CABLE MANAGEMENT SYSTEMS

ELEVATED + GROUND MOUNTED

DB NETZE
TM 2012 - 241 I. NVT 2

NetworkRail
PAO5/06162

ÖBB INFRA
TK135/R551dbl
(Ausgabe 3-3/2012)

Approved by
banedanmark
KN239.00 Q nr. 4579

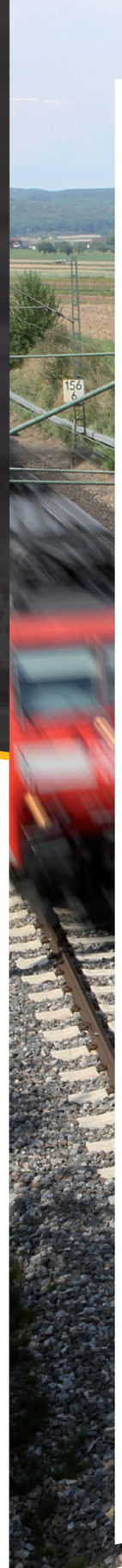
CASTIONI
KABELFÜHRUNGSSYSTEME

INHALT

ARCOSYSTEM
ELEVATED COMPOSITE CABLE TROUGHING

ELEVATED
GRP CABLE DUCT

Whether on rail routes, at airports, or in the fi eld of energy supply, the availability of modern systems largely depends on reliable power supply and transmission of information. In this context it is important that a multitude of sensitive cables are effi ciently protected against outside infl uences. The elevated GRP cable duct system off ers reliable protection against foreign infl uences and was designed for diffi cult terrains. The elevated GRP cable duct system ARCOSYSTEM Sizes 1 + 2 was designed for topographically diffi cult terrains along the rails. Even in such conditions the laying of cables does not present a problem. ARCOSYSTEM Size 1 has a usable inner cross section of 100 x 150 mm and ARCOSYSTEM Size 2 250 x 150 mm. The elevated cable duct ARCOSYSTEM Sizes 1 + 2 allows a maximum distance of 6 metres between the sigma posts. Therefore a structural analysis was done and rechecked by an inspecting structural engineer. The GRP cable duct is extremely light, yet solid due to the double-walled construction of the base. The lid snaps in to the base and can only be opened with an accurate tool.



As populations increase around the world the volume of passenger services and goods transportation by rail are steadily increasing. Rail networks are expanding, and their support systems demand better connectivity. Networking along English, German and European rail routes is undergoing major expansion. The provision of power and transmission of data depends upon the suitability of the cable management system. Cables need to be effectively protected against the elements and external influences if continuing power and data transmission is to be guaranteed.

Cables that are kilometres long ensure that point mechanisms and signals are controlled, that electronic signal boxes are connected, that railway staff can communicate via GSM-R train radio and that other current consumers and data users can be supplied.

Logistics play a critical role during expansion of this kind, especially in extremely congested built-up areas, node points and in costly city locations such as Berlin, London or Paris. In other poorly accessible areas, such as remote embankments, the use of heavy concrete cable ducts is equally costly in terms of personnel, equipment, mobilization and possession time.

At the end of the millennium, the German DB Netz AG drew up a book of specifications for buried plastic cable ducts and elevated GRP cable ducts as an alternative to concrete troughs. Whether buried or elevated, plastic cable ducts need to be light. This makes them quicker and easier to install.

Difficult or even impassable terrain, as well as restrictions arising from lack of space or ownership status along the DB AG railway routes mean that it is not always technically, operationally or economically feasible to install conventional, buried concrete or plastic cable ducts in order to accommodate and route cables. The ARCOSYSTEM Size 1 + Size 2 elevated GRP cable management system is an economic alternative in cases such as this.

The overall system is designed in such a way that the ARCOSYSTEM Size 1 + Size 2 GRP cable management system can be installed as an elevated system, on walls and on bridge structures as well as frequently being installed in hillside locations.

COMPARISON CONCRETE TO PLASTIC

A size 1 concrete cable duct has a trough weight of 85 kg; for size 2 it is 126 kg. Added to this are a cover weight of 20 kg for size 1 and 40 kg for size 2. The same duct in plastic form, whether buried or elevated, has a weight of 5 kg for size 1 and 8 kg for size 2 per metre, including cover and trough. Concrete cable ducts are first delivered by lorry and, in contrast to plastic cable ducts, their high weight means that only very small quantities can be delivered at a time. For size 1, a 24-ton delivery is sufficient for about 230 metres of concrete trough and cover; for size 2, the figure is about 145 metres. A lorry that is fully loaded with buried or elevated GRP cable ducts can carry 2,000 metres of size 1 or 1,000 metres of size 2.

For installation the concrete cable ducts are reloaded on to rail vehicles and, in contrast to plastic cable ducts, must be handled with lifting equipment. The installation team can only lift and place on the sand bed one concrete cable duct at a time with the lifting equipment provided on the rail vehicles. The high weight and difficult access to some route sections can then result in long and expensive construction times. Furthermore, the track in question must remain closed to rail traffic for safety reasons during the construction work. It can be very difficult to obtain possession in build-up areas or at node points nowadays. It is virtually impossible to use concrete cable ducts for bridge crossings. With regard to transport, handling and installation in areas that are difficult to access or densely built up, plastic cable ducts offer substantial advantages.

