FTTx Microduct Connectors

DATASHEET Series V4000

THIS DOCUMENT REPLACES THE PREVIOUS DATASHEET CODE 00-5612-502949 REV.D

Issued from	Date	Designer	Approved
TECHNICAL OFFICE	04-05-2020	Paolo Simpsi	Francesco Bignami

Recepita come CEI EN 50411-2-8:2010-06

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 50411-2-8

May 2009

ICS 33.180.20

English version

Fibre organisers and closures to be used in optical fibre communication systems - Product specifications - Part 2-8: Microduct connectors, for air blown optical fibres, Type 1

Organiseurs et boîtiers de fibres à utiliser dans les systèmes de communication par fibres optiques - Spécifications de produits - Partie 2-8: Connecteurs en microconduits de Type 1, destinés aux fibres optiques soufflées à l'air comprimé

LWL-Spleißkassetten und -Muffen für die Anwendung in LWL-Kommunikationssystemen - Produktnormen - Teil 2-8: ABF-Mikrorohrverbinder, Bauart 1

This European Standard was approved by CENELEC on 2008-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC
European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 50411-2-8:2009 E

1 Scope

1.1 Product identification

This specification contains the initial, start of life dimensional, optical, mechanical and environmental performance requirements of a fully installed blown fibre 'microduct' connector in order for it to be categorised as an EN standard product.

This product specification covers the following 'microduct connectors' to suit a wide range of blown fibre applications, for floating or fixed:

- joining the same size microduct, or different sizes of microduct;
- joining same size protected microduct, to same or different size of microduct or protected microduct;
- disconnection of the connector to gain access, for example, to insert blowing equipment;
- a means to seal the fibre inside the connector to prevent the flow of liquids;
- close off open-ended microducts.

This product specification covers blown fibre microduct connectors for use in 'sub-ducts or protected micro-duct cable closures' as specified in EN 50411-2-5 for use in outside environments, and for both sealed and non-sealed closures. The outside environment includes both subterranean (underground) and/or aerial applications.

This document includes reducer/enlarger products. It may not be possible to blow through these devices. Manual feeding may be required because of the pressure gradient step.

This product specification does not apply to microduct connectors for use in direct sunlight.

1.2 Operating environment

The tests selected, combined with the severity and duration, are representative of an outside plant environment for both subterranean and aerial environments defined by

- ETSI EN 300 019 series: class 8.1: underground locations,
- EN 61753-1: all categories.

Source: EN 50411-2-8

CAMOZZI Automation

MICRODUCT CONNECTORS > SERIES V4000

Series V4000 microduct connectors

External diameters: 3, 4, 5, 7, 8, 8.5, 10, 12, 12.7, 14, 16, 18, 20 mm;
Versions: Standard, Direct Buried (DB), Reducing, Endstop

SERIES V4000

These connectors were developed to connect microducts with each other. Our system enables an easy, fast connection and disconnection of the microduct.

The connectors' robust construction includes IP68 water ingress protection and resistance to high pressure forces, allowing them to be used in direct buried (DB) applications. The transparent body enables easy visual inspection of the cable within the connector. The straight push-in and endstop connectors have a fully plastic design utilising non-conductive parts only and are also free from metal parts.

The connectors are made in accordance with Standard CEI EN 50411-2-8. In addition, the uniformity of production is ensured by an external, recognised quality assurance program, TÜV Süd.
Besides production uniformity, TÜV Süd also tests the tightness, any pressure drop during tests, the tensile strength of the microduct as well as the (cyclic) temperature change, waterproofness and resistance to stress cracking solvents. Further, the connectors are subjected to visual inspection and a salt spray test.

SERVICE LIFE EXPECTANCY

1.3 Reliability

Whilst the anticipated service life expectancy of the product in these environments is 20 years, compliance with this specification does not guarantee the reliability of the product. This should be predicted using a recognised reliability assessment programme.

Source: EN 50411-2-8

While the expected service life for the product can be set, complying EN 50411-2-8, to 20 years Camozzi, which is a recognized expert in microduct connectors, has designed and tested its products to be fit for purpose for 25 years of normal service.

AGEING TEST:

CAMOZZI

V4580: AGEING TEST
TEST N° 1781-13

Start test 15/11/12
Page 1 of 2

1. REFERENCE: Internal test related to the project 7L-5610-5107

2. OBJECT: ageing test on microduct connector serie V4000 for optical fibre.

3. INSTRUMENTS:

Hoven 0 ÷ 300 °C	87-6506-000152	\
Dynamometer 0 ÷ 250 Kg cfr. OIML R76	87-6651-000351	Scadenza 03/2014
Pressure gauge with digital control Cristal Xp -1, 20 bar	87-5601-000153	Scadenza 03/2013
Booster SMC 20 bar	-	-

4. TESTED MATERIAL:
- n°5 V4580 12/10 with OR in FKM (2 samples assembled with safety clip 4702-10)
- n°4 V4750-12 with OR in FKM and clip 4702-12
- n°4 V4581 12/8
- n°3 V4580 10/8
- n°3 V4580 8/6
- n°3 V4580 14/12
- n°3 V4580 16/12
- n°3 V4580 5/3,5
- n°3 V4580 15/12
- n°3 V4580 7/5,5

Some connectors are assembled with Protection Cap mod.:
- n°6 4708 12
- n°3 4708 14
- n°3 4708 15
- n°3 4708 16

5. TESTS DONE:

5.1 **Conditioning at 60°C in oven for 3 months** without microduct. Some samples are assembled with safety clip mod. 4702 and with Protection Cap mod. 4708.

5.2 **Mechanical performance with pressure of 20 bar for 1 hour:** Connectors shall be capable of withstanding 20 bar pressure at temperature of 20°C for a period of 1 hour. The test is performed after the conditioning in oven.

5.3 **Pull out test:** The test is performed using a microduct connectors with microducts inserted. The extremity of the microducts is fixed to external metal fittings. The measure of the maximum pull out force is carried out using a load cell and moving the metal part with a speed of 25 mm/min.
This test is performed at 20 °C on the aged samples.

Ente Emittente	End test	Esecutore	Revisore
LABORATORIO	15/02/13	Marco Ghidini	Massimo Leali

CAMOZZI

V4580: AGEING TEST
TEST N° 1781-13

Start test 15/11/12
Page 2 of 2

6. RESULTS:
5.1 Conditioning at 60°C in a oven for 3 months:

Start conditioning: 15-11-2012
Stop conditioning: 15-02-2012

No deterioration was observed on aged samples. No degradation was observed on the Protection Cap.

5.2 Mechanical performance with pressure of 20 bar for 1 hour:
After the test no damage or burst has been detected.
After the mechanical test, a leakage test with pressure of 0,4 bar was performed: no leakage has been observed.
There isn't difference between microducts connectors with OR standard and OR FKM.

5.3 Pull out test:

Mod.	Size	sample n°	Pull out force [N]
V4581 5/3,5	Ø5	*1*	207,5
		2	201,6
		3	203,8
V4581 7/4	Ø7	*1*	428,7
		2	426,7
		3	419,9
V4581 10/8	Ø10	*1*	500
		2	497,9
		3	491
V4580 12/10	Ø12	*1*	574
		2	560,6
		3	573,4
V4580 14/12	Ø14	*1*	626,4
		2	798
		3	935
V4581 16/12	Ø16	*1*	1441,7
		2	1412,7
		3	1381,8

7. CONCLUSIONS:
The aged microduct connectors serie V4000 do not show signs of wear and they have successfully passed the mechanical stress test with pressure of 20 bars.
No functional deterioration found during the pull out test.
No difference between OR standard and OR FKM.

Ente Emittente	End test	Esecutore	Revisore
LABORATORIO	15/02/13	Marco Ghidini	Massimo Leali

