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European Technical Assessment

ETA-09/0248
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(original version in French)

GENERAL

Technical Assessment Body issuing the European Technical Assessment:	Centre Scientifique et Technique du Bâtiment (CSTB)
Trade name of the construction product:	**- FLEX-SEAL Plus (NORHAM)** **- CANADA Plus (MÜCHER DICHTUNGEN GMBH & CO KG)**
Family of products to which the construction product belongs:	Flexible elastomer couplings, potentially equipped with stainless-steel reinforcement bands, intended for assembling sanitation pipes with or without pressure
Manufacturer:	**NORHAM** **ZA Les Druisieux** **F-26260 Saint-Donat-sur-l'Herbasse** www.norham.fr
Manufacturing plant(s):	**- NORHAM, ZA Les Druisieux, F-26260 Saint-Donat-sur-l'Herbasse, France** **- MÜCHER DICHTUNGEN GmbH & Co. KG • Europaallee 43 • D-50226 Frechen**
This European Technical Assessment contains:	9 pages, including 5 appendices that are integral parts of the document.
This European Technical Assessment has been issued in accordance with Regulation (EU) No. 305/2011, based on:	European Assessment Document EAD 17-18-0018-07.04
This version replaces:	ETA 09/0248-2013-01-15

SPECIFIC PART

1. Technical description of the product

FLEX-SEAL Plus or CANADA Plus flexible couplings for sanitation pipes are elastomer (EPDM or nitrile) couplings that may or may not be equipped with a metal (stainless steel) reinforcement band. Their purpose is to connect different types of pipes, which may be made from different materials.

The elastomer components adhere to standard EN 681-1 and the stainless-steel grades are 1.4307, 1.4301, 1.4303, 1.4404, 1.4401, or 1.4571 according to standard EN 10088-2. The elastomer seal is compressed on the piping using a stainless-steel band clamp, with the recommended tightening torque written on the coupling. The different components of the band clamps are made from steel with the same specifications and with a minimum hardness corresponding to class +C850, according to standard EN 10088-2.

The constituent materials of the pipes to be connected and their diameters may differ.

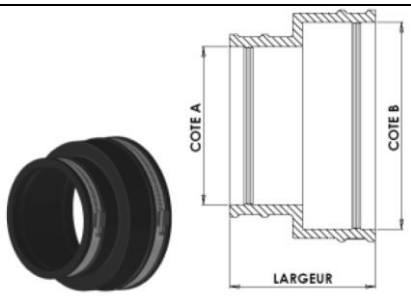
The FLEX-SEAL Plus or CANADA Plus product lines of couplings are the following:

- SC (FLEX-SEAL Plus) or MSC (CANADA Plus) couplings: with a metal reinforcement band, for small differences in outside diameter between the pipes to be connected,
- AC (FLEX-SEAL Plus) or MAC (CANADA Plus) couplings: without a metal reinforcement band, for significant differences in outside diameter between the pipes to be connected,
- DC (FLEX-SEAL Plus) or MDC (CANADA Plus) couplings: without a metal reinforcement band, for small differences in outside diameter between the pipes to be connected.

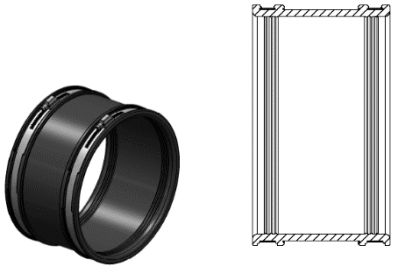
For SC or MSC couplings, when the difference between the outside diameters of the pipes to be connected is too significant (see table below), the connection can be made by combining the appropriate compensation ring with the coupling.

Outside diameters	Difference between outside diameters
OD ≤ 120 mm	10 mm
300 ≥ OD > 120 mm	12 mm
600 > OD ≥ 300 mm	15 mm

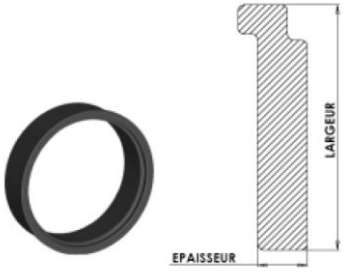
SC (or MSC) flexible coupling



AC (or MAC) flexible coupling



DC (or MDC) flexible coupling



BC compensation ring

2. Specifications for the intended use according to the applicable European Assessment Document (hereinafter referred to as EAD)

The FLEX-SEAL Plus or CANADA Plus flexible couplings make it possible to connect different types of sanitation pipes that use gravity or low pressure, either buried or not, intended for the transport of waste water or rain water, inside or outside of buildings.

The following limiting conditions for usage apply:

Coupling type	Maximum pressure in the pipe (bar)	Outside diameters and materials of pipes connected	Shear strength R (N)*
SC (or MSC)	1.0	Different	R (N) > 25xDN (mm)
AC (or MAC)	0.6	Different	Weak
DC (or MDC)	0.6	Identical	Weak
* According to standard EN 476. The DN value to be taken into account is the maximum outside diameter that can be connected with the flexible coupling, in mm.			

