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File E170293  
Project 96ME62315  
July 25, 1997  
REPORT  
on  
OUTLET BUSHINGS AND FITTINGS  
OBO Bettermann GmbH & Co  
58710 Menden  
Fed. Rep. Germany

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dedicated to public safety and  
committed to quality service

## DESCRIPTION

## PRODUCT COVERED

Component-Liquid-Tight Flexible Cord Connectors, Cat. Nos. V-TEC, V-TEC M, V-TEC L, V-TEC K; sizes PG7, PG9, PG11, M12 x 1.5, M16 x 1.5

## ENGINEERING CONSIDERATIONS (NOT FOR UL REPRESENTATIVE USE)

## Conditions of Acceptability -

1. These devices are for use in Listed equipment.
2. These devices shall be provided with locknuts.
3. These devices have been subjected to the Assembly Test, Oven Conditioning Test, Oil Spray Test, Flexing Test and Flammability Test in accordance with the Standard for Fittings for Conduit and outlet Boxes, UL 514B.
4. The following are the pull force values applied to the devices when tested using the method of the Pull Test in accordance with the Standard for Fittings for Conduit and outlet Boxes, UL 514B.

<u>Catalog Number</u>	<u>Cord Dia mm (In)</u>	<u>Pull Force, N, (lb)</u>
V-TEC PG7, M12x1.5	6.5 (0.260)	155.7 (35)
V-TEC PG9, M16x1.5	8.0 (0.315)	49.8 (11.2)
V-TEC PG11	5.0 (0.197)	60.0 (13.5)
V-TEC PG11	10.0 (0.394)	60.0 (13.5)

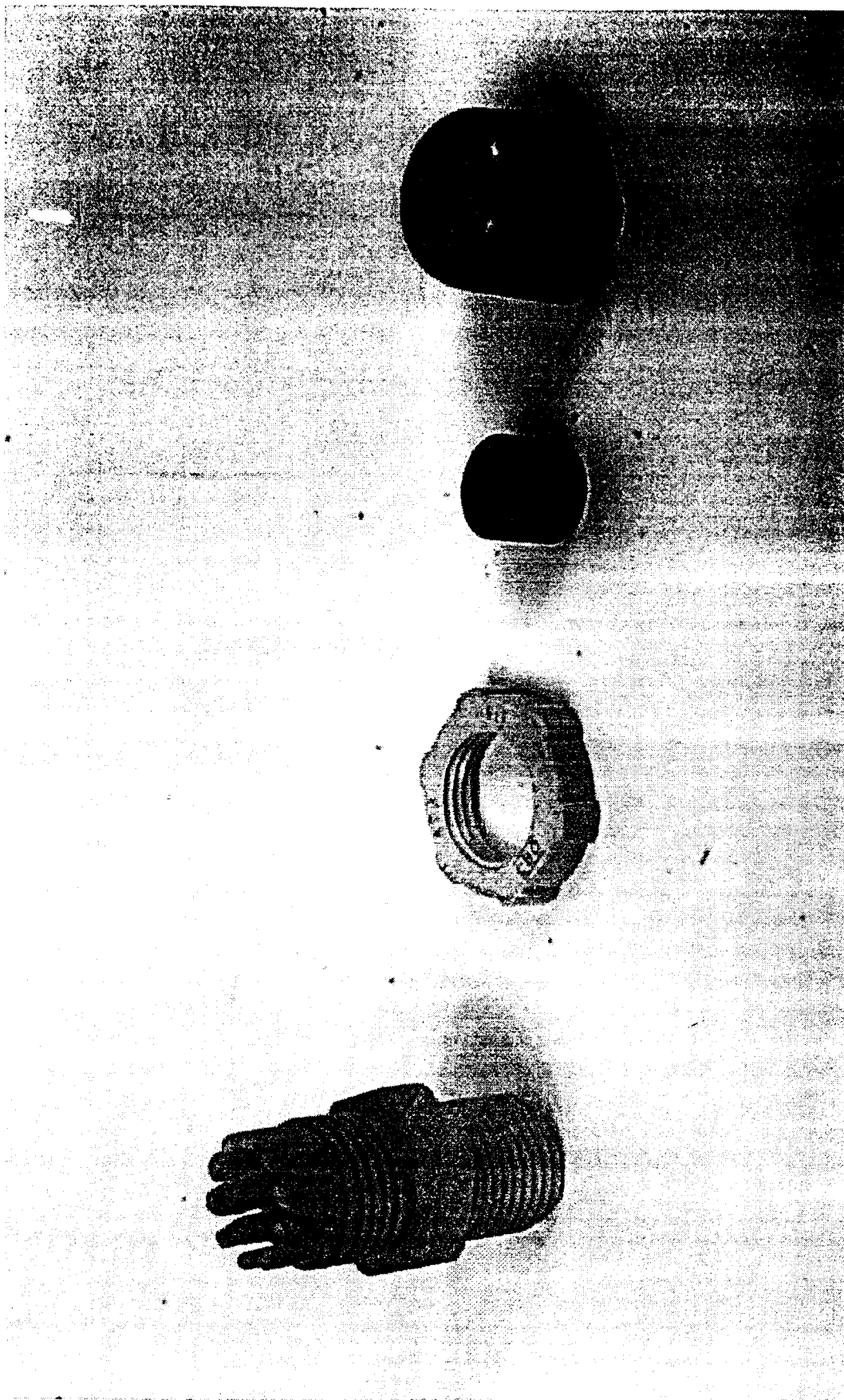
Marking - Recognized Company's name or trademark on device. Catalog number on device or shipping carton. Cord diameter size on carton. The carton may contain the marking "Liquid-Tight" or equivalent.