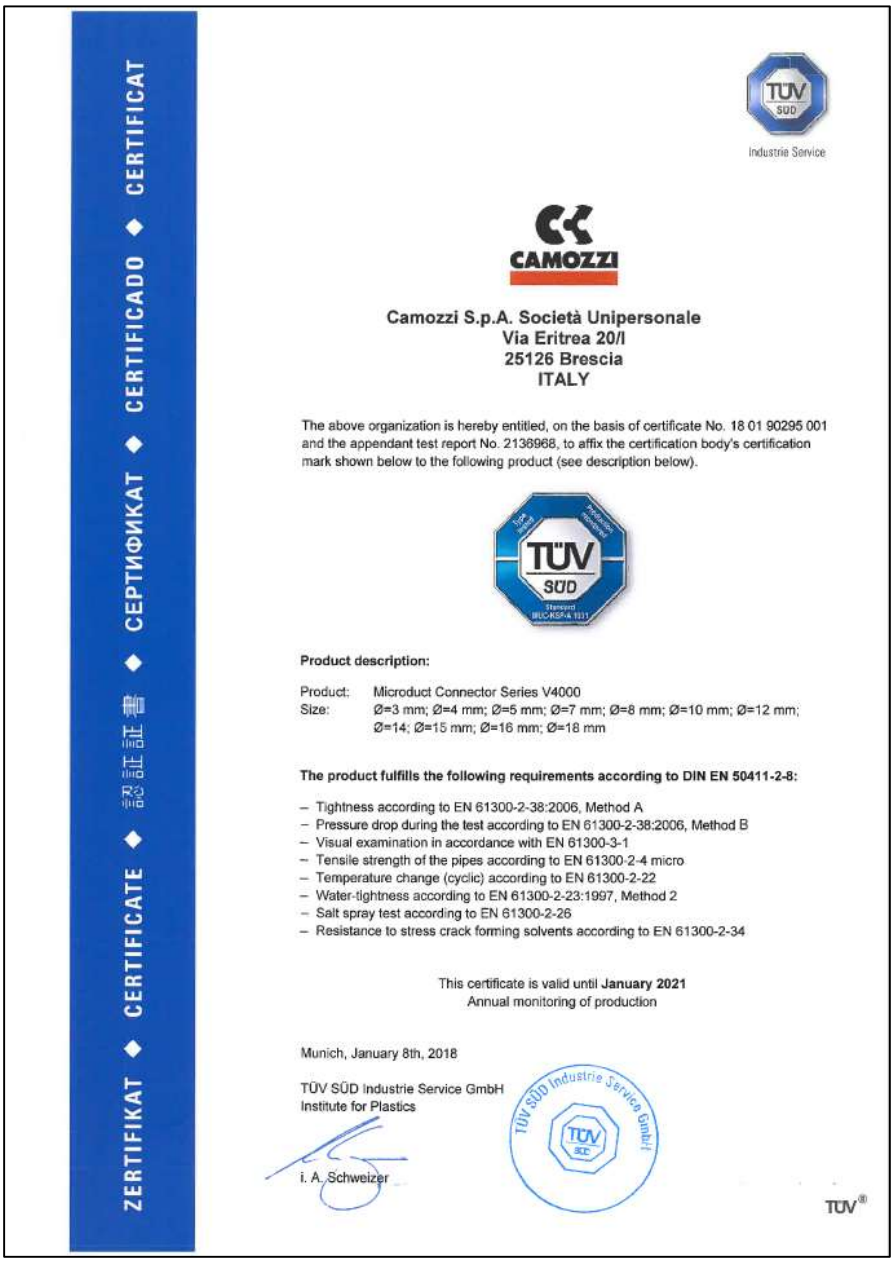
QUALITY ASSURANCE

1.4 Quality assurance

Compliance with this specification does not guarantee the manufacturing consistency of the product. This should be maintained using a recognised quality assurance programme.

Source: EN 50411-2-8

The manufacturing consistency of the product is maintained using TÜV SÜD dedicated quality assurance program.



ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD
Industrie Service

CAMOZZI

Camozzi S.p.A. Società Unipersonale
Via Eritrea 20/I
25126 Brescia
ITALY

The above organization is hereby entitled, on the basis of certificate No. 18 01 90295 001 and the appendant test report No. 2136968, to affix the certification body's certification mark shown below to the following product (see description below).

TÜV SÜD

Product description:

Product: Microduct Connector Series V4000
Size: Ø=3 mm; Ø=4 mm; Ø=5 mm; Ø=7 mm; Ø=8 mm; Ø=10 mm; Ø=12 mm; Ø=14; Ø=15 mm; Ø=16 mm; Ø=18 mm

The product fulfills the following requirements according to DIN EN 50411-2-8:

- Tightness according to EN 61300-2-38:2006, Method A
- Pressure drop during the test according to EN 61300-2-38:2006, Method B
- Visual examination in accordance with EN 61300-3-1
- Tensile strength of the pipes according to EN 61300-2-4 micro
- Temperature change (cyclic) according to EN 61300-2-22
- Water-tightness according to EN 61300-2-23:1997, Method 2
- Salt spray test according to EN 61300-2-26
- Resistance to stress crack forming solvents according to EN 61300-2-34

This certificate is valid until **January 2021**
Annual monitoring of production

Munich, January 8th, 2018

TÜV SÜD Industrie Service GmbH
Institute for Plastics

i. A. Schweizer

TÜV SÜD Industrie Service GmbH

TÜV®

FEATURES AND FUNCTIONAL SPECIFICATIONS:

- For Standard and Direct Buried Applications
- Compact Size
- FULL PLASTIC DESIGN (METAL-FREE)
- Push-Fit
- No tools needed
- Without Safety Clip V4580-V4581-V4582-V4750
- With Safety Clip CV4580-CV4581-CV4582-CV4750
- Transparent body allows verification of the position of microduct and population of the fibre
- Maximum installation pressure: 30 bar
- Working temperature: -20° / +50°C
- Fluid: Compressed air with blowing system
- Microduct to connect: Polyethylene HDPE
- According to Standards: CEI EN 50411-2-8
- Protection class: IP68
- Year esteemed of life: 25 years

All straight connectors, endstop connectors and reducing straight connectors are made with plastic materials compatible with the substances present in the ground (substances and percentage values in accordance with the Standard CEI EN 50411-2-8).

All technopolymers used for production of Series V4000 comply with Directive 2002/95/EC RoHS (Restriction of Hazardous Substances).

To interventions on the system, after years of installation, during which maintenance and/or disconnection of the microduct from connectors is required, we recommend using of the Protection Cap Mod. 4708.

4 Description

4.1 Microduct connector housing

It is essential that the connector should be compatible with input and output microduct internal diameters and that the connector with different microduct internal diameter tubes, should not impede blowing performance from the blowing direction.

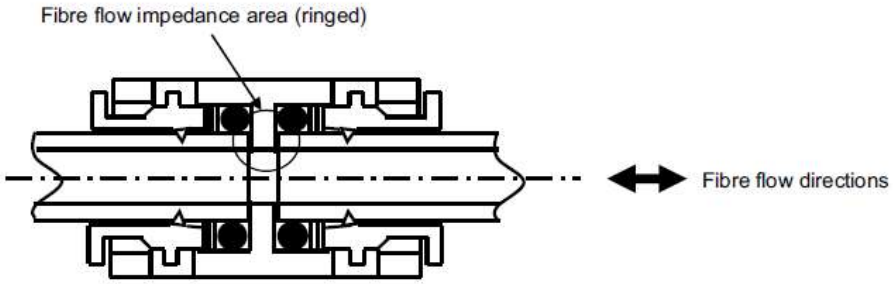


Figure 1 – Fibre flow impedance

Fibre flow impedance is typically caused by one of the following. Possible causes of impedance should be identified and effects on blowing considered prior to product selection.

a) Internal diameter of the microduct stop lip face of the connector smaller than the internal diameter of the microduct, creating a step in both directions.

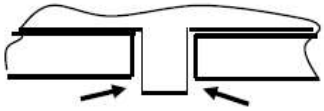


Figure 2 – Fibre flow impedance – Both direction step

b) Internal diameters of the two microducts are different creating a step in one direction.

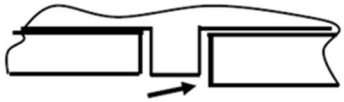


Figure 3 – Fibre flow impedance – One direction step

c) Connector with different size microducts with an acute angled step on the lip stop face of the connector.

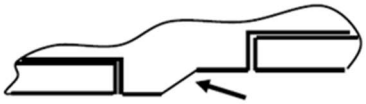
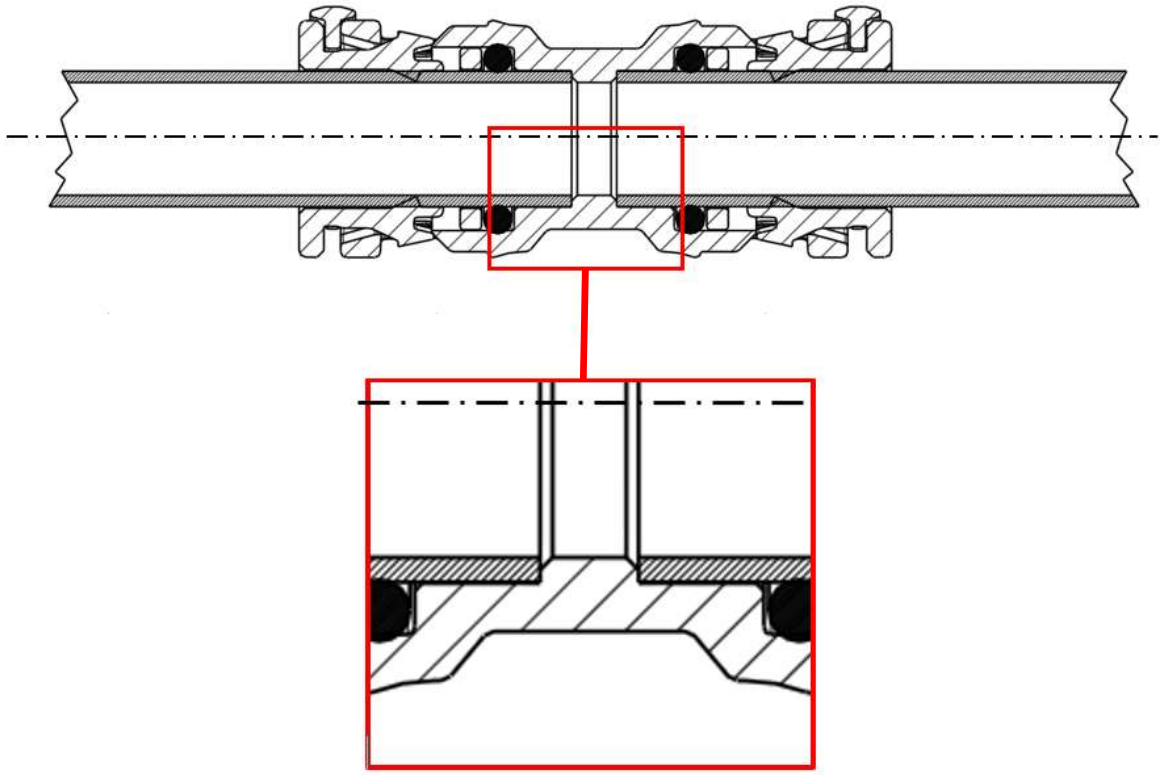


Figure 4 – Fibre flow impedance – Acute angled step

Source: EN 50411-2-8



Source: Camozzi Series V4000 Catalogue

PERFECT FIT
Series V4000 are designed to have a different model for every single internal diameter of the microducts.

