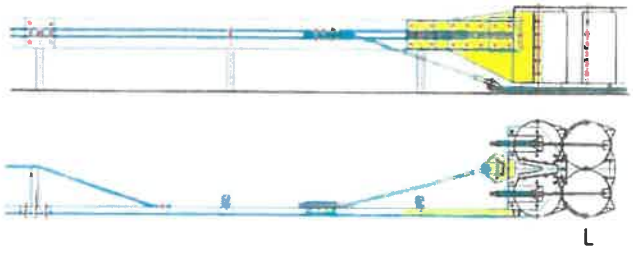
Exemplary Connecting Construction Crash Cushion System VECU – STOP Systems 100 and 120

Anpralldämpfer VECU-STOP®

Systeme 100 und 120

Beispielhafte Anschlußkonstruktionen an FRS N2 / H1 (Stahl)

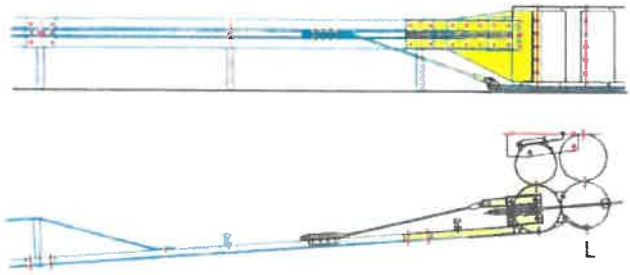
1



einseitig Links VS - P100 und VS - P120

ESP	h = 750 mm
EDSP	h = 750 mm
Easy - Rail	h = 750 mm
und andere	

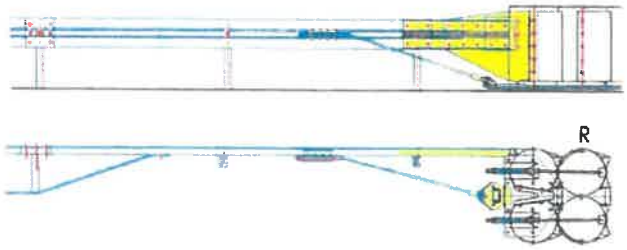
2



einseitig Links VS - V100 und VS - V120

ESP	h = 750 mm
EDSP	h = 750 mm
Easy - Rail	h = 750 mm
und andere	

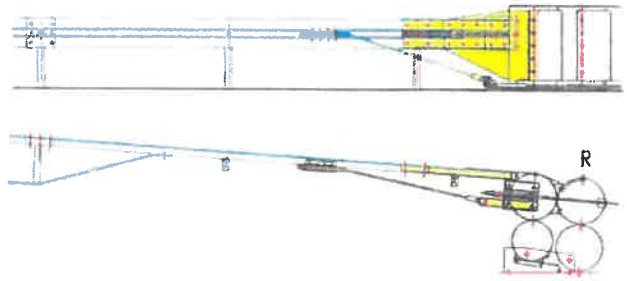
3



einseitig Rechts VS - P100 und VS - P120

ESP	h = 750 mm
EDSP	h = 750 mm
Easy - Rail	h = 750 mm
und andere	

4



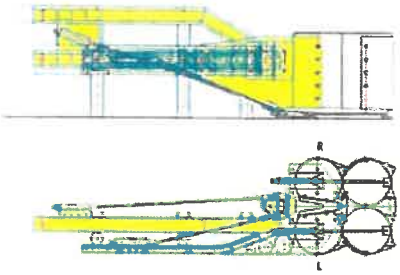
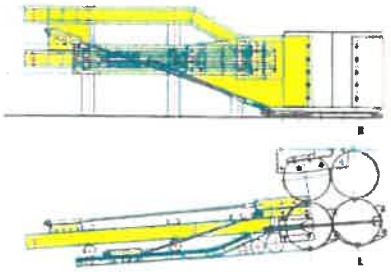
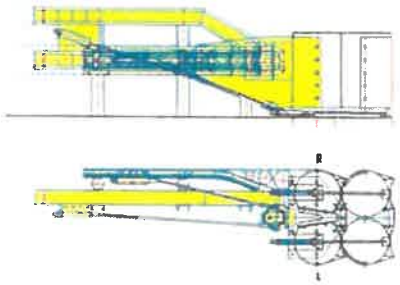
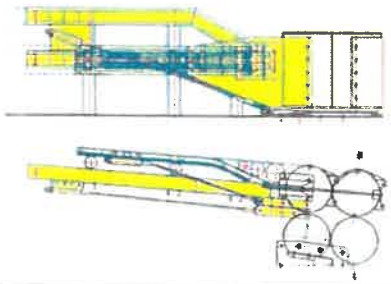
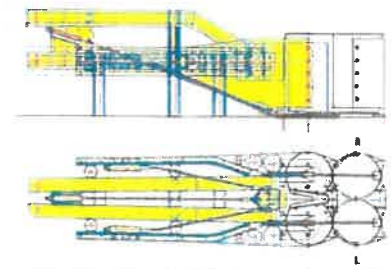
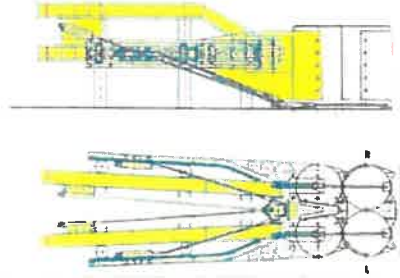
einseitig Rechts VS - V100 und VS - V120