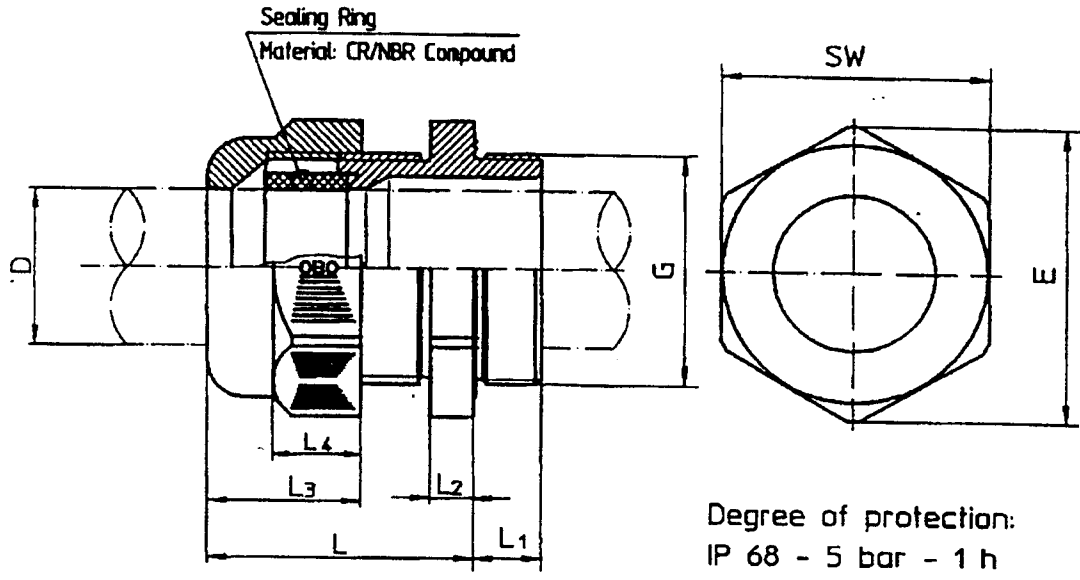
CAT NO. V-TEC PG9  
(REPRESENTS ALL CAT. NOS.)