For example, CV4580 12/10 and CV4581 12/8, despite the common external diameter of coupling with the microduct, each have a different internal passage to align the walls of the duct with the walls of the connectors to ensure the absence of possible steps that could cause the fiber to block during the blowing process.

4.4 Materials

All materials that could come in contact with personnel shall meet appropriate health and safety regulations.

Connector housing and sealing materials shall be compatible with each other and with the materials of the cables. Material section of this document must conform to RoHS requirements.

All components of the microduct connector shall be resistant to solvents and degreasing agents typically used.

The effects of fungus shall be determined by measuring a suitable property both before and after exposure. The 28-day test from EN 60068-2-10 (micro-organisms) should be used.

Metallic parts shall be resistant to corrosive influences they may encounter during the lifetime of the product.

Source: EN 50411-2-8

CAMOZZI
Automation

Doc. Reference: 5000029975

Subject: Supplier Declaration of Conformance to Directive 2011/65/EU on restriction of use of certain hazardous substances in electrical and electronic equipment, recasted after Commission Delegated Directive (EU) 2015/863, Commission Delegated Directive (EU) 2018/739, Commission Delegated Directive (EU) 2018/740, Commission Delegated Directive (EU) 2018/741

Camozzi Automation Spa declares that the "homogeneous materials" used in the products listed below are in compliance with requirements of directive

2011/65/EU

Camozzi Product category	Description	Restricted substance contained	Exemption	Material containing restricted substances
C_FTTx	Series V4000 microduct connectors	None	None	None

Camozzi Automation hereby certifies that heavy metals such as lead,mercury,cadmium, hexavalent chromium and poly brominated biphenils and poly brominated diphenils ethers were not used as intentional ingredients in the production of the products listed above. In addition the composition of raw materials used in production of these products were reviewed for any known presence of residual heavy metals, PBBs and PBDEs and none above the current RoHS limits was found.
Restricted Phthalates contained in the following list:Bis(2-ethylhexyl) phthalate (DEHP),Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP), Diisobutyl phthalate (DIBP) , are not intentionally added by Camozzi Automation's suppliers, any presence of these substances is not foreseen in our products.

The Declaration of Conformity to the Directive and expiry date of exemptions is responsibility of the producer of the equipment which is part of the Categories mentioned in the scope of directive.

Brescia,2020/04/30TH

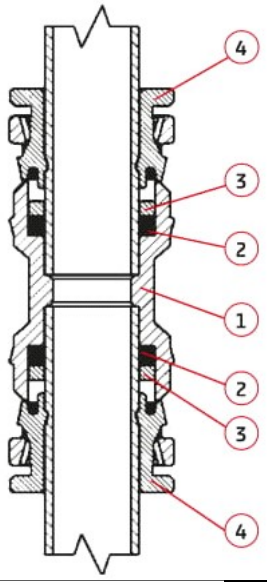
Camozzi Automation SPA
Product Certification Manager
Guerrini Fabrizio

Camozzi Automation S.p.A.
Società Unipersonale
Via Eritrea, 20/I
25126 Brescia
Italia
Tel. +39 030 37921
Fax +39 030 3758097
info@camozzi.com
www.camozzi.com

Fax uffici:
Comm. Italia +39 030 2400464
Comm. estero +39 030 2400430
Contabilità +39 030 3758096
Acquisti +39 030 47100

Capitale Sociale € 15.600.000,00 i.v.
Sede Legale: Brescia
REA C.C.I.A.A. 342858
C.F. - Reg. Imp. Brescia 03207930177
P.IVA IT 03207930177
Società soggetta all'attività di direzione e coordinamento di Camozzi Group S.p.A.

CAMOZZI AUTOMATION Division



FULL PLASTIC DESIGN

General data

Materials	1 = body Polyamide 2 = seal NBR 3 = washer Polyacetal 4 = collet Polyacetal

SAFETY CLIP
locking clip in Polyacetal

FULL PLASTIC DESIGN

Series V4000 are made with only plastic components (technopolymer and NBR) without using any metal part to avoid possible damages cause by corrosion inluences.

INSTALLATION GUIDELINES

1. Preparing the microduct to be connected
   Take the micorduct to be connected, clean it, check its dimension and ovality.
   The microduct should be clean and free from burrs, cuts, scratches or any other damage before it is inserted into the connector. In case of ovalization of the microduct shaping the round profile is mandatory.
   Cut the microduct (recommended cut with Camozzi tube cutters Mod. PNZ-25 or Mod. PNZP-12) with a tilt angle of 90° (± 3°) and remove any burr due to the cut by trimming the edges of the microduct with a bevel tool.
2. Installing the connector
   With the microduct properly prepared, install the push-fit connector (removal of safety clip is not required) reaching the internal register which indicates the correct position of the microduct in the connector.
3. Position of the connector in the infrastructure
   Straight connectors CV4580-V4580 CV4581-V4581 and Reducing Straight connectors CV4582-V4582 are designed to work parallel to the installation axis of the connected microducts, for this reason it is mandatory to respect at least 200 mm on each side of overlapped alignment of the axis of the connectors with respect to the axis of the microducts.
   Endstop connectors CV4750-V4750 can be placed in any position of the infrastructure.
4. Releasing the connector
   Make sure that the system is depressurised before you remove the microduct from the connector.
   If present remove the safety clip and press the collet towards the inside of the connector.
   The connector can be pulled following the installation axis.
   Avoid twisting and rotating the connector around the microduct during the pulling operation as this could damage the design of the collets and render the connector unusable. If release of connector has been done by twisting and rotating don't use the same connector for new installation or reinstallation.
   Using the correct procedure the connector can be released and installed up to 5 times.
   For interventions on the infrastructure, after years of installation, during which maintenance and / or disconnection of the microduct from the connectors is required, we recommend the use of the Protection cap Mod. 4708.
5. Reinstalling the connector
   To reinstall the connector on the infratructure please refer to point 1 and point 4.
   Cutting the used ends of the microduct may be necessary and is certainly advisable.
6. Direct Buried (DB) installation
   Althogh the V4000 series can be direct buried we recommend a protective cap is placed on the connector before the microduct is inserted, especially on very challenging environmental conditions. The protective cap prevents waste, soil, stones or sand entering the connector during disconnection.

ENVIRONMENTAL CONDITIONS:

Transport and storage temperature:	-10° / +50° C
Installation temperature:	-15° / +50° C
Working temperature:	-20° / +50°C
Maximum installation pressure:	30 bar
Recommended blowing temperature:	-15° / +35°C
Outdoor exposure limit:	NOT use in direct sunlight

DIRECT BURIED (DB) USE:
CV4580-V4580 – CV4581-V4581 – CV4582-V4582 - CV4750-V4750 models can be used in direct buried installation. We don't recommend the burying of thin microduct which can fail in DB conditions while the connector will perform correctly

WARNING:
not to be used in sealed closures without an over pressure safety system

CONFLICT of substances:
No liquids may be introduced into the infrastructure except for water-based lubricants specifically designed for optical fibers.

STORAGE CONDITIONS:
store in a dry environment, in the absence of dirt and dust, away from direct sunlight and heat sources

MODEL VERSIONS:

	
CV4580 – CV4581 – CV4582 – CV4750	**V4580 -V4581 – V4582 – V4750**
SAFETY CLIP ASSEMBLED	**Without SAFETY CLIP**

EN 50411-2-8 VARIANT NUMBERS:

CATALOGUE PART with SAFETY CLIP	CATALOGUE PART without SAFETY CLIP	VARIANT NUMBER (EN 50411-2-8)	DESCRIPTION (EN 50411-2-8)
CV4750 3	V4750 3	EN50411-2-8 - 030 - EST - T	End stop
CV4580 3/2.1	V4580 3/2.1	EN50411-2-8 - 030/021 - 030/021 - STR - T	Straight
CV4750 4	V4750 4	EN50411-2-8 - 040 - EST - T	End stop
CV4580 4/2.5	V4580 4/2.5	EN50411-2-8 - 040/025 - 040/025 - STR - T	Straight
CV4750 5	V4750 5	EN50411-2-8 - 050 - EST - T	End stop
CV4581 5/2.1	V4581 5/2.1	EN50411-2-8 - 050/021 - 050/021 - STR - T	Straight