ESP	h = 750 mm
EDSP	h = 750 mm
Easy - Rail	h = 750 mm
und andere	

Anpralldämpfer VECU-STOP®

Systeme 100 und 120

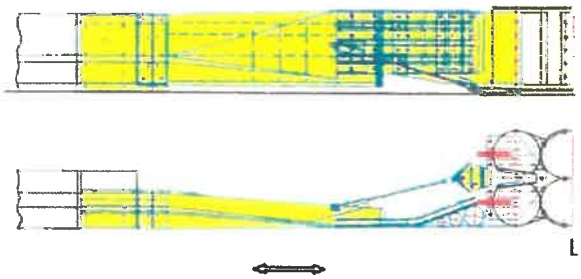
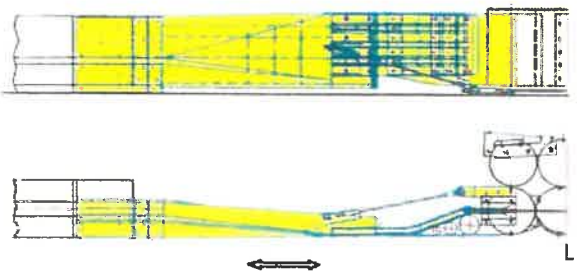
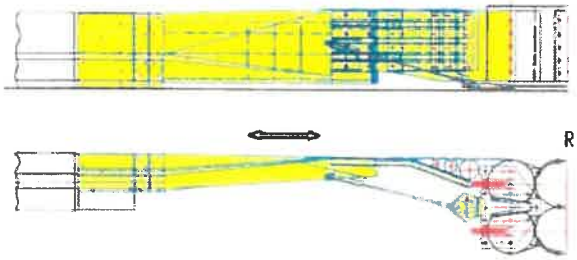
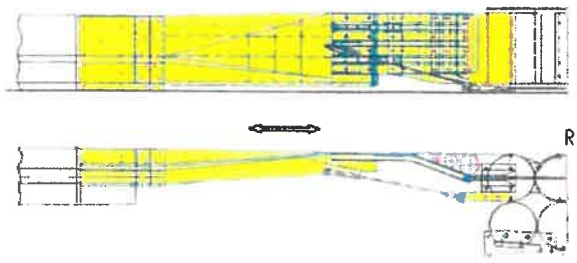
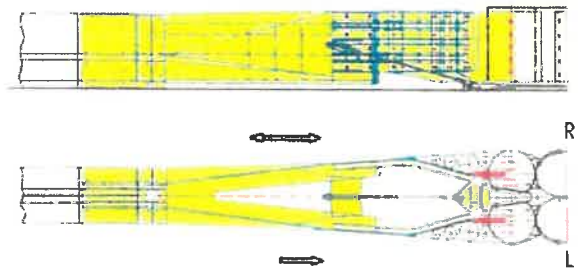
Beispielhafte Anschlußkonstruktionen an FRS H2 (Stahl)

1		einseitig Links VS - P100 und VS - P120 Super-Rail h= 1150 Super-Rail eco h= 900 Super-Rail eco 1A h= 1000 Mega-Rail s h= 900 und andere
2		einseitig Links VS - V100 und VS - V120 Super-Rail h= 1150 Super-Rail eco h= 900 Super-Rail eco 1A h= 1000 Mega-Rail s h= 900 und andere
3		einseitig Rechts VS - P100 und VS - P120 Super-Rail h= 1150 Super-Rail eco h= 900 Super-Rail eco 1A h= 1000 Mega-Rail s h= 900 und andere
4		einseitig Rechts VS - V100 und VS - V120 Super-Rail h= 1150 Super-Rail eco h= 900 Super-Rail eco 1A h= 1000 Mega-Rail s h= 900 und andere
5		doppelt Mittig VS - V100 und VS - V120 Super-Rail h= 1150 Super-Rail eco h= 900 Super-Rail eco 1A h= 1000 Mega-Rail s h= 900 und andere
6		einseitig li / einseitig re VS - V100 und VS - V120 Super-Rail h= 1150 Super-Rail eco h= 900 Super-Rail eco 1A h= 1000 Mega-Rail s h= 900 und andere