FIG. 1 (M97-09749)

1. Gland Nut - Molded of Polyamid 6 designated 6PA 45/1 by Albis Plastics. Flexible part of V-TEC K connectors molded f Bergaflex 70 A 302 by Bergmann. See Ills. 1-3 for details.
2. Gland - Compound of Chloroprene rubber and AcryInitril Butatien rubber.
3. Locknuts - Molded of polyamid 6 designated Schulamid 6 GF 30 FR by Schulman.
4. Body - Molded of Polyamid 6 designated 6PA 45/1 by Albis Plastics. See Ills. 1-3 for details.

and Report





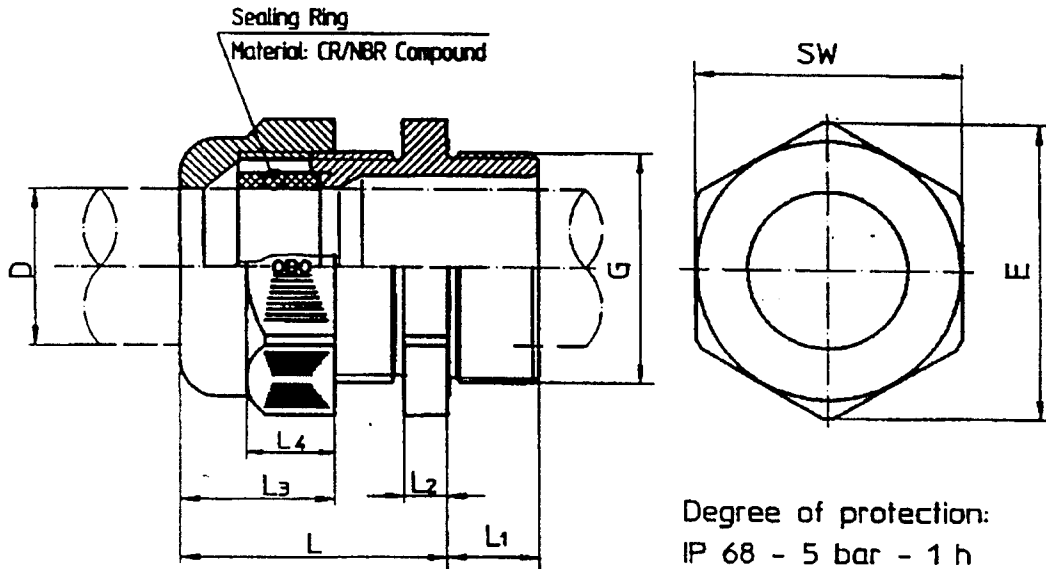
Degree of protection:  
IP 68 - 5 bar - 1 h  
according to IEC 529.

Nominal Size (according to DIN 40 430) Outer thread diameter G	Clamping and sealing range D	Hexagon		L	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	Order no.					
		mm	inches						SW	E	min	max	silver-grey RAL 7001	light grey RAL 7035
Pg 7	12.5	6.5	.138- .256	15	16.5	18	23	8	5	12.6	7	2022 605	2024 705	2024 519
Pg 9	15.2	8	.157- .315	19	21	21	27	8	5	15.5	9	2022 613	2024 713	2024 535
Pg11	18.6	5 -10	.197- .394	22	25	22	29	8	5	17	10	2022 621	2024 721	2024 543

Dimensions in mm.

Pos.	Sick.	Benennung	Zeichnung-Nr. / Normteile	Abmessung/Werkstoff/Bemerkung
CAD		HP ME10	ÄNDERUNGEN NUR MIT CAD	Filename: users/obot/3AKabelverschraubungen/V-TEC/V-TEC-Pg/ev11-02.dwg
BLT	Datum	Name	Zul. Abw.	Oberfläche
OS				
AFE				
			Datum	Name
			Bearb. 08.11.95	Melos
			Gepr.	
			Norm	
<b>OBO NEUWA</b> <b>BETTERMANN</b>				Zeichnung-Nr. <b>EV11-02</b>
b	D-Moße geändert	09.08.96	Melos	
a	Korrektur	31.10.95	Melos	
				Blatt:
				Bl