CV4582 5/3.5-3/2.1	V4582 5/3.5-3/2.1	EN50411-2-8 - 050/035 - 030/021 - BRE - T	ID and OD reducer/enlarger
CV4580 5/3.5	V4580 5/3.5	EN50411-2-8 - 050/035 - 050/035 - STR - T	Straight
CV4750 7	V4750 7	EN50411-2-8 - 070 - EST - T	End stop
CV4582 7-5/3.5	V4582 7-5/3.5	EN50411-2-8 - 070/035 - 050/035 - ORE - T	OD reducer/enlarger
CV4581 7/3.5	V4581 7/3.5	EN50411-2-8 - 070/035 - 070/035 - STR - T	Straight
CV4581 7/4	V4581 7/4	EN50411-2-8 - 070/040 - 070/040 - STR - T	Straight
CV4580 7/5.5	V4580 7/5.5	EN50411-2-8 - 070/055 - 070/055 - STR - T	Straight
CV4750 8	V4750 8	EN50411-2-8 - 080 - EST - T	End stop
CV4581 8/4	V4581 8/4	EN50411-2-8 - 080/040 - 080/040 - STR - T	Straight
CV4581 8/4.5	V4581 8/4.5	EN50411-2-8 - 080/045 - 080/045 - STR - T	Straight
CV4581 8/5	V4581 8/5	EN50411-2-8 - 080/050 - 080/050 - STR - T	Straight
CV4580 8.5/6	V4580 8/6	EN50411-2-8 - 080/060 - 080/060 - STR - T	Straight
CV4750 8.5	V4750 8.5	EN50411-2-8 - 085 - EST - T	End stop
CV4580 8/6	V4580 8.5/6	EN50411-2-8 - 085/060 - 085/060 - STR - T	Straight
CV4750 10	V4750 10	EN50411-2-8 - 100 - EST - T	End stop
CV4582 10-7/5.5	V4582 10-7/5.5	EN50411-2-8 - 100/055 - 070/055 - ORE - T	OD reducer/enlarger
CV4582 10/5.5-8/5	V4582 10/5,5-8/5	EN50411-2-8 - 100/055 - 080/050 - BRE - T	ID and OD reducer/enlarger
CV4581 10/5,5	V4581 10/5.5	EN50411-2-8 - 100/055 - 100/055 - STR - T	Straight
CV4581 10/6	V4581 10/6	EN50411-2-8 - 100/060 - 100/060 - STR - T	Straight
CV4581 10/7	V4581 10/7	EN50411-2-8 - 100/070 - 100/070 - STR - T	Straight
CV4580 10/8	V4580 10/8	EN50411-2-8 - 100/080 - 100/080 - STR - T	Straight
CV4750 12	V4750 12	EN50411-2-8 - 120 - EST - T	End stop
CV4582 12-10/8	V4582 12-10/8	EN50411-2-8 - 120/080 - 100/080 - ORE - T	OD reducer/enlarger
CV4581 12/8	V4581 12/8	EN50411-2-8 - 120/080 - 120/080 - STR - T	Straight
CV4580 12.7/10	V4580 12/10	EN50411-2-8 - 120/100 - 120/100 - STR - T	Straight
CV4750 12.7	V4750 12.7	EN50411-2-8 - 127 - EST - T	End stop
CV4580 12/10	V4580 12.7/10	EN50411-2-8 - 127/100 - 127/100 - STR - T	Straight
CV4750 14	V4750 14	EN50411-2-8 - 140 - EST - T	End stop
CV4582 14-12/10	V4582 14-12/10	EN50411-2-8 - 140/100 - 120/100 - ORE - T	OD reducer/enlarger
CV4581 14/10	V4581 14/10	EN50411-2-8 - 140/100 - 140/100 - STR - T	Straight
CV4580 14/11	V4580 14/11	EN50411-2-8 - 140/110 - 140/110 - STR - T	Straight
CV4580 14/12	V4580 14/12	EN50411-2-8 - 140/120 - 140/120 - STR - T	Straight
CV4750 15	V4750 15	EN50411-2-8 - 150 - EST - T	End stop
CV4580 15/12	V4580 15/12	EN50411-2-8 - 150/120 - 150/120 - STR - T	Straight
CV4750 16	V4750 16	EN50411-2-8 - 160 - EST - T	End stop
CV4581 16/10	V4581 16/10	EN50411-2-8 - 160/100 - 160/100 - STR - T	Straight

CV4582 16/12-14/10	V4582 16/12-14/10	EN50411-2-8 - 160/120 - 140/100 - BRE - T	ID and OD reducer/enlarger
CV4581 16/12	V4581 16/12	EN50411-2-8 - 160/120 - 160/120 - STR - T	Straight
CV4580 16/14	V4580 16/14	EN50411-2-8 - 160/140 - 160/140 - STR - T	Straight
CV4750 18	V4750 18	EN50411-2-8 - 180 - EST - T	End stop
CV4581 18/12	V4581 18/12	EN50411-2-8 - 180/120 - 180/120 - STR - T	Straight
CV4581 18/14	V4581 18/14	EN50411-2-8 - 180/140 - 180/140 - STR - T	Straight
CV4580 18/15	V4580 18/15	EN50411-2-8 - 180/150 - 180/150 - STR - T	Straight
CV4750 20	V4750 20	EN50411-2-8 - 200 - EST - T	End stop
CV4581 20/15	V4581 20/15	EN50411-2-8 - 200/150 - 200/150 - STR - T	Straight
CV4581 20/16	V4581 20/16	EN50411-2-8 - 200/160 - 200/160 - STR - T	Straight

PACKAGING INFORMATION:

Mod.	Pieces (each package)*
CV4580 / V4580 3/2,1	**100**
CV4580 / V4580 4/2.5	**100**
CV4580 / V4580 5/3.5	**100**
CV4580 / V4580 7/5.5	**100**
CV4580 / V4580 8/6	**100**
CV4580 / V4580 8.5/6	**100**
CV4580 / V4580 10/8	**100**

CV4580 / V4580 12/10	**100**
CV4580 / V4580 12.7/10	**100**
CV4580 / V4580 14/11	**100**
CV4580 / V4580 14/12	**100**
CV4580 / V4580 15/12	**50**
CV4580 / V4580 16/14	**50**
CV4580 / V4580 18/15	**50**

Mod.	Pieces (each package)*
CV4581 / V4581 5/2.1	**100**
CV4581 / V4581 7/3.5	**100**
CV4581 / V4581 7/4	**100**
CV4581 / V4581 8/4	**100**
CV4581 / V4581 8/5	**100**
CV4581 / V4581 10/5.5	**100**
CV4581 / V4581 10/6	**100**
CV4581 / V4581 10/7	**100**
CV4581 / V4581 12/8	**100**
CV4581 / V4581 14/10	**100**
CV4581 / V4581 16/10	**50**
CV4581 / V4581 16/12	**50**
CV4581 / V4581 16/13	**50**
CV4581 / V4581 18/12	**50**
CV4581 / V4581 18/14	**50**
CV4581 / V4581 20/15	**50**
CV4581 / V4581 20/16	**50**

Mod.	Pieces (each package)*
CV4750 / V4750 3	**100**
CV4750 / V4750 4	**100**
CV4750 / V4750 5	**100**
CV4750 / V4750 7	**100**
CV4750 / V4750 8	**100**
CV4750 / V4750 8.5	**100**
CV4750 / V4750 10	**100**
CV4750 / V4750 12	**100**
CV4750 / V4750 12.7	**100**

CV4750 / V4750 14	**100**
CV4750 / V4750 15	**100**
CV4750 / V4750 16	**50**
CV4750 / V4750 18	**50**
CV4750 / V4750 20	**50**

Mod.	**Pieces (each package)***
CV4582 / V4582 5/3.5-3/2.1	**100**
CV4582 / V4582 7-5/3.5	**100**
CV4582 / V4582 10-7/5.5	**100**
CV4582 / V4582 10/5.5-8/5	**100**
CV4582 / V4582 12-10/8	**100**
CV4582 / V4582 14-12/10	**100**
CV4582 / V4582 16/12-14/10	**50**

Standard Plastic Bags and Label:

Microperforated package in Polyethylene PE-LD material. 04 PE-LD

Standard Carton Boxes dimensions: 40 mm. x 30 mm. h. 30 mm.

6 Dimensional requirements

6.1 Dimensions diagram

The overall dimensions of the sealed air blown fibre microduct connector are shown in Figure 15.