ARCOSYSTEM
ELEVATED COMPOSITE CABLE TROUGHING

ARCOSYSTEM *SIZE 1 + SIZE 2*

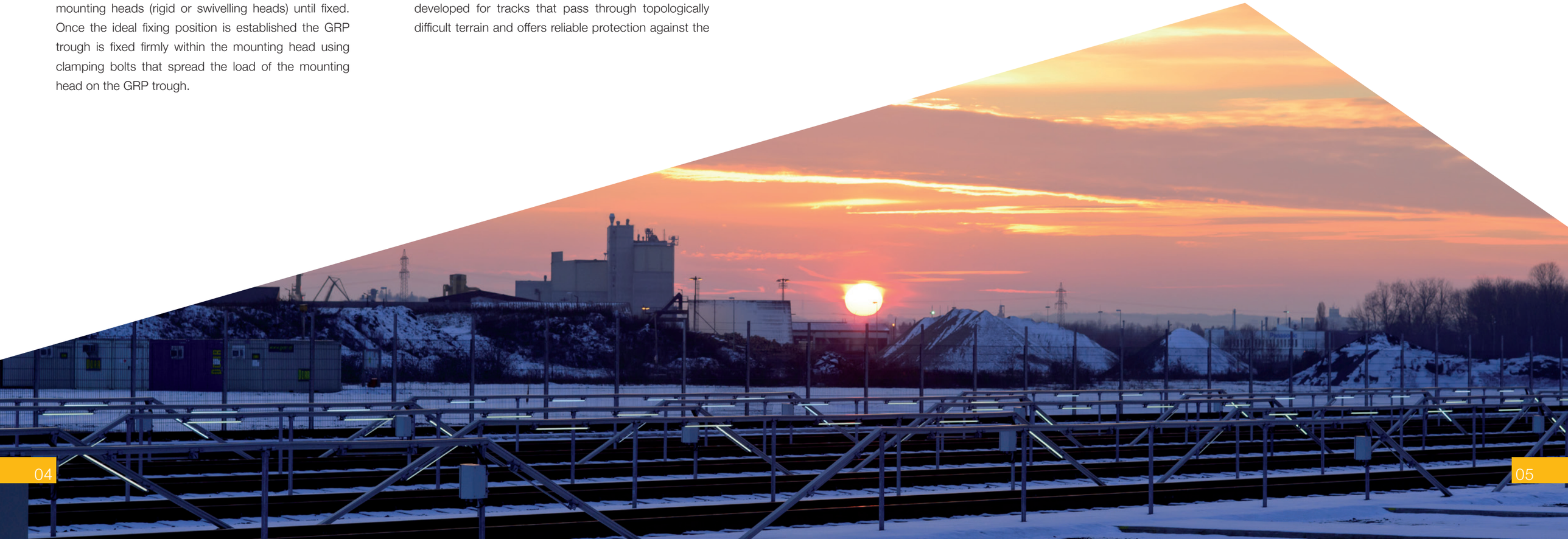
Plastic cable ducts made of glassfibre reinforced composite or polypropylene are considered to be an economical alternative to conventional concrete cable ducts and are increasingly used in cable route construction by railways for the provision of communications and power supplies. In addition to shortening the duration of projects, they also help to lower mobilization, installation and labour costs.

The elevated GRP cable duct is based on a multi-chamber system and additional glass fibre reinforcement in the form of glass fibre multiaxial fabrics. The reinforcement geometry and the multi-chamber design provides significantly higher strength in the transverse direction. The system is designed such that it floats freely in the mounting heads (rigid or swivelling heads) until fixed. Once the ideal fixing position is established the GRP trough is fixed firmly within the mounting head using clamping bolts that spread the load of the mounting head on the GRP trough.

Bending tests performed during development showed that the multi-chamber system used in conjunction with glass fibre multiaxial fabrics is a superior design compared to other systems. Thanks to the inclined side walls, it was possible to design the mounting head such that the GRP cable duct trough can be mounted using a floating arrangement. Float mounting makes straightforward insertion into the mounting head is an important step with regard to simplified installation. Efforts were also intensified to develop a screw-free, snap-in cover, which helps to further shorten installation times. The elevated GRP cable duct ARCOSYSTEM Size 1 + Size 2 is very easy to install.

The elevated GRP cable ducts ARCOSYSTEM were developed for tracks that pass through topologically difficult terrain and offers reliable protection against the elements. Cables can be laid without problems even under the most difficult conditions.

ARCOSYSTEM Size 1 has a usable cross section of 100 x 150 mm, while that of ARCOSYSTEM Size 2 is 250 mm x 150 mm. The elevated GRP cable duct ARCOSYSTEM is designed for a maximum span of 6 meters between 2 sigma-section posts. ARCOSYSTEM Size 1 + Size 2 - made of glass fibre reinforced plastic - is extremely light, yet very stable, thanks to its double-walled construction. The cover is fitted by simply snapping it into the cable duct, and it can be opened using a suitable tool. The design capability of ARCOSYSTEM Size 1 + Size is known and documented. Its successful use is ensured by continued use within its design limits and where public safety and order are not endangered. The minimum distance to the track centre depends on the line speed and must be determined in accordance with the currently applicable train guidelines. A thorough assessment must be performed before using the ARCOSYSTEM Size 1 + Size 2 in areas prone to snow slides and snow drifting (e.g. in Alpine regions, in cuttings through terrain and on embankments), especially in snow load zone III, or in areas in which there is a risk of falling rocks.



EASY TO INSTALL

Connection plate, sigma post and the GRP cable duct base and lid are extremely easy to install. The sigma post is rammed into the soil. Then, the connection plate is bolted together with the sigma post. Depending on the selected fixation with 2 or 4 bolts, the 6 metre long GRP cable duct base is inserted into the fixation. The 6 metre long GRP lid snaps in the GRP cable duct base without any additional fixings.

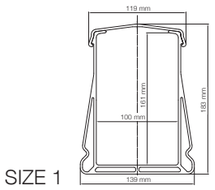
BENEFITS

As a result of this easy to install system the assembly time of the cable duct is extremely reduced. The simple and thus fast installation provides a great advantage. Overall, the GRP cable duct system presents a commercially viable alternative to conventional concrete cable ducts. Thanks to this solution, the project duration is shortened and the construction and labour costs are low.

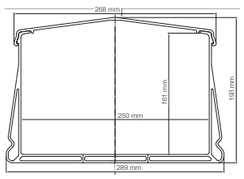
IMAGEFILM

Visit our imagefilm on: www.castioni-kabelkanal.com

- EASY TO INSTALL
- SNAP-ON LID
- STANDARD SPAN OF 6 METRES
- LOW COST OF TRANSPORTATION, SIMPLE HANDLING
- SOLID DESIGN, MADE OF GLASS-FIBRE-REINFORCED PLASTIC (GRP)
- NON-CONDUCTIVE, NO EARTHING REQUIRED
- HIGH MECHANICAL STABILITY



SIZE 1



SIZE 2

TECHNICAL DATA

ARCOSYSTEM
ELEVATED COMPOSITE CABLE TROUGHING

MATERIAL

Polyesterresin with glassfibre fabrics and glassfibre rovings. Surface veil on outer surface.

MECHANICAL DATA

The elevated cable duct system is designed to withstand a working load of 0.45 kN/m for ARCO-SYSTEM SIZE 1 and 0.9 kN/m for ARCOSYSTEM SIZE 2, additionally in the middle of the duct a man load of 0.75 kN and a horizontal load from wind pressure of 1.45 kN/m.

ELECTRICAL VALUES

Earthing and insulated construction are not necessary. Breakdown voltage according to DIN EN IEC 60243-2 25 kV.