and Report

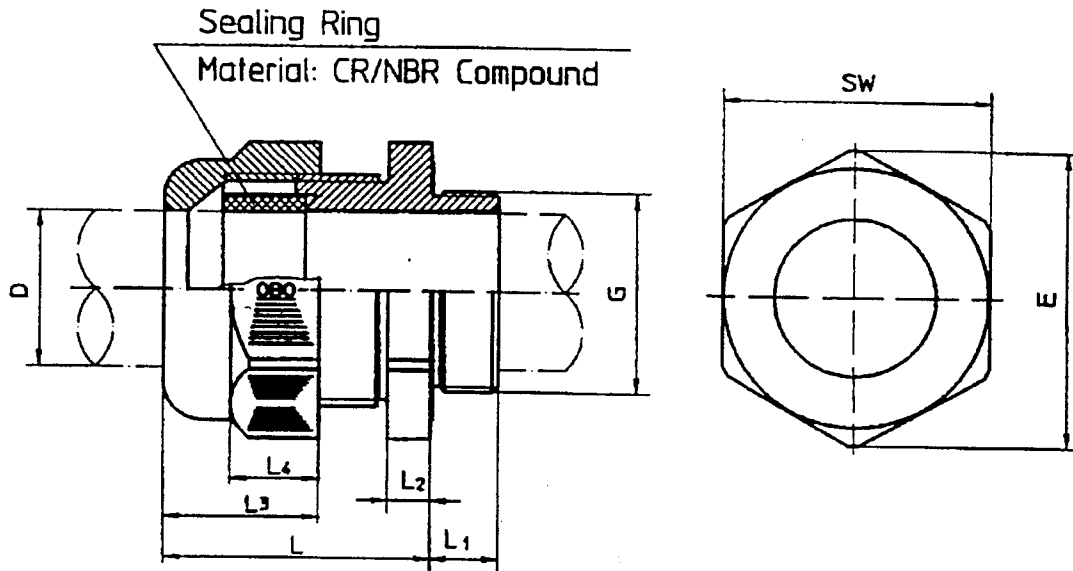


Degree of protection:  
IP 68 - 5 bar - 1 h  
according to IEC 529.

Nominal Size (according to DIN 40 430) Outer thread diameter G	Clamping and sealing range ⊙ D mm	Clamping and sealing range ⊙ D inch ⊙	Hexagon		L min/max	L1	L2	L3	L4	Order no.			
			SW	E						silver- grey RAL 7001	light grey RAL 7035	black RAL 9005	
Pg 7	12.5	6.5	.138- .256	15	16.5	18	23	5	12.6	7	2024 179	2024 284	2024 381
Pg 9	15.2	8	.157- .315	19	21	21	27	5	15.5	9	2024 187	2024 292	2024 403
Pg11	18.6	5 -10	.197- .394	22	25	22	29	5	17	10	2024 195	2024 306	2024 411

Dimensions in mm.

Pos.	Stück.	Benennung	Zeichnung-Nr. / Normteile	Abmessung/Werkstoff/Bemerkung
CAD		HP ME10	ÄNDERUNGEN NUR MIT CAD	Filename: users/robot3/Kabelverschraubungen/V-TEC/V-TEC-Py/ev112-01-stk
BLT		Datum	Name	Zul. Abw.
OS				Oberfläche
AFE				
			Datum	Name
			Bearb.	08.11.95
			Gepr.	
			Norm	
				Werkstoff: Polyamid 6
				Stand vom: 09.08.96
				Bemerkung: Cable Gland Type V-TEC L with 'long' steel conduit thread according to DIN 40 430 (Main dimensions)
				Zeichnung -Nr. EV112-01
				Blatt: Bl.
b		D-Naß geändert	09.08.96	Melias
a		Korrektur	31.10.95	Melias
Zust.	Änderung	Datum	Name	
<b>OBO NEUWA BETTERMANN</b>				Ers f.: EV112-01 vom 08.08.95
				Ers d.:



Degree of protection:  
IP 68 - 5 bar - 1h  
according to IEC 529

Nominal Size (according to DIN 13) G	Clamping and sealing range ⊙ D		Hexagon		L		L1	L2	L3	L4	Order no.	
	mm	inch ⊙	SW	E	min	max					light grey RAL 7035	silver-grey RAL 7001
M12x1.5	6.5	.138 - .256	15	16.5	18	23	8	5	12.6	7	2022 338	2022 257
M16x1.5	4 - 8	.157 - .315	19	21	24	27	8	5	15.5	9	2022 346	2022 265

Dimensions in mm.