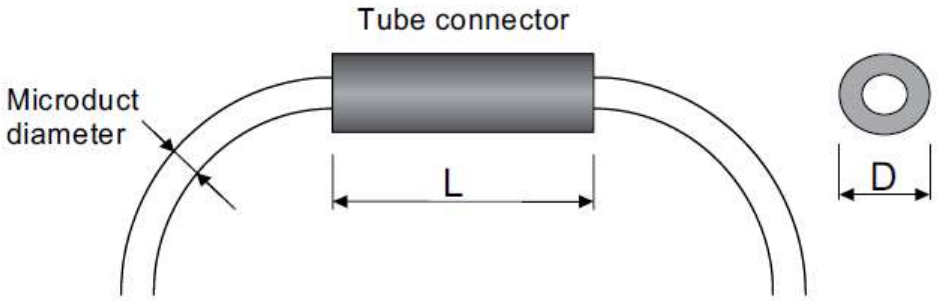


Figure 15 – Microduct connector overall dimensions

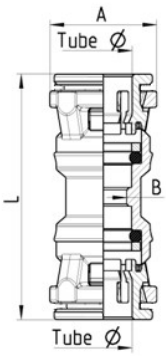
6.2 'Straight' connectors – Equal microduct

Table 2 – 'Straight' connector design – Maximum dimensions

Microduct	Diameter or across corners **D** max. mm	Overall length **L** max. mm
3	9	23
4	14	32
5	15	40
6	15	38
7	18	42
8	20	46
10	24	50
12	25	54
14	29	62
15	38	70
16		

Source: EN 50411-2-8

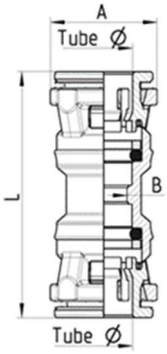
DIMENSIONS and TOLLERANCES

		
CV4580		**V4580**

STRAIGHT CONNECTOR CV4580 / V4580
Microduct standard for DI (Direct Installation) use

Mod.	Tube Ø	A	B	L	Weight (g)
CV4580 3/2,1	3	10±0.2	2.1±0.12	30.0±0.5	2
CV4580 4/2.5	4	10±0.2	2.5±0.12	30.0±0.5	2
CV4580 5/3.5	5	12.4±0.2	3.5±0.12	39.0±0.5	4
CV4580 7/5.5	7	16.3±0.2	5.5±0.12	41.5±0.5	6.5
CV4580 8/6	8	17.7±0.2	6.0±0.12	43.0±0.5	7
CV4580 8.5/6	8.5	17.7±0.2	6.0±0.12	43.0±0.5	7
CV4580 10/8	10	20.2±0.2	8.0±0.12	48.0±0.5	9
CV4580 12/10	12	23.0±0.2	10.0±0.12	51.7±0.5	12
CV4580 12.7/10	12.7	23.0±0.2	10.0±0.12	51.7±0.5	12
CV4580 14/11	14	25.6±0.2	11.0±0.12	59.2±0.5	16
CV4580 14/12	14	25.6±0.2	12.0±0.12	59.2±0.5	16
CV4580 15/12	15	27.2±0.2	12.0±0.12	59.7±0.5	18.5
CV4580 16/14	16	30.0±0.2	14.0±0.12	66.0±0.5	26
CV4580 18/15	18	33.5±0.2	15.0±0.12	77.0±0.5	37

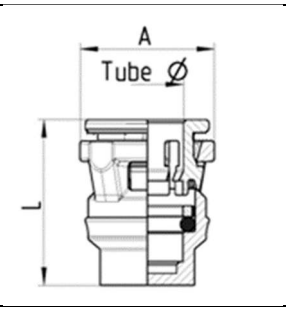
For dimension and tolerances for models V4750 see CV4750 ones

		
CV4581		**V4581**

STRAIGHT CONNECTOR CV4581 / V4581
Microduct for DB (Direct Buried) use

Mod.	Tube Ø	A	B	L	Weight (g)
CV4581 5/2.1	5	12.4±0.2	2.1±0.12	39.0±0.5	4
CV4581 7/3.5	7	16.3±0.2	3.5±0.12	41.2±0.5	6.5
CV4581 7/4	7	16.3±0.2	4.0±0.12	41.2±0.5	6.5
CV4581 8/4	8	17.7±0.2	4.0±0.12	43.0±0.5	7.5
CV4581 8/5	8	17.7±0.2	5.0±0.12	43.0±0.5	7.5
CV4581 10/5.5	10	20.2±0.2	5.5±0.12	48.0±0.5	10
CV4581 10/6	10	20.2±0.2	6.0±0.12	48.0±0.5	10
CV4581 10/7	10	20.2±0.2	7.0±0.12	48.0±0.5	10
CV4581 12/8	12	23.0±0.2	8.0±0.12	51.7±0.5	12
CV4581 14/10	14	25.6±0.2	10.0±0.12	59.2±0.5	16
CV4581 16/10	16	30.0±0.2	10.0±0.12	66.0±0.5	26
CV4581 16/12	16	30.0±0.2	12.0±0.12	66.0±0.5	26
CV4581 16/13	16	30.0±0.2	13.0±0.12	66.0±0.5	26
CV4581 18/12	18	33.5±0.2	12.0±0.12	77.0±0.5	37
CV4581 18/14	18	33.5±0.2	14.0±0.12	77.0±0.5	37
CV4581 20/15	20	37.5±0.2	15.0±0.12	81.5±0.5	45
CV4581 20/16	20	37.5±0.2	15.0±0.12	81.5±0.5	45

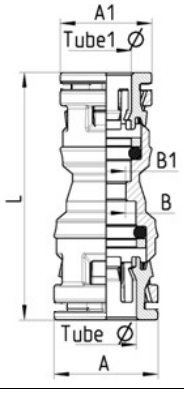
For dimension and tolerances for models V4750 see CV4750 ones

		
CV4750		**V4750**

ENDSTOP CONNECTOR CV4750 / V4750
Endstop for Microduct standard DI (Direct installation) and Microduct DB (Direct Buried) use

Mod.	Tube Ø	A	L	Weight (g)
CV4750 3	3	10.0±0.2	16.5±0.3	1.5
CV4750 4	4	10.0±0.2	16.5±0.3	1.5
CV4750 5	5	12.4±0.2	21.5±0.3	2.5
CV4750 7	7	16.3±0.2	22.6±0.3	3.5
CV4750 8	8	17.7±0.2	23.6±0.3	3.5
CV4750 8.5	8.5	17.7±0.2	23.6±0.3	3.5
CV4750 10	10	20.2±0.2	26.0±0.3	5
CV4750 12	12	23.0±0.2	27.8±0.3	7
CV4750 12.7	12.7	23.0±0.2	27.8±0.3	7
CV4750 14	14	25.6±0.2	32.6±0.3	9
CV4750 15	15	27.2±0.2	32.9±0.3	10
CV4750 16	16	30.0±0.2	36.0±0.3	13.5
CV4750 18	18	33.5±0.2	42.0±0.3	19
CV4750 20	20	37.5±0.2	45.5±0.3	25

For dimension and tolerances for models V4750 see CV4750 ones



REDUCING STRAIGHT CONNECTOR CV4582 / V4582
Microduct standard DI (Direct installation) and Microduct DB (Direct Buried) use

Mod.	Tube 1 Ø	Tube 2 Ø	A	A1	B	B1	L	Weight (g)
CV4582 5/3.5-3/2.1	**5**	**3**	**16.3±0.2**	**10.0±0.2**	**3.5±0.12**	**2.1±0.12**	**35.0±0.5**	**4**
CV4582 7-5/3.5	**7**	**5**	**16.3±0.2**	**12.4±0.2**	**3.5±0.12**	**3.5±0.12**	**40.3±0.5**	**4.5**
CV4582 10-7/5.5	**10**	**7**	**20.3±0.2**	**16.3±0.2**	**5.0±0.12**	**5.0±0.12**	**44.8±0.5**	**6**
CV4582 10/5.5-8/5	**10**	**8**	**20.3±0.2**	**17.5±0.2**	**5.5±0.12**	**5.0±0.12**	**45.8±0.5**	**7.5**
CV4582 12-10/8	**12**	**10**	**23.0±0.2**	**20.3±0.2**	**8.0±0.12**	**8.0±0.12**	**50.0±0.5**	**10**
CV4582 14-12/10	**14**	**12**	**25.6±0.2**	**23.0±0.2**	**10.0±0.12**	**10.0±0.12**	**55.8±0.5**	**14**
CV4582 16/12-14/10	**16**	**14**	**30.0±0.2**	**25.6±0.2**	**12.0±0.12**	**10.0±0.12**	**55.8±0.5**	**15**

For dimension and tolerances for models V4580 see CV4580 ones

MICRODUCTS DIMENSIONS*

Annex B
(informative)

Air blown fibre microduct – Mean outside diameter range

For the "O" ring seal to be effective these tolerances on the microducts outside diameter are recommended.

Table B.1 – Air blown fibre microduct – Mean outside diameter range

Nominal microduct outside diameter	Outside diameter range	
	min.	max.
mm	mm	mm
3	2,90	3,10
4	4,10	3,90
5	4,90	5,10
6	5,90	6,10
7	6,90	7,10
8	7,90	8,10
10	9,90	10,10
12	11,90	12,10
14	13,90	14,10
15	14,90	15,10
16	15,90	16,10

NOTE 1 The microduct information refers to manufacturing process data; coiling, transport, handling and installation will affect the measured dimensions and tolerances.

NOTE 2 Some connectors are tolerant of larger dimensional variants, because they allow reshaping of some microducts.

NOTE 3 Other nominal outside diameters can be used as long as the following dimensional tolerances, apply:

- 3 mm to 16 mm: nominal
- (+0,10 to -0,10) mm: insert symbol ±.

Source: EN 50411-2-8

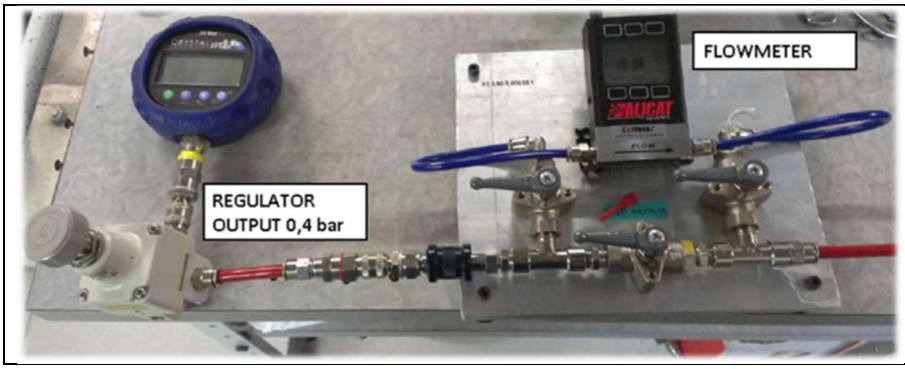
(*)
All dimensions and tolerances, referred to microducts, are reported in:

- Annex B of CEI EN 50411-2-8.