THERMAL PROPERTIES VALUES

Permanent dimensional stability between -30 °C and 80 °C. UV-resistant

FIRE BEHAVIOUR

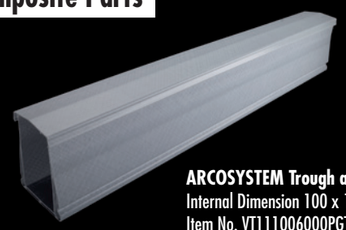
K 1/3 mm in accordance with DIN 53438 part 2
V0 in accordance with UL 94
S4 in accordance with DIN 5510-2
Halogenfree in accordance with IEC 61249-2-21

WEIGHT

ARCOSYSTEM SIZE 1
approx. 5 kg/metre duct and lid
ARCOSYSTEM SIZE 2
approx. 7.5 kg/metre duct and lid

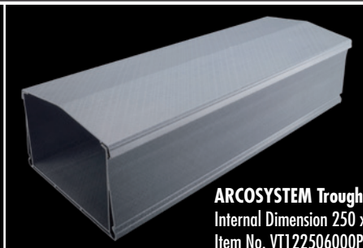
Composite Parts

SIZE 1



ARCOSYSTEM Trough and Lid - SIZE 1
Internal Dimension 100 x 160 mm
Item No. VT111006000PGT - Trough
Item No. VT111006000PGD - Lid

SIZE 2

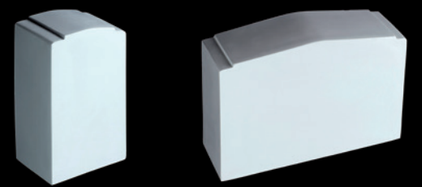


ARCOSYSTEM Trough and Lid - SIZE 2
Internal Dimension 250 x 160 mm
Item No. VT122506000PGT- Trough
Item No. VT122506000PGD - Lid

SIZE 1/SIZE 2

GRP-Divider
112x45x3 mm, 6000 mm
Item No. SH07112456000PGR

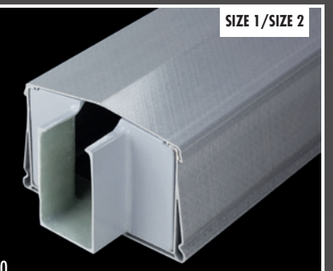
SIZE 1



End Cap - SIZE 1
Item No. VT11-P002-C025

End Cap - SIZE 2
Item No. VT12-P002-C026

SIZE 1/SIZE 2



GRP-Connector
SIZE 2 to SIZE 1
Art.-Nr. VT12-P002-1120

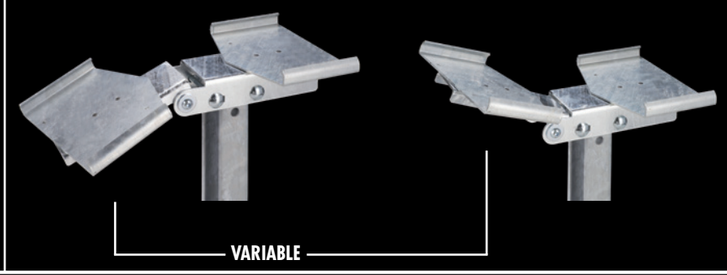
Post Mounted

SIZE 1/SIZE 2

Straight Connection Plate - SIZE 1
Item No. VT11-P002-A007

Straight Connection Plate - SIZE 2
Item No. VT12-P002-A008

SIZE 1/SIZE 2



Hinged Swivel Riser - SIZE 1
Item No. VT11-P002-1050

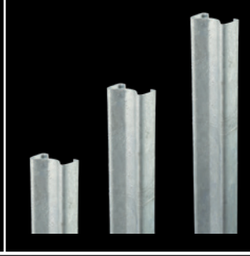
Hinged Swivel Riser - SIZE 2
Item No. VT12-P002-1051

SIZE 1/SIZE 2

Single Plane Swivel Connection Plate - SIZE 1
Item No. VT11-P002-A005

Single Plane Swivel Connection Plate - SIZE 2
Item No. VT12-P002-A006

SIZE 1/SIZE 2



Sigma Post
1200/1500/1900/
2500/3000 mm
Item No. VT1011-P002-1200
Item No. VT1011-P002-1500
Item No. VT1011-P002-1900
Item No. VT1011-P002-2500
Item No. VT1011-P002-3000

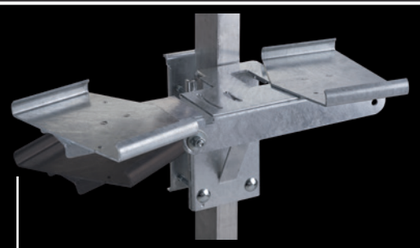
Outhanging Post Mounted 300

SIZE 1/SIZE 2

Single Plane Swivel O/H Post Fixing - Size 1 (300)
Item No. VT1011-P002-A027K

Single Plane Swivel O/H Post Fixing - Size 2 (300)
Item No. VT1011-P002-A028K

SIZE 1/SIZE 2



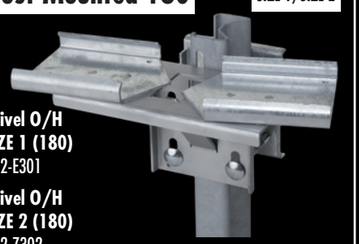
Universal Hinged O/H Post Swivel Fixing Size 1 (300)
Item No. VT11-P002-E303

Universal Hinged O/H Post Swivel Fixing Size 2 (300)
Item No. VT12-P002-Z304

SIZE 1/SIZE 2

Outhanging Post Mounted 180

SIZE 1/SIZE 2



Single Plane Swivel O/H Post Fixing - SIZE 1 (180)
Item No. VT11-P002-E301

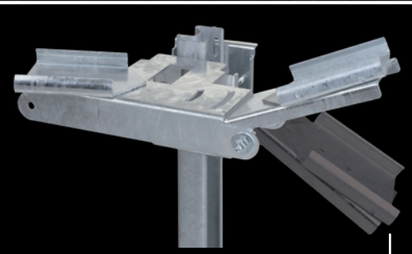
Single Plane Swivel O/H Post Fixing - SIZE 2 (180)
Item No. VT12-P002-Z302

SIZE 1/SIZE 2

Universal Hinged O/H Post Swivel Fixing - SIZE 1 (180)
Item No. VT11-P002-E305

Universal Hinged O/H Post Swivel Fixing - SIZE 2 (180)
Item No. VT12-P002-Z306

SIZE 1/SIZE 2



Wall Mounted 180

SIZE 1/SIZE 2

Single Plane Swivel Wall Bracket
SIZE 1 (180) - Item No. VT11-P002-E501

Single Plane Swivel Wall Bracket
SIZE 2 (180) - Item No. VT12-P002-Z502

Slim Universal Hinged Swivel Wall Bracket Size 1 (180)
Item No. VT11-P002-E503

SIZE 1/SIZE 2

Universal Hinged Swivel Wall Bracket - SIZE 1 (180)
Item No. VT11-P002-E506

Universal Hinged Swivel Wall Bracket - SIZE 2 (180)
Item No. VT12-P002-Z504

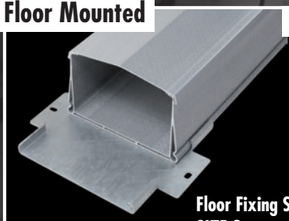
Slim Single Plane Swivel Wall Bracket - Size 1 (180)
Item No. VT11-P002-E505