Pos.	Stück	Benennung	Zeichnung-Nr. / Normteile		Abmessung/Werkstoff/Bemerkung	
CAD		HP ME10	ÄNDERUNGEN NUR MIT CAD		Filename: users/obo13/Kabelverschraubungen/V-TEC/V-TEC-met/ev114-01-nbl	
BLT					Maßstab:	Gewicht:
OS					Werkstoff: Polyamid 6	Stand vom: 09.08.96
AFE					Benennung: Cable Gland Type V-TEC M	
			Bearb.	08.08.95	with Iso metric screw thread according to DIN 13/IEC 423 (Main dimensions)	
			Gepr.		Zeichn.-Nr. EV114-01	
			Norm		Blatt:	
b	D-Haße geändert	09.08.96	Melas		RETTERMANN	
a	Korrektur	07.11.95	Melas			

TEST RECORD NO. 1

SAMPLES:

Samples of Liquid-tight fittings for cord, Cat. Nos. V-TEC, V-TEC M, V-TEC L, V-TEC K; were submitted by the manufacturer.

The following tests were performed.

Sequence A:

Assembly  
Oven Conditioning  
Oil Spray  
Flexing  
Pull

Sequence C:

Assembly  
Flexing  
Pull  
Oil Spray

ASSEMBLY TEST:

METHOD

Samples were assembled to 18 in lengths of Listed flexible cord, having the smallest and largest overall diameter specified by the manufacturer. The samples were assembled according to the manufacturer's installation instructions.

RESULTS

The fittings were assembled without damage to the fittings or cord and comply with the current requirements.

## OVEN CONDITIONING TEST:

## METHOD

Samples were placed in air-circulating oven at  $70 \pm 1^\circ\text{C}$  for a period of 168 h.

## RESULTS

There was no warping, charring or blistering of samples.

## OIL SPRAY TEST:

## METHOD

The sample cord and fittings were assembled in the intended manner to a wet location enclosure and mounted in a fixed position so that the axis of the entire assembly was at an angle of 45 degrees from the vertical with the cord end up. A stationary nozzle with a 3/8 in dia opening was located 10 in above the surface of the cord and directed so as to spray oil vertically downward to strike the cord approx. 1 in from the mouth of the fitting measured along the axis of the assembly. A mixture of 10 parts kerosene to 1 part straight mineral oil was sprayed through the nozzle at rate of not less than 2 gallons per min for a period of 30 min.

## RESULTS

No oil entered the assemblies.

## FLEXING TEST:

## METHOD

Samples were mounted vertically in a fixed position (oil or water conditioned samples were wiped dry) and a reference mark was made on the cord jacket to indicate displacement of the jacket from the fitting. Starting from the vertical position, the cord was flexed through a 90 degree angle having a radius of 5 in for cord 3/4 in in dia or less, and 10 in for the cord more than 3/4 in dia. The cord was then flexed through 180 degree angle in the opposite direction and then back to the vertical position. This operation was continued for 500 c.

## RESULTS

After the sample had been subjected to 500 c of flexing, there was no cord displacement of more than 1/8 in, loosening of the cord or loss of integrity of components such that they are no longer capable of performing their intended function.

## PULL TEST:

## METHOD

Samples were mounted in a fixed position and a reference mark was made on the cord jacket to indicate displacement of the jacket from the fitting. A load, as shown below, was applied to the end of the cord so that the load was applied to both the jacket and the conductors in a direction along the axis of the fitting. The load was applied gradually and maintained for 1 min. After removal of the load, the cord was allowed to recover from 1 min before the displacement was measured.

<u>Cat. No.</u>	<u>Cord Dia, mm (in)</u>	<u>Pull Force, N (lb)</u>
V-TEC PG7	6.5 (0.260)	155.7 (35)
V-TEC PG9	8.0 (0.315)	49.8 (11.2)
V-TEC PG11	5.0 (0.197)	60.0 (13.5)
V-TEC PG11	10.0 (0.394)	60.0 (13.5)

## RESULTS

The cord was not displaced more than 1/8 in from its original position, as measured from the plane of the test enclosure to which the fitting was secured.

## CONCLUSION

Samples of the product covered by this Report have been found to comply with the requirements covering the class and the product are judged to be eligible for Component Recognition and Follow-Up Service. Under the Service the manufacturer is authorized to use the Recognized Marking described in the Follow-Up Service Procedure on such products which comply with said Procedure and any other applicable requirements of Underwriters Laboratories Inc. Only those products which properly bear the Recognized Marking are considered as Recognized Components by Underwriters Laboratories Inc.

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