The data, indicated in the next pages, refer to tests performed with micorducts in accordance with these tollerances and connectors Series V4000 Camozzi.

1	Sealing performance after test	No emission of water indicating a leak	Method: Test temperature: Test pressure: Duration: Pre-conditioning procedure:	EN 61300-2-38:2006, Method A 23 °C ± 3 °C Internal overpressure 40 kPa ± 2 kPa (0,4 bar) 15 min Sample should be conditioned to room temperature for at least 2 h.
2	Pressure loss during test	Difference in pressure before and after test shall be less than 2 kPa. Measurements taken at same atmospheric conditions	Method: Test temperature: Test pressure: Pressure detector: Pre-conditioning procedure:	EN 61300-2-38:2006, Method B As specified by individual test Internal overpressure 40 kPa ± 2 kPa at test temperature Minimum resolution 0,1 kPa Sample should be conditioned to specified temperature at test pressure for at least 4 h.

Source: EN 50411-2-8



All connectors
V4000 pass test

3	Visual appearance	No defects which would affect functionality of the connector	Method: Examination:	EN 61300-3-1 Product shall be checked with naked eye.

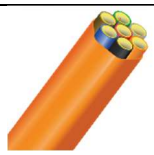
Source: EN 50411-2-8

All connectors
V4000 pass test

4	Change in attenuation (point defect) [a]	Excursion losses: δIL ≤ 0,4 dB per incoming fibre during test (multimode only) δIL ≤ 0,2 dB per incoming fibre during test (δIL ≤ 0,2 dB per incoming fibre during test (single mode only)	Method: Wavelengths: Source stability Detector linearity Measurements required:	EN 61300-3-3 EN 60793-1-40 850 nm ± 25 nm (Multimode only) 1 550 nm ± 25 nm (Single mode only) 1 625 nm ± 25 nm (Single mode only) Within ± 0,05 dB over the measuring period Within ± 0,05 dB over the dynamic range to be measured Before, during and after the test

Source: EN 50411-2-8

TEST NOT APPLICABLE!
The test refers to connectors for fibre-cable and NOT to connectors for microducts (see pictures).

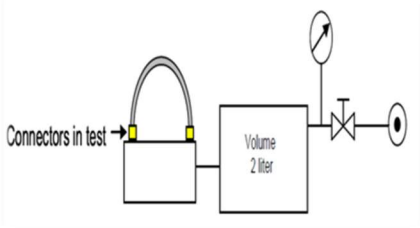


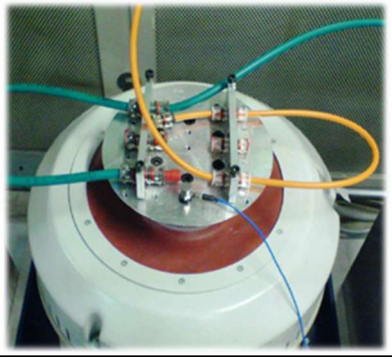
Microducts

Fibre Cables

5	Vibration (sinusoidal)	Sealing performance (test 1) Visual appearance (test 3)	Method: Frequency range: Amplitude / acceleration force: Cross-over frequency: Number of sweeps Number of axes: Test temperature: Test pressure: Pre-conditioning procedure:	EN 61300-2-1 5 Hz – 500 Hz at 1 octave/min 3 mm or 1 g_n max. 9 Hz 10 sweeps (5-500-5) 3 mutually perpendicular 23 °C ± 3 °C Internal overpressure 100 kPa ± 2 kPa Sample should be conditioned to room temperature for at least 2 h.

Source: EN 50411-2-8

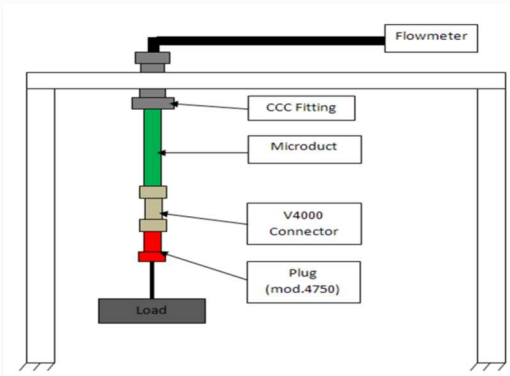


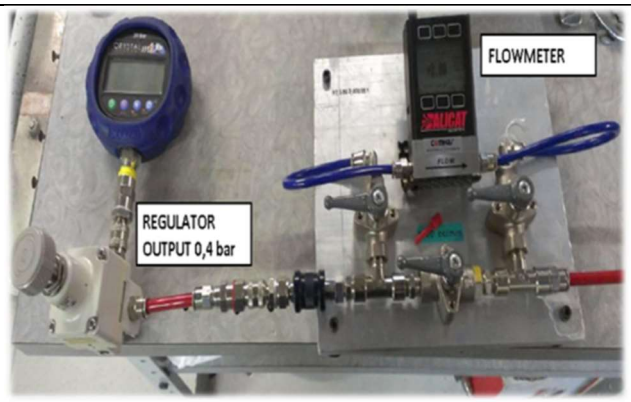


All connectors V4000 pass test

6	Microduct retention	Sealing performance (test 1) Pressure loss (test 2) Visual appearance (test 3)	Method: Test temperatures: Load: Duration: Test pressure: Pre-conditioning procedure:	EN 61300-2-4 -15 °C ± 2 °C and +45 °C ± 2 °C value N (as follows) 3 mm diameter: 25 N 5 mm diameter: 55 N 8 mm to 16 mm diameter: 125 N 1 h per tube Internal overpressure 40 kPa ± 2 kPa Sample should be conditioned to specified temperature for at least 4 h.

Source: EN 50411-2-8





All connectors
V4000 pass test

TENSILE TEST: MAX VALUE ** (TEST NOT REQUESTED BY NORM)

STRAIGHT CONNECTOR CV4580 / V4580 *

Mod.	Tensile Test (N)
CV4580 3/2,1	≥ 65
CV4580 4/2.5	≥ 65
CV4580 5/3.5	≥ 160
CV4580 7/5.5	≥ 200
CV4580 8/6	≥ 300
CV4580 8.5/6	≥ 420
CV4580 10/8	≥ 400
CV4580 12/10	≥ 450
CV4580 12.7/10	≥ 700
CV4580 14/11	**
CV4580 14/12	≥ 500
CV4580 15/12	≥ 900
CV4580 16/14	**
CV4580 18/15	≥ 1400

STRAIGHT CONNECTOR CV4581 / V4581*

Mod.	Tensile Test (N)

CV4581 5/2.1	**
CV4581 7/3.5	≥ 350
CV4581 7/4	≥ 300
CV4581 8/4	**
CV4581 8/5	**
CV4581 10/5.5	**
CV4581 10/6	≥ 600
CV4581 10/7	≥ 600
CV4581 12/8	≥ 900
CV4581 14/10	≥ 900
CV4581 16/10	≥ 1000
CV4581 16/12	≥ 1000
CV4581 16/13	≥ 1000
CV4581 18/12	**
CV4581 18/14	≥ 1400
CV4581 20/15	≥ 2000
CV4581 20/16	≥ 2000

ENDSTOP CONNECTOR CV4750 / V4750 ***

Mod.	Tensile Test (N)
CV4750 3	≥ 65
CV4750 4	≥ 65
CV4750 5	≥ 160
CV4750 7	≥ 200
CV4750 8	≥ 300
CV4750 8.5	≥ 420
CV4750 10	≥ 400
CV4750 12	≥ 450
CV4750 12.7	≥ 700
CV4750 14	≥ 500
CV4750 15	≥ 900
CV4750 16	≥ 1000
CV4750 18	≥ 1400
CV4750 20	≥ 2000

REDUCING STRAIGHT CONNECTOR CV4582 / V4582 *

Mod.	Tensile Test (N)
CV4582 5/3.5-3/2.1	in evaluation
CV4582 7-5/3.5	≥ 160
CV4582 10-7/5.5	≥ 200
CV4582 10/5.5-8/5	**
CV4582 12-10/8	≥ 400

CV4582 14-12/10	≥ 450
CV4582 16/12-14/10	**

(*)
The value might be higher if tested with microducts of different producers.

(**)
At the moment, test not performed on all the dimension of outside/inside diameter microducts; the value might be higher if tested with microducts of different producers.

(***)
Minimum value measured in the tests of V4580 e V4581; under the same conditions of outside diameter microducts, the value might be higher if tested with different inside diameter microducts.

7	Microduct bending	Tightness Sealing performance (test 1) Pressure loss (test 2) Visual appearance (test 3)	Method: Test temperatures: Angle: Force application: Number of cycles: Test pressure: Pre-conditioning procedure:	EN 61300-2-37 -15 °C ± 2 °C and +45 °C ± 2 °C 30° at point of force application 400 mm from end of connector 5 cycles per tube Internal overpressure 40 kPa ± 2 kPa at test temperature Sample should be conditioned to specified temperature for at least 4 h.