SIZE 1/SIZE 2

90° Sigma Post
Ø 210 mm
Item No. VT11-P002-C101

Floor Mounted

SIZE 2



Floor Fixing Straight
SIZE 2
Item No. VT12-P002-1070

Floor Mounted

SIZE 2

Floor Fixing SIZE 2
45° – Item No. VT12-P002-1073
90° – Item No. VT12-P002-1071

Accessories

SIZE 1/SIZE 2

Stainless Steel Sleeve
20 x 2.5 mm
Item No. VT11-P002-A045

Cable Exit

SIZE 1/SIZE 2

Cable Exit - SIZE 1 Ø 70 mm
Item No. VT1011-P002-A019
Cable Exit - SIZE 2 Ø 115 mm
Item No. VT1011-P002-A021

Cable Exit

SIZE 1/SIZE 2

Lateral Cable Exit
Ø 70 mm
Item No. VT11-P002-1085

Lateral Cable Exit
Ø 115 mm
Item No. VT-11-P002-1086

Cable Exit

SIZE 1/SIZE 2

Two-piece Cable Exit 30°
Size 1 Ø 70 mm
Item No. VT11-P002-1081

Two-piece Cable Exit 30°
Size 2 Ø 115 mm
Item No. VT12-P002-1080

Accessories

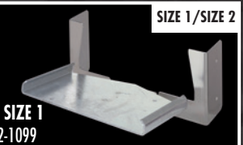
SIZE 1/SIZE 2

Security Strap
Lid Closer - SIZE 1
Item No. VT11-P002-1090

Security Strap
Lid Closer - SIZE 2
Item No. VT12-P002-1091

Accessories

SIZE 1/SIZE 2



C.1.7 Transition - SIZE 1
Item No. VT11-P002-1099

C.1.10 Transition - SIZE 1
Item No. VT11-P002-1097

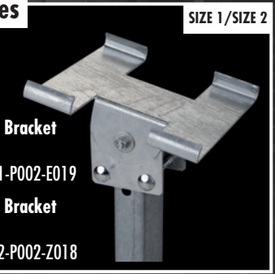
C.1.10 Transition - SIZE 2
Item No. VT12-P002-1095

C.1.29 Transition - SIZE 1
Item No. VT11-P002-1098

C.1.29 Transition - SIZE 2
Item No. VT12-P002-1096

Accessories

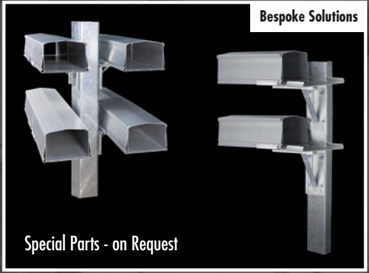
SIZE 1/SIZE 2



Pivot Plane Bracket
SIZE 1
Item No. VT11-P002-E019

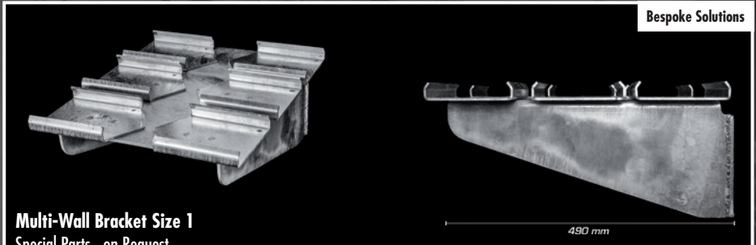
Pivot Plane Bracket
SIZE 2
Item No. VT12-P002-Z018