Anpralldämpfer VECU-STOP®

Systeme 100 und 120

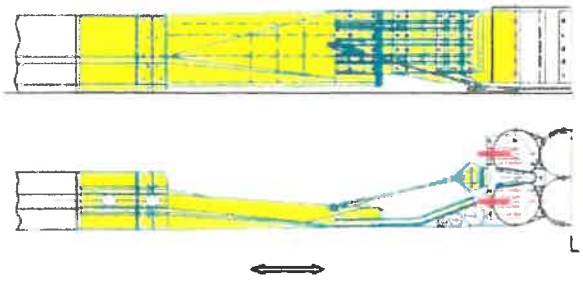
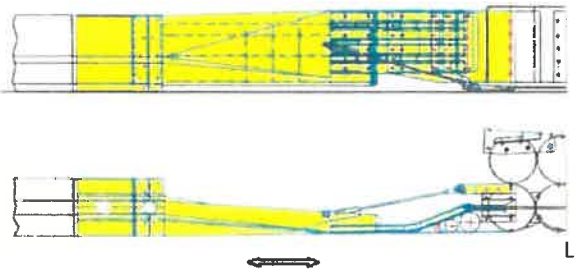
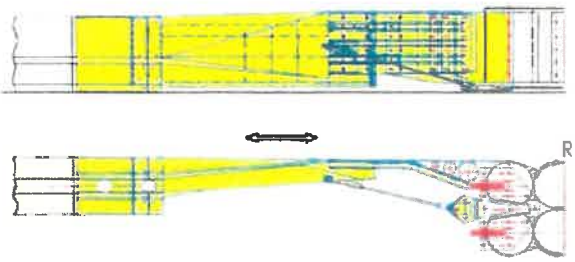
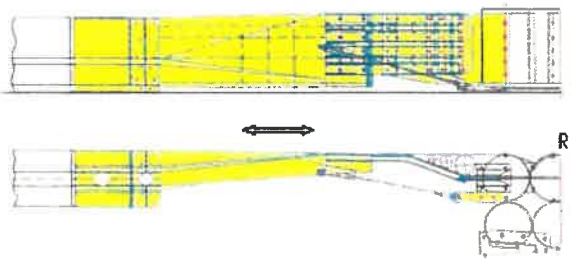
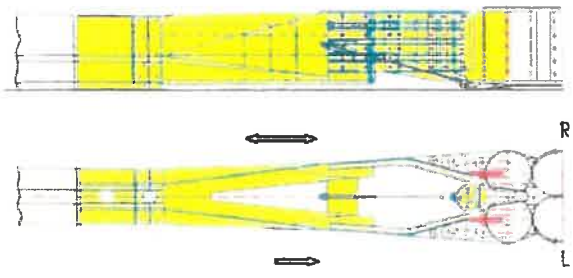
Beispielhafte Anschlußkonstruktionen an BSWF

1		einseitig Links VS - P100 und VS - P120 New Jersey h= 810 STEP h= 900 und andere
2		einseitig Links VS - V100 und VS - V120 New Jersey h= 810 STEP h= 900 und andere
3		einseitig Rechts VS - P100 und VS - P120 New Jersey h= 810 STEP h= 900 und andere
4		einseitig Rechts VS - V100 und VS - V120 New Jersey h= 810 STEP h= 900 und andere
5		doppeleinseitig VS - V100 und VS - V120 New Jersey h= 810 STEP h= 900 und andere

Anpralldämpfer VECU-STOP®

Systeme 100 und 120

Beispielhafte Anschlußkonstruktionen an BSWO

1		einseitig Links VS - P100 und VS - P120 New Jersey h= 810 STEP h= 900 und andere
2		einseitig Links VS - V100 und VS - V120 New Jersey h= 810 STEP h= 900 und andere
3		einseitig Rechts VS - P100 und VS - P120 New Jersey h= 810 STEP h= 900 und andere
4		einseitig Rechts VS - V100 und VS - V120 New Jersey h= 810 STEP h= 900 und andere
5		doppeleinseitig VS - V100 und VS - V120 New Jersey h= 810 STEP h= 900 und andere