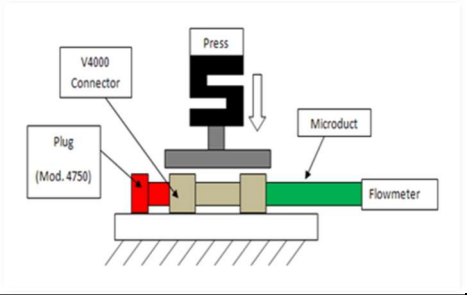
No.	Test	Requirement	Details	
8	Torsion/Twist	Sealing performance (test 1) Pressure loss (test 2) Visual appearance (test 3)	Method: Test temperatures: Torque: Force application: Number of cycles: Test pressure: Pre-conditioning procedure:	EN 61300-2-5 -15 °C ± 2 °C and +45 °C ± 2 °C 90° or max. 2 Nm 100 mm from end of seal 5 cycles per tube Internal overpressure 40 kPa ± 2 kPa Sample should be conditioned to specified temperature for at least 4 h.

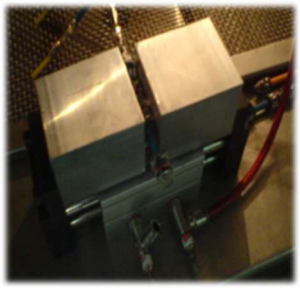
Source: EN 50411-2-8

TEST NOT APPLICABLE!	The test refers only to connectors for fibre cable (7) or to microducts (8) and NOT to connectors for microducts.

9	Crush resistance	Sealing performance (test 1) Pressure loss (test 2) Visual appearance (test 3)	Method: Test temperatures: Load: Application area: Locations: Duration: Test pressure: Pre-conditioning procedure:	EN 61300-2-10 -15 °C ± 2 °C and +45 °C ± 2 °C 450 N 25 cm² Centre of connector at 0° and 90° around longitudinal axis of tube connector 10 min Internal overpressure 40 kPa ± 2 kPa Sample should be conditioned to specified temperature for at least 4 h.

Source: EN 50411-2-8

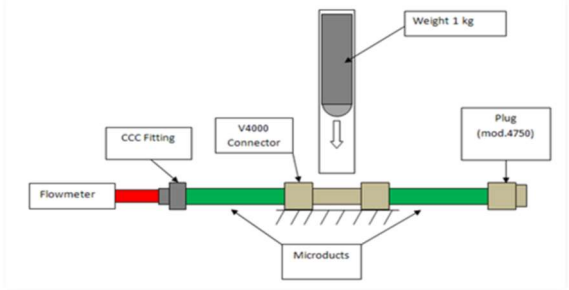




All connectors V4000 pass test

10	Impact	Sealing performance (test 1) Visual Appearance (test 3)	Method: Test temperatures: Impact tool: Impact locations: Impact energy: Number of impacts: Pre-conditioning procedure:	EN 60794-1-2:2003, Method E4 -15 °C ± 2 °C and +45°C ± 2 °C Steel ball with radius of striking surface: 12,5 mm. 1 hit at the mid-section 1,0 joule 1 Sample should be conditioned to specified temperature for at least 4 h.

Source: EN 50411-2-8



All connectors V4000 pass test

IMPACT TEST (-20°C): MAX VALUE WITHOUT BREAK (TEST NO REQUEST BY NORM)

STRAIGHT CONNECTOR CV4580 / V4580

Mod.	Value (J)
CV4580 3/2,1	0.7
CV4580 4/2.5	0.7
CV4580 5/3.5	0.7
CV4580 7/5.5	1.5
CV4580 8/6	1.5
CV4580 8.5/6	1.5
CV4580 10/8	1.5
CV4580 12/10	2
CV4580 12.7/10	2
CV4580 14/11	2
CV4580 14/12	2
CV4580 15/12	2
CV4580 16/14	2
CV4580 18/15	2

STRAIGHT CONNECTOR CV4581 / V4581

Mod.	Value (J)
CV4581 5/2.1	0.7
CV4581 7/3.5	1.5
CV4581 7/4	1.5
CV4581 8/4	1.5
CV4581 8/5	1.5
CV4581 10/5.5	1.5
CV4581 10/6	1.5
CV4581 10/7	1.5
CV4581 12/8	2
CV4581 14/10	2
CV4581 16/10	2
CV4581 16/12	2
CV4581 16/13	2
CV4581 18/12	2
CV4581 18/14	2
CV4581 20/15	N/A
CV4581 20/16	N/A

ENDSTOP CONNECTOR CV4750 / V4750

Mod.	Value (J)
CV4750 3	0.7
CV4750 4	0.7

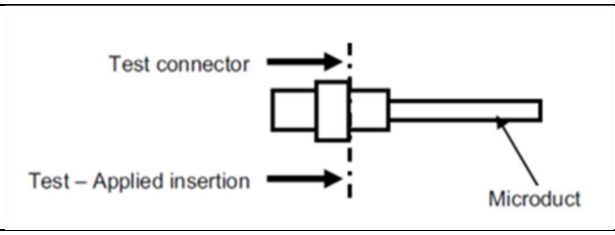
CV4750 5	0.7
CV4750 7	1.5
CV4750 8	1.5
CV4750 8.5	1.5
CV4750 10	1.5
CV4750 12	2
CV4750 12.7	1.5
CV4750 14	2
CV4750 15	2
CV4750 16	2
CV4750 18	2
CV4750 20	N/A

REDUCING STRAIGHT CONNECTOR V4582 / V4582

Mod.	Value (J)
CV4582 5/3.5-3/2.1	N/A
CV4582 7-5/3.5	0.7
CV4582 10-7/5.5	1.5
CV4582 10/5.5-8/5	1.5
CV4582 12-10/8	1.5
CV4582 14-12/10	2
CV4582 16/12-14/10	N/A

11	Re-entries (only to be performed when tube connector can be disconnected and reconnected again)	Sealing performance (test 1) Visual appearance (test 3)	Method: Test temperature: Conditioning between each re-entry: Number of re-entries:	EN 61300-2-33 -15 °C ± 2 °C and +45 °C ± 2 °C Ageing of minimum 1 temperature cycle as specified in test 12 5

Source: EN 50411-2-8



All connectors
V4000 pass test

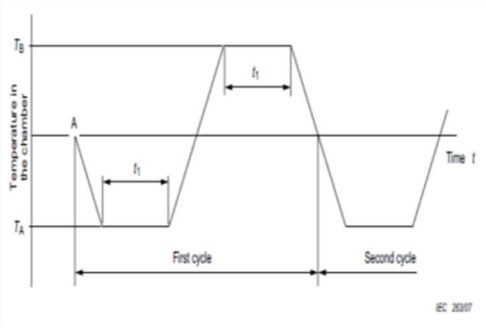
RELEASE / UNRELEASE TEST (TEST NOT REQUESTED BY NORM)

CONNECTORS CV4580 - CV4581 – CV4852 – CV4750
CONNECTORS V4580 - V4581 – V4852 – V4750

Tube Ø	Connection/Disconnection (N°)
3	≥ 20
4	≥ 20
5	≥ 20
7	≥ 20
8	≥ 20
8.5	≥ 20
10	≥ 20
12	≥ 20
12.7	≥ 20
14	≥ 20
15	≥ 20
16	≥ 20
18	≥ 20
20	≥ 20

12	Change of temperature (cycling)	Sealing performance (test 1) Visual appearance (test 3) (separate test samples are made for the optical test)	Method: Extreme temperatures: Dwell time: Rate of change Number of cycles: Sample configuration: for sealing performance Test pressure:	EN 61300-2-22 -40 °C ± 2 °C and +65 °C ± 2 °C 4 h 1 °C/min 20 Half of population is placed in a straight configuration, the other half shall make a 90° bend with minimum allowed bend radius as specified by the supplier of the microduct Internal overpressure regulated at 40 kPa ± 2 kPa during test

Source: EN 50411-2-8



TA = +65°C
TB = -40°C
t1 = 4 hhh

All connectors V4000 pass test

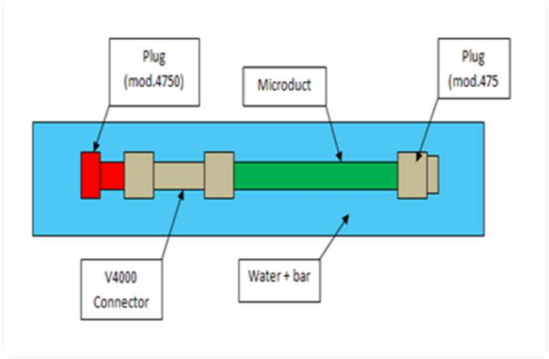
13	Change of temperature (optical)	Change in attenuation (test 4)	Method: Extreme temperatures: Dwell time: Rate of change Number of cycles:	EN 61300-2-22 -40 °C ± 2 °C and +65 °C ± 2 °C 2 h 1 °C/min 1

Source: EN 50411-2-8

TEST NOT APPLICABLE!	The test refers only to connectors for fibre cable and NOT to connectors for microducts.