Bespoke Solutions



Special Parts - on Request

Bespoke Solutions



Multi-Wall Bracket Size 1
Special Parts - on Request

Bespoke Solutions

Special Parts - on Request

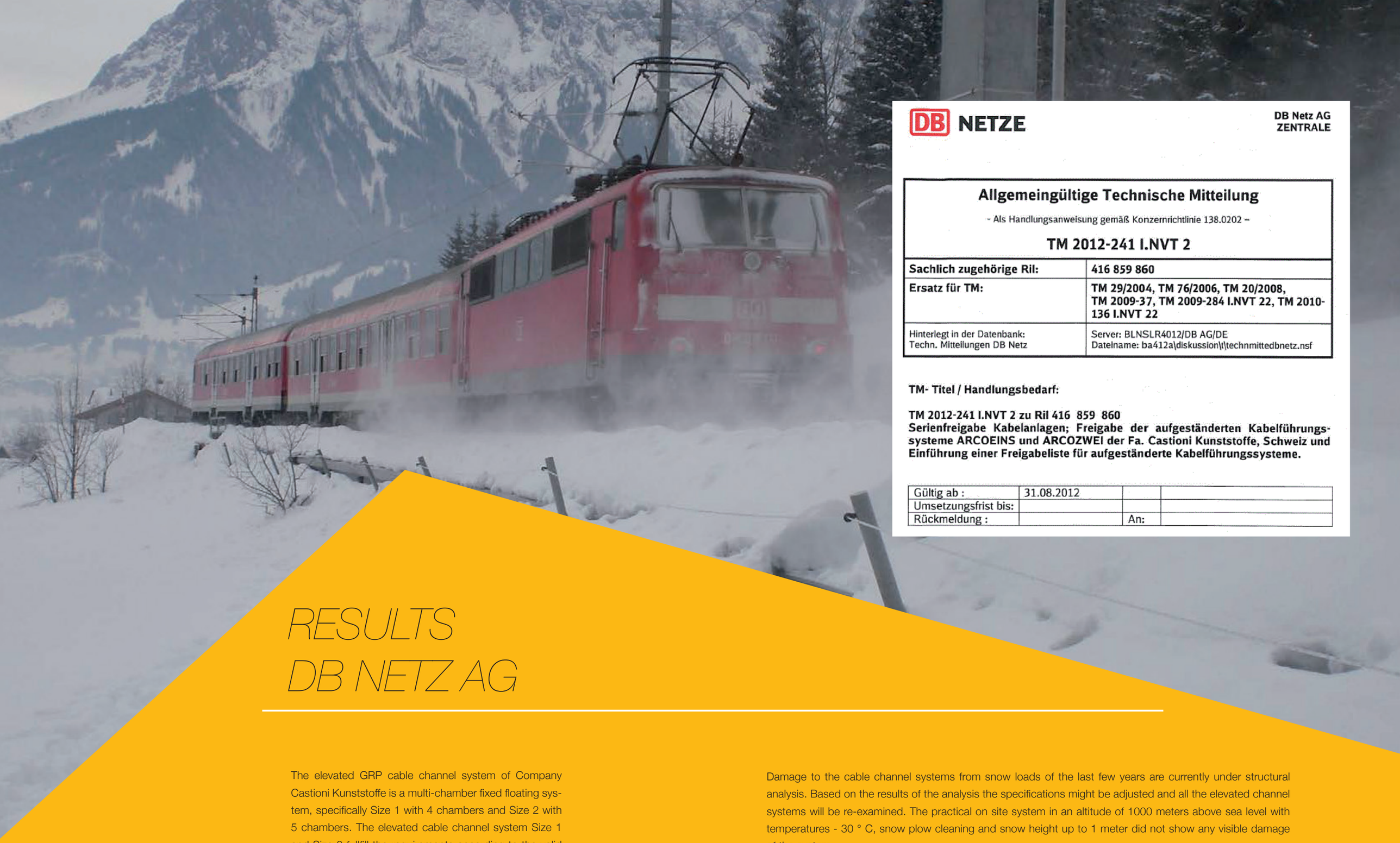
Bespoke Solutions

Printed Veils
Special Parts - on Request

Accessories

SIZE 1/SIZE 2

Lid Opener - SIZE 1 + SIZE 2
Item No. VT101-P002-A018



DB NETZE

DB Netz AG
ZENTRALE

Allgemeingültige Technische Mitteilung

- Als Handlungsanweisung gemäß Konzernrichtlinie 138.0202 –

TM 2012-241 I.NVT 2

Sachlich zugehörige Ril:	**416 859 860**
Ersatz für TM:	**TM 29/2004, TM 76/2006, TM 20/2008, TM 2009-37, TM 2009-284 I.NVT 22, TM 2010-136 I.NVT 22**
Hinterlegt in der Datenbank: Techn. Mitteilungen DB Netz	Server: BLNSLR4012/DB AG/DE Dateiname: ba412a\diskussion\t\technmittedbnetz.nsf

TM- Titel / Handlungsbedarf:

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Serienfreigabe Kabelanlagen; Freigabe der aufgeständerten Kabelführungssysteme ARCOEINS und ARCOZWEI der Fa. Castioni Kunststoffe, Schweiz und Einführung einer Freigabeliste für aufgeständerte Kabelführungssysteme.

Gültig ab :	31.08.2012		
Umsetzungsfrist bis:			
Rückmeldung :		An:	

RESULTS DB NETZ AG

The elevated GRP cable channel system of Company Castioni Kunststoffe is a multi-chamber fixed floating system, specifically Size 1 with 4 chambers and Size 2 with 5 chambers. The elevated cable channel system Size 1 and Size 2 fullfill the requirements according to the valid specification “plastic cable channels” dated 01.08.2002 (An Austrian ÖBB additional bending test was done as a pre-selection of the system).

Damage to the cable channel systems from snow loads of the last few years are currently under structural analysis. Based on the results of the analysis the specifications might be adjusted and all the elevated channel systems will be re-examined. The practical on site system in an altitude of 1000 meters above sea level with temperatures - 30 ° C, snow plow cleaning and snow height up to 1 meter did not show any visible damage of the system.

The use and operation of the elevated channel system Size 1 and Size 2 can be recommended, taking into account restrictions/auxiliary conditions and planning instructions.

ARCOsizeZERO
ELEVATED COMPOSITE CABLE TROUGHING

GRP CABLE DUCT SYSTEM

FOR ONE FIBRE OPTIC CABLE

INTRODUCTION GSM-R SYSTEM

GSM-R – Global System of Mobile Communication-Rail – is an international wireless communications standard for railway communication and applications. The new technology will cover voice and data communication in the future.
In earlier times, cable and analog communications systems were common in European railways. However, railway communication was affl icted with problems such as poor functionality and high maintenance costs. Coming up with high-speed trains, analogue systems were unable to meet the requirements of train dispatch and control. The UIC (International Union of Railways) has been developing GSM-R trial networks to solve the problems of analogue communications systems.

Elevated straight direction

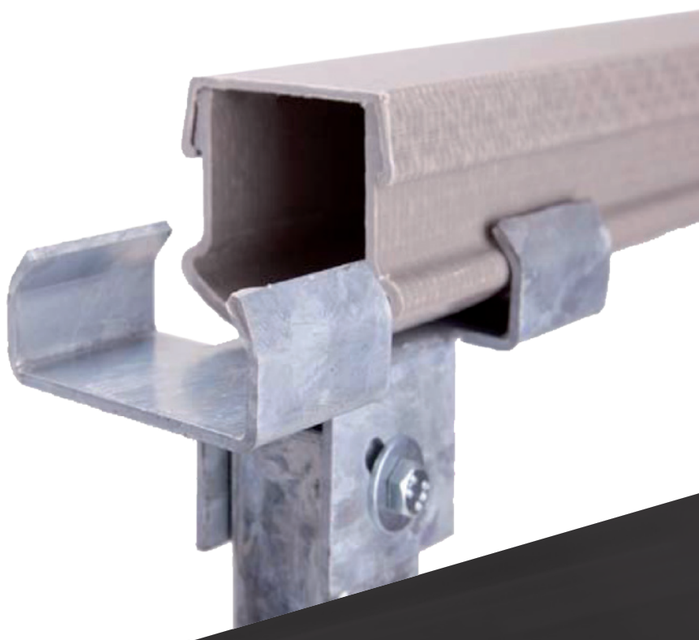
Elevated lowering

Elevated with angle option

Ground mounted straight direction

Ground mounted loweringon

Ground mounted with angle option



GSM-R is a secure and efficient platform for voice and data communication between railway operational staff and station controllers. It provides a variety of data communication services that support rail dispatch and control. In 2009, more than 30 countries had applied GSM-R in their railway infrastructure. GSM-R is built on GSM technology, and benefits from its GSM technology heritage. The goal of GSM-R is to achieve interoperability using a single communication platform, thus enabling higher train speeds and traffic density with a high level of safety.

In Europe, a specific frequency band was reserved and used for the GSM-R system. 867 – 880 MHz is used for data transmission; 921 – 925 MHz is used for data reception. Railway operators however were interested in receiving a standardized new system for railway communication for a fast growing transnational traffic.