The provisions of this ETA are based on an assumed life span of at least 50 years, provided that the conditions for implementation set forth in Appendix 5 are adhered to. Indications related to life span shall not be interpreted as a guarantee provided by the Manufacturer. They are only to be considered as a means for choosing the appropriate products for the economically feasible life span expected from work performed.

3. Product performance and references to the methods used for the assessment of their performance

In the table below, “BRCW” means “Basic Requirement for Construction Work”.

Essential characteristic	Performance
BRCW 1: Mechanical resistance and stability	
Dimensions according to EAD 17-18-0018-07.04 §2.2.1.1 - Sleeves - Reinforcements and band clamps	See Appendices 1, 2, and 3 The dimensional tolerances of cast components meet class M3 requirements under the ISO 3302-1 standard. The dimensional tolerances of extruded and vulcanised components meet class E3 requirements under ISO 3302-1.
Strength of band clamps according to EAD 17-18-0018-07.04 §2.2.1.2	The band clamp stands up to a tightening torque of: ≥ 10 N.m when a screwdriver is recommended ≥ 17 N.m when a lever tool is recommended
Tensile strength of welded or clinched assembled parts according to EAD 17-18-0018-07.04 §2.2.1.3	The assembled parts stand up to a tensile force of 6000 N
Heat resistance (for usage inside of a building) according to EAD 17-18-0018-07.04 §2.2.1.4	No leakage

Essential characteristic	Performance
Watertightness at the recommended tightening torque according to EAD 17-18-0018-07.04 §2.2.1.5	No leakage
BRCW 2: Safety in case of fire	
Reaction to fire (for usage inside of a building) according to EAD 17-18-0018-07.04 §2.2.2	Class E
BRCW 4: Safety and accessibility in use	
Watertightness according to EAD 17-18-0018-07.04 §2.2.3: - Shear force and negative pressure - Negative pressure and angular deviation - Positive pressure and shear force - Positive pressure and angular deviation - Negative pressure and diametric deformation - Positive pressure and diametric deformation	No leakage
Long-term shear strength according to EAD 17-18-0018-07.04 §2.2.3.2	No leakage at the recommended tightening torque

4. System for assessment and verification of the constancy of performance (hereinafter referred to as AVCP) applied, with references to its legal basis

In accordance with European Commission Delegated Decision (EU) 2015/1959 of 1 July 2015, the AVCP systems (see Appendix V of the Regulation (EU) No. 305/2011) given in the following table apply:

Product	**Intended usage**	**System**
Flexible coupling	For usage outside of a building (BRCW 1 & 4)	4
	For usage subject to fire-related regulations (BRCW 2)	3

5. Technical details required for implementation of the AVCP system, as set forth by the applicable EAD

The technical details required for implementation of the AVCP system are specified in the inspection plan submitted to the CSTB.

Prepared in Champs-sur-Marne, France, on:

by:

Appendices

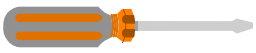
Appendix 1: “AC” or “MAC” flexible couplings (type 1)

Outside diameter (mm)	Thickness under the band clamp (mm)	Width of the band clamp (mm)	Thickness of the band clamp (mm)
< 200	4.5	12	0.6
201 - 375	5.5		

Minimum dimensions of the “AC” or “MAC” flexible couplings (Side A = side with smaller diameter; Side B = side with larger diameter)

AC (or MAC) References	Side A usage range (mm)	Side B usage range (mm)	Width (mm)	Tightening torque (N.m)
1221	80-95	110-125	120	
1361	80-95	121-136	120	
5144	100-115	110-125	120	
1362	100-115	121-136	120	
5654	100-115	130-145	102	
5664	100-115	155-170	150	
5164	100-115	165-182	153	
0264	100-115	180-200	150	
4000	110-125	121-136	120	
1452	110-125	130-145	120	
1602	110-125	144-160	120	
1702	110-125	155-170	120	
1922	110-125	170-193	120	
2102	110-125	185-210	150	
2352	110-125	210-235	150	
1603	121-136	144-160	120	
1923	121-136	170-193	120	
2353	121-136	210-235	150	
1703	130-145	155-170	120	
2000	130-145	180-200	150	
2104	130-145	185-210	150	
5685	130-145	210-235	166	
1924	144-160	170-193	120	
2105	144-160	185-210	152	
2354	144-160	210-235	150	
2654	144-160	240-265	150	
5686	150-170	197-222	150	
0286	153-168	232-257	153	
2001	155-170	180-200	150	
56106	155-175	255-280	165	
6000	160-180	180-200	150	
2355	170-193	210-235	150	
2655	170-193	240-265	150	
0698	180-200	275-300	152	
2356	190-215	210-235	150	
2656	190-215	240-265	150	
56108	197-222	250-275	165	
2657	210-235	240-265	150	
5612	250-275	300-325	165	
0212	300-325	350-375	153	

6 N.m
Tool: screwdriver

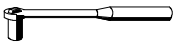


Range of “AC” or “MAC” flexible couplings (note: NBR couplings are marked with an N in the reference)

Appendix 2: “SC” or “MSC” flexible couplings (type 2B)