14	Water immersion	No water ingress Visual appearance (test 3)	Method: Test temperatures: Water column height: Wetting agent: Duration: Test pressure:	EN 61300-2-23:1997, Method 2 +23 °C ± 3 °C 5 m or an equivalent external water pressure of 50 kPa None 7 days 0 kPa overpressure in tube

Source: EN 50411-2-8



All connectors
V4000 pass test

15	Salt mist	Sealing performance (test 1) Visual appearance (test 3)	Method: Test temperatures: Salt solution: Duration: Test pressure:	EN 61300-2-26 +35 °C ± 2 °C 5 % NaCl (pH 6,5-7,2) 5 days 0 kPa overpressure

Source: EN 50411-2-8

NO METAL PARTS = NO CORROSION PHENOMENA	All connectors V4000 pass test

16	Resistance to solvents and contaminating fluids	Sealing performance (test 1) Visual appearance (test 3)	Method: Test temperatures: Submersion in: Drying time at 70 °C: Duration: Test pressure:	EN 61300-2-34 +23 °C ± 3 °C HCl at pH 2 NaOH at pH 12 Kerosene (lamp oil) ISO 1998-1 1,005 Petroleum jelly Diesel fuel for cars EN 590 5 % NaCl (pH 6,5-7,2) White spirit and IPA None 5 days 0 kPa overpressure

Source: EN 50411-2-8

Technopolymers and NBR used for Series V4000 connectors are resistant to the substances listed in the norm, in the percentages mentioned.	All connectors V4000 pass test

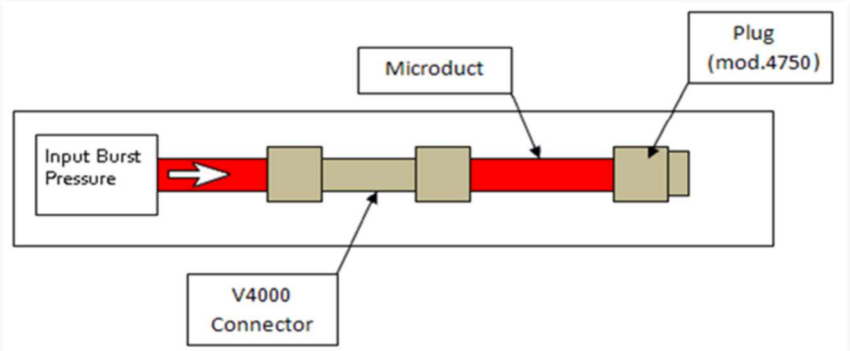
17	Resistance to stress cracking solvents	Sealing performance (test 1) Visual appearance (test 3) No visible cracking allowed	Method: Test temperatures: Submersion in: Drying time at 70 °C: Duration: Test pressure:	EN 61300-2-34 +50 °C ± 2 °C 10 % detergent solution (Nonylphenol ethoxylate, non ionic surfactant e.g. CAFLON NP9, IGEPAL) None 5 days 0 kPa overpressure

Source: EN 50411-2-8

Technopolymers and NBR used for Series V4000 connectors are resistant to the substances listed in the norm, in the percentages mentioned.	All connectors V4000 pass test

18	High pressure resistance (safety)	Visual appearance (test 3) No damage or disconnection	Method: Test temperatures: Duration: Test pressure:	Annex C +23°C ± 2°C 30 min 2 500 kPa overpressure

Source: EN 50411-2-8



All connectors
V4000 pass test

BURST PRESSURE TEST: MAX BREAK VALUE (TEST NO REQUIRED BY NORM)

STRAIGHT CONNECTOR CV4580 / V4580

Mod.	Burst Pressure Test (Bar)
CV4580 3/2.1	**> 50**
CV4580 4/2.5	**> 50**
CV4580 5/3.5	**> 50**
CV4580 7/5.5	**> 50**
CV4580 8/6	**> 50**
CV4580 8.5/6	**> 50**
CV4580 10/8	**> 50**
CV4580 12/10	**> 50**
CV4580 12.7/10	**> 50**
CV4580 14/11	**> 50**
CV4580 14/12	**> 50**
CV4580 15/12	**> 50**
CV4580 16/14	**> 50**
CV4580 18/15	**> 50**

STRAIGHT CONNECTOR V4581 / V4581

Mod.	Burst Pressure Test (Bar)
CV4581 5/2.1	**> 50**
CV4581 7/3.5	**> 50**
CV4581 7/4	**> 50**
CV4581 8/4	**> 50**
CV4581 8/5	**> 50**
CV4581 10/5.5	**> 50**
CV4581 10/6	**> 50**
CV4581 10/7	**> 50**
CV4581 12/8	**> 50**
CV4581 14/10	**> 50**
CV4581 16/10	**> 50**
CV4581 16/12	**> 50**
CV4581 16/13	**> 50**
CV4581 18/12	**> 50**
CV4581 18/14	**> 50**
CV4581 20/15	**> 50**
CV4581 20/16	**> 50**

ENDSTOP CONNECTOR CV4750 / V4750

Mod.	Burst Pressure Test (Bar)
CV4750 3	> 50

CV4750 4	> 50
CV4750 5	> 50
CV4750 7	> 50
CV4750 8	> 50
CV4750 8.5	> 50
CV4750 10	> 50
CV4750 12	> 50
CV4750 12.7	> 50
CV4750 14	> 50
CV4750 15	> 50
CV4750 16	> 50
CV4750 18	> 50
CV4750 20	> 50

REDUCING STRAIGHT CONNECTOR CV4582 / V4582

Mod.	Burst Pressure Test (Bar)
CV4582 5/3.5-3/2.1	N/A
CV4582 7-5/3.5	> 50
CV4582 10-7/5.5	> 50
CV4582 10/5.5-8/5	> 50
CV4582 12-10/8	> 50
CV4582 14-12/10	> 50
CV4582 16/12-14/10	N/A

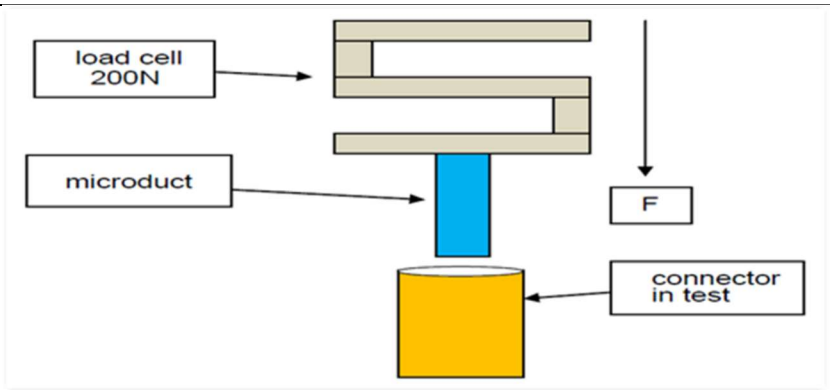
19	Installation test	Sealing performance (test 1) Visual appearance (test 3) Must allow, microduct fibre cable, or a fibre unit, to pass through the connector	Method: Test temperatures: Duration: Test pressure:	Annex D +23 °C ± 2 °C (both at -10 °C and +40 °C) 1 h 1 000 kPa overpressure

Source: EN 50411-2-8

	CHECK of the shrinkage of internal diameter of microduct during tensile test		All connectors V4000 pass test

20	Insertion force	Sealing performance (test 1)	Method Inserting force in fitting the connector to the microduct	Annex E 50 N max. (12 mm microducts and below) 120 N max. (above 14 mm microducts)

Source: EN 50411-2-8

	All connectors V4000 pass test

INSERTION TEST: VALUE

STRAIGHT CONNECTOR CV4580 / V4580

Mod.	Insertion Force (N)
CV4580 3/2.1	<50
CV4580 4/2.5	<50
CV4580 5/3.5	<50
CV4580 7/5.5	<50
CV4580 8/6	<50
CV4580 8.5/6	<50
CV4580 10/8	<50
CV4580 12/10	<50
CV4580 12.7/10	<50
CV4580 14/11	<120
CV4580 14/12	<120
CV4580 15/12	<120
CV4580 16/14	<120
CV4580 18/15	<120

STRAIGHT CONNECTOR CV4581 / V4581

Mod.	Insertion Force (N)
CV4581 5/2.1	<50
CV4581 7/3.5	<50
CV4581 7/4	<50
CV4581 8/4	<50
CV4581 8/5	<50
CV4581 10/5.5	<50
CV4581 10/6	<50
CV4581 10/7	<50
CV4581 12/8	<120
CV4581 14/10	<120
CV4581 16/10	<120
CV4581 16/12	<120
CV4581 16/13	<120
CV4581 18/12	<120
CV4581 18/14	<120
CV4581 20/15	<120
CV4581 20/16	<120

ENDSTOP CONNECTOR CV4750 / V4750

Mod.	Insertion Force (N)
CV4750 3	<50
CV4750 4	<50

CV4750 5	<50
CV4750 7	<50
CV4750 8	<50
CV4750 8.5	<50
CV4750 10	<50
CV4750 12	<50
CV4750 12.7	<50
CV4750 14	<120
CV4750 15	<120
CV4750 16	<120
CV4750 18	<120
CV4750 20	<120

REDUCING STRAIGHT CONNECTOR CV4582

Mod.	Insertion Force (N)
CV4582 5/3.5-3/2.1	In evaluation
CV4582 7-5/3.5	<50
CV4582 10-7/5.5	<50
CV4582 10/5.5-8/5	<50
CV4582 12-10/8	<50
CV4582 14-12/10	<120
CV4582 16/12-14/10	<120