ARCOsizeZERO
ELEVATED COMPOSITE CABLE TROUGHING

REASONS FOR A GRP CABLE DUCT SYSTEM

FOR ONE FIBRE OPTIC CABLE

In Germany the DB Netz AG in collaboration with DB Systel created a specification for a cable duct system in glass fibre-reinforced plastic. As the system had to be installed in the ground and elevated it made sense to work with the already well known glass fibre-reinforced plastic (GRP). Due to rough and difficult terrain conditions or tight spaces, it is not always possible to install conventional concrete cable duct systems. In such cases the ARCOsizeZERO-system is an option. The ARCOsizeZERO-system must protect and be able to carry one fibre optic cable with 60 fibres.

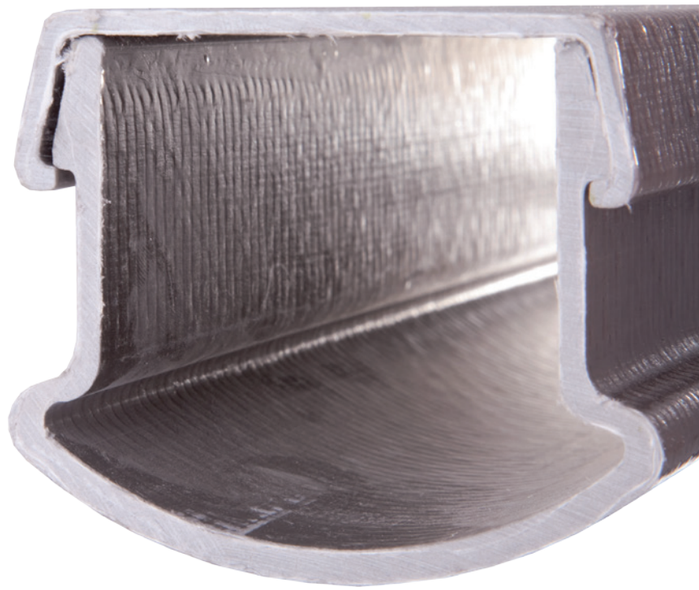
This cable corresponds to a diameter of 25 mm. The cable duct system must be designed for an elevated and in the ground installation. The specification provides a minimum distance between the supports of 2 metres.

The present system was laid out for a 3 metre span. Therefore a structural analysis was done and rechecked by an inspecting structural engineer.

Practical tests were done together with DB Systel and the installer - company Andreas Mühlbauer GmbH in Saalfeld according to the specifications of DB Systel. In early 2011, a first test track of 8 km was installed for the German Orlabahn.

ARCOsizeZERO
ELEVATED COMPOSITE CABLE TROUGHING

- 3 METRE SPAN
- SNAP-IN LID
- EASY TO INSTALL
- USABLE CROSS SECTION 53 X 56 MM
- WITH GLASSFABRIC REINFORCEMENT
- MANLOAD 140 KG
- FEW PARTS



ARCOsizeZERO GRP-CABLE DUCT SYSTEM

The installation of the EINLWL system is highly effi cient. The system consists of 1 galvanized steel square tube, 1 galvanized steel connection plate, GRP cable duct base and lid. The elevated system only needs one bolt every 3 metres. The connection plate is bolted to the square tube. The 3 metre long GRP cabled duct base is only inserted into the connection plate. The 3 metre long GRP lid snaps in the GRP cable duct base without any additional fi xings. The installation in the soil is fi xed with 2 soil nails. This allows the use of very few parts on the construction site, therefore achieving a high operating effi ciency. Due to the 3 metre span, one third of ramming and connections plates can be saved.

Preproduction series release DB Netze
TM 2010-342 I.NVT 2 zu Ril 416 859 860

FIRE BEHAVIOUR
K 1/3 mm according to DIN 53438 part 2
V0 according to UL 94
S4 according to DIN 5510-2
Halogenfree in accordance with
IEC 61249-2-21

CABLE MANAGEMENT SYSTEMS

CABLEONE
STANDARD GRP CABLE DUCTS

IN COMPOSITE MATERIALS

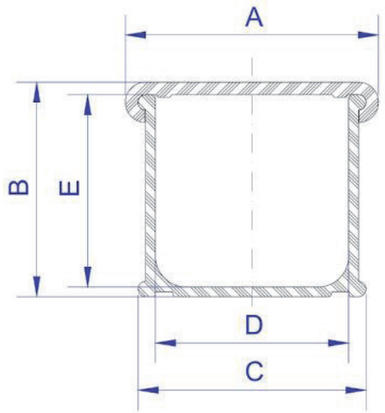
GRP-cable ducts produced by the continuous Pultrusion process offers an effective protection for the cables against external influences. The pultrusion process allows cable ducts with various cross sections in different resin formulations. The length of the profiles or cable ducts is unlimited.

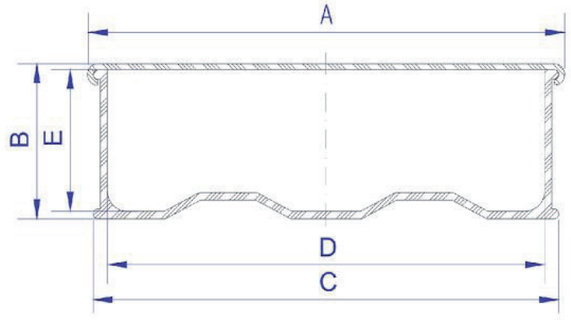
Pultruded cable ducts are the perfect solution in tunnels, bridges, railways, metro and airports because they are resistant to corrosion and with the choice of the perfect resin formulation selfextinguishing and nonhalogen.

In offshore applications, GRP cable ducts are particularly suited to reduce the life cycle costs in the harsh marine environment. They resist most chemicals and are perfectly adapted for such application.

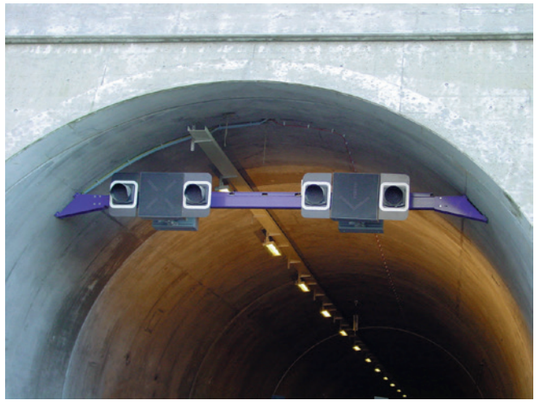
Composite profiles are increasingly used instead of aluminium and steel due to their resistance to chemicals, corrosion, thermal and electrical insulation capacity. Their low weight makes these cable ducts easy to handle.

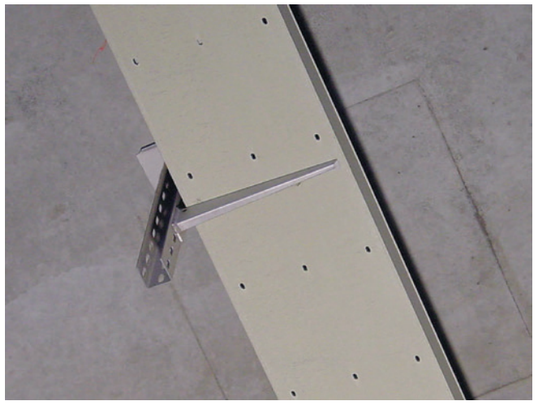
GRP cable ducts are offered from 50 mm width up to 600 mm. The cable duct consists of a trough and a lid. The lid is fitted by simply snapping it into the cable trough and it can be reopened.

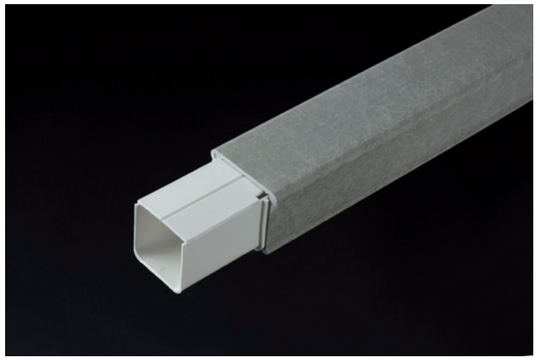


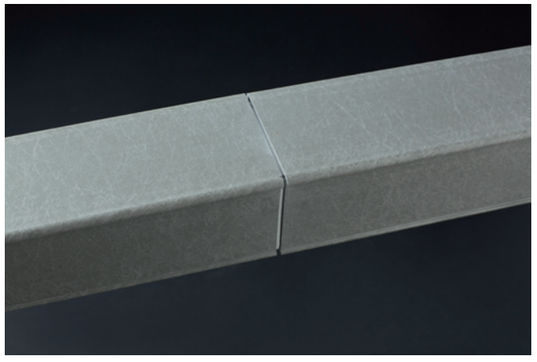


INNER CROSS SECTION IN MM	
50 x 50	175 x 120
80 x 80	175 x 175
100 x 50	200 x 80
120 x 120	300 x 80
140 x 70	400 x 80
140 x 100	500 x 80
140 x 140	600 x 80
175 x 75	









CABLE DUCT IN PP

CABLE LAYING FAST AND EFFICIENT

Whether on rail routes, at airports or in energy networks, the availability of modern systems largely depends on reliable power supply and transmission of information. In this context it is important that a multitude of sensitive cables are effi ciently protected against outside infl uences by means of cost-eff ective measures that feature fl exibility in implementation and allow modifi cations and extensions to be carried out fast and easy.

QUICK AND EASY TO INSTALL

The use of lightweight plastics provides a multitude of advantages, ranging from cost-eff ective transport through simplifi ed installation on site without the need for any transport and hoisting tools, to new application options. Rupture joints for cable outlets allow a more effi cient installation.
Thanks to trough wall aprons, no hollow spaces are created during the sealing process and transverse drainage is ensured.

FLEXIBLE IN USE AND REUSABLE

The lid element of the plastic duct, which is walkable and is lockable, can be easily opened. This allows a fast control or reinstallation of the cables. Furthermore, the plastic cable duct can be easily removed and reused, and hence off ers the perfect concept for solutions for limited periods.

EBA registration No. 7366 / 7
Product release 84 / 97

FIRE BEHAVIOUR
K1/3.5 mm according to DIN 53438 Part 2
Halogenfree in accordance with IEC 61249-2-21

Overall, the plastic cable duct presents a commercially viable alternative to conventional concrete cable ducts. Thanks to this solution, the project duration is shortened, construction and labour costs are reduced, and high disposal costs are avoided as a result of the 100 % recycling capability.

ROBUST AND LIGHTWEIGHT

The plastic cable duct is light in weight and, thanks to its integrated columns and ribs, extremely solid. It is able to withstand the same loads as a concrete duct. The lid is walkable and can be closed and opened as many times as desired, allowing convenient laying and fast inspection.

SIMPLE AND FLEXIBLE HANDLING

Plastic cable ducts can be installed by hand fast and easy. They are simply plugged in one to another, without any supplementary parts being required. Furthermore, thanks to the lightweight construction of these ducts, large quantities can be transported and unloaded cost-effective without heavy lifting tools.

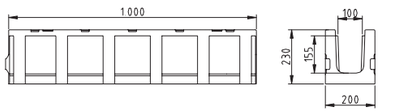
CONVENIENT AND UNIVERSAL

Preset mitre lines allow that the plastic cable duct can be adapted easy and individual to all on-site conditions, such as curves, T-pieces and angles.

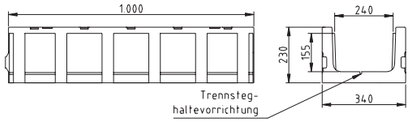
QUICK AND SAFE INSTALLATION

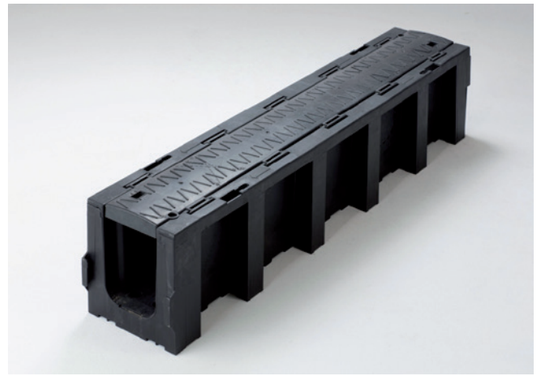
Preset cutouts for cable penetrations ensure fast and simple handling.

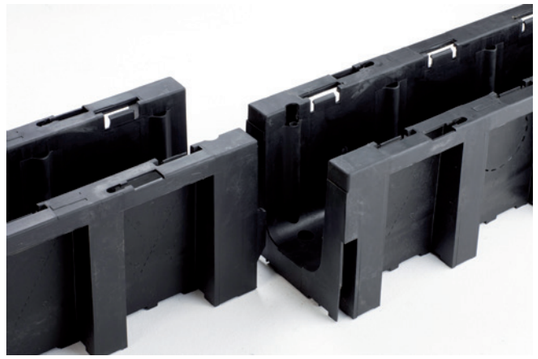
TERRASYSTEM Size 1

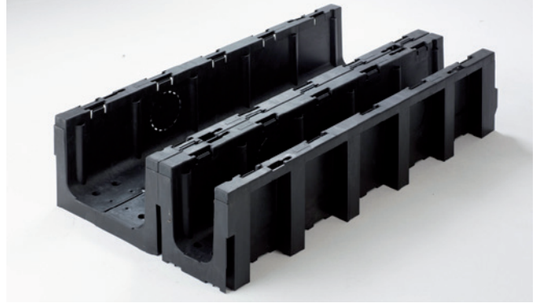


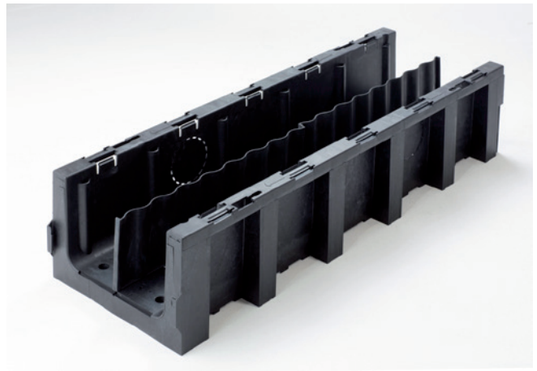
TERRASYSTEM Size 2











- FAST AND EFFICIENT TRANSPORT
- FAST AND EASY UNLOADING
- EASY TO INSTALL BY HAND
- FLEXBILE ADAPTION OF THE ELEMENTS ON SITE (CUTTING LINES 15°/30° INTEGRATED IN THE DUCT)
- ENVIRONMENTALLY COMPATIBLE AND FULLY RECYCLABLE POLYPROPYLENE
- LIGHTWEIGHT CONSTRUCTION 4.5 KG FOR TERRASYSTEM SIZE 1 AND 8.4 KG FOR TERRASYSTEM SIZE 2

TECHNICAL DATA

MATERIAL

Polypropylene:
- UV-stabilized
- halogen free
- fully recyclable
- not hazardous to the environment

MECHANICAL VALUES

Load capability is approx. 10 kN without rupture.

ELECTRICAL CHARACTERISTICS

The electric strength in accordance with DIN VDE 303-21 is 670 kV/cm. Earthing and insulated construction are not required. Surface resistance is approx. 1000 Ohm.
DIN IEC 93/VDE 0303, Part 30.

THERMAL CHARACTERISTICS

Permanent thermal stability is ensured at outside temperatures of -30°C to +85°C.

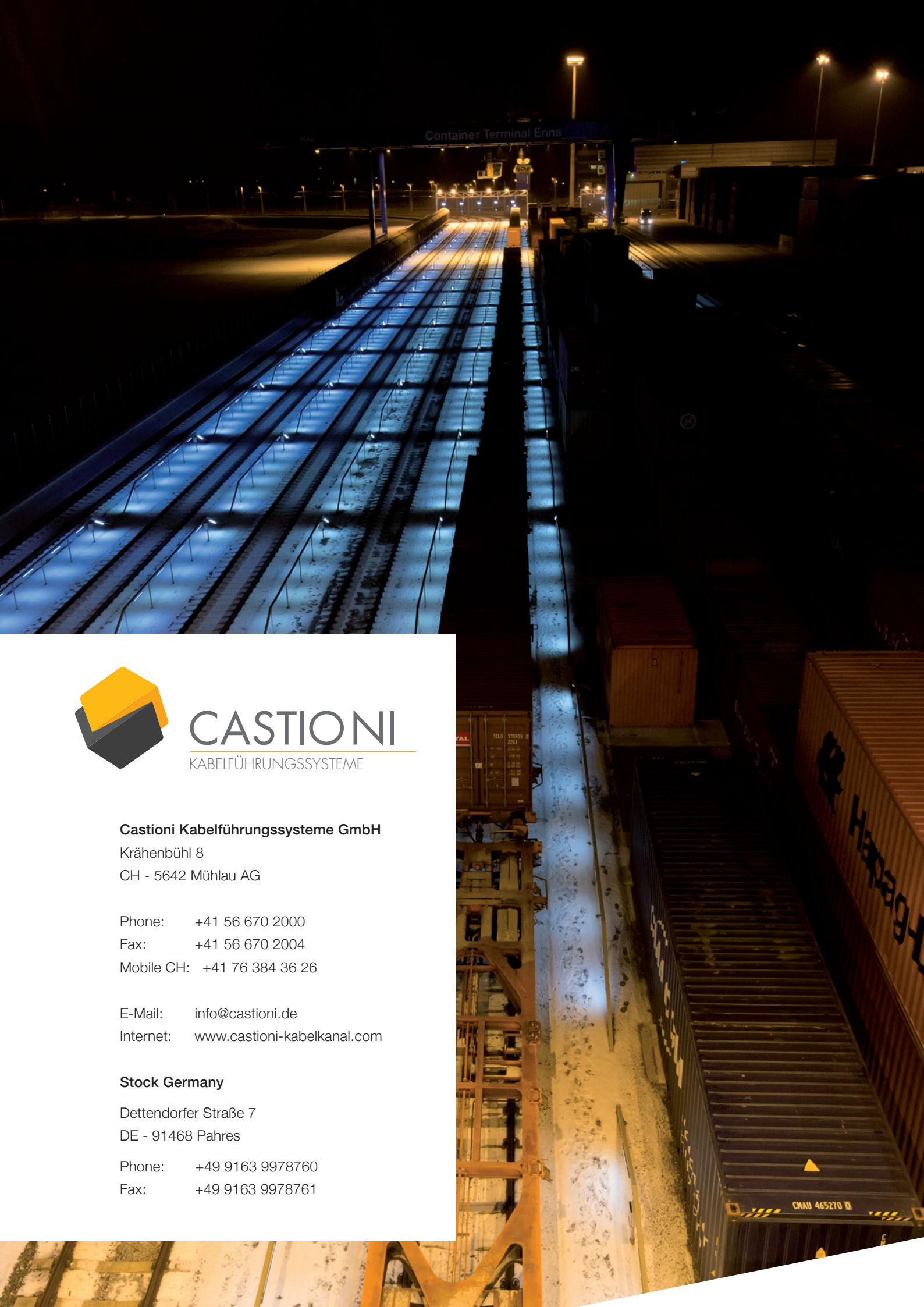
FIRE CHARACTERISTICS

K1 in accordance with DIN 53438 part 2
Halogenfree in accordance with IEC 61249-2-21

WEIGHT

TERRASYSTEM SIZE 1
approx. 4.5 kg/metre duct and lid

TERRASYSTEM SIZE 2
approx. 8.4 kg/metre duct and lid



CASTIONI
KABELFÜHRUNGSSYSTEME

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