Outside diameter (mm)	Sleeve width (mm)	Thickness under the band clamp (mm)	Width of the shear band (mm)	Thickness of reinforcement against shearing (mm)	Width of the band clamp (mm)	Thickness of the band clamp (mm)
< 200	120	7.0	54	0.35	12	0.6
201 – 300	150	7.5	78	0.35	12	0.6
301 – 600	185	9.0	97	0.75	12	0.6

Minimum dimensions of “SC” or “MSC” flexible couplings

Reference (SC or MSC)	Min. diameter (mm)	Max. diameter (mm)	Width (mm)	Tightening torque
115	100	115	120	6 N.m Tool: screwdriver 
120	110	121	120	
137	120	137	120	
150	130	150	120	
162	137	162	120	
175	150	175	120	
180	165	180	150	
190	165	190	150	
200	175	200	150	10 N.m Tool: lever tool 
212	187	212	150	
225	200	225	150	
250	225	250	150	
275	250	275	150	
290	265	290	150	
310	285	310	190	
320	290	320	190	
335	310	335	190	
350	325	350	190	
360	335	360	190	
365	340	365	190	
385	355	385	190	
410	385	410	190	13 N.m Tool: lever tool 
430	400	430	190	
445	415	445	190	
465	435	465	190	
490	460	490	190	
510	480	510	190	
525	495	525	190	
545	515	545	190	
550	525	550	190	
560	530	560	190	
570	545	570	190	
585	550	585	190	
600	570	600	190	

Range of “SC” or “MSC” flexible couplings (note: NBR couplings are marked with an N in the reference)

Appendix 3: “DC” or “MDC” flexible couplings (type 1)

Outside diameter (mm)	Sleeve width (mm)	Thickness under the band clamp (mm)	Width of the band clamp (mm)	Thickness of the band clamp (mm)
< 200	120	7.0	12	0.6
201 – 275	150	7.5	12	0.6

Minimum values for dimensions of “DC” or “MDC” flexible couplings

Reference (DC or MDC)	Min. diameter (mm)	Max. diameter (mm)	Width (mm)	Tightening torque
115	100	115	102	6 N.m Tool: screwdriver 
120	110	120	120	
137	120	137	120	
150	125	150	120	
162	137	162	120	
175	150	175	120	
180	160	180	150	
190	165	190	150	
200	175	200	150	
212	187	212	150	
225	200	225	150	
250	225	250	150	
275	250	275	150	

Range of “DC” or “MDC” flexible couplings (note: NBR couplings are marked with an N in the reference)

Appendix 4: dimensions of "BC" elastomer rings

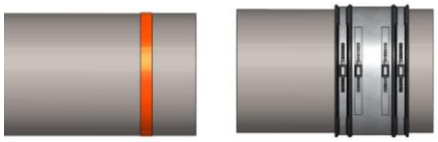
BC reference	08-80	16-80	08-100	16-100	24-100	32-100	40-100	48-100
Thickness (mm)	8	16	8	16	24	32	40	48
Width (mm)	80	80	100	100	100	100	100	100
Intended usage	AC & SC or MAC & MSC width < 190 mm		SC or MSC width ≥ 190 mm					

Note: NBR rings are marked with an N in the reference

Appendix 5: Implementation

1. “SC”-“DC” or “MSC”-“MDC” flexible couplings

In all cases, the coupling must cover 4 cm of the pipe on each side. If there is risk of shearing, the distance between the two pipes must not exceed 2 cm.



① On the pipe with the larger outside diameter, make a mark corresponding to half of the width of the coupling
② Loosen the fasteners and slide the coupling onto the pipe with the larger outside diameter

③ Align the two pipes and bring their ends as close together as possible

④ Slide the coupling up to the mark drawn on the pipe and tighten all of the fasteners as much as possible (the recommended tightening torque is indicated on the label of the coupling)

2. “SC” or “MSC” flexible couplings with “BC”

In all cases, the coupling must cover 4 cm of the pipe on each side. If there is risk of shearing, the distance between the two pipes must not exceed 2 cm.

① Loosen the fasteners and slide the coupling onto the pipe with the larger outside diameter
② Slide the ring onto the pipe with the smaller outside diameter. The ring is level with the edge of the pipe

③ Align the two pipes and bring their ends as close together as possible

④ Slide the coupling onto the ring until the coupling is flush with the flange of the ring. Tighten all of the fasteners as much as possible (the recommended tightening torque is indicated on the label of the coupling)

3. “AC” or “MAC” flexible couplings

In all cases, the coupling must cover 4 cm of the pipe on each side.

① Loosen the fasteners
② Slide the coupling onto the pipe with the smaller outside diameter

③ Bring the pipe with the smaller outside diameter towards the pipe with the larger outside diameter, bringing the latter as close as possible to the inside flange of the coupling.
④ Tighten all of the fasteners as much as possible (the recommended tightening torque is indicated on the label of the coupling)

Additional comments on assembly:

-1: In the case of a “coupling + ring” assembly, depending on the direction of flow, it may be useful to seal the compensation ring to limit the risk of dislocation.
-2: For any connection on a concrete pipe, first check the state of the surface of the pipe. If necessary, make the surface smooth and clean.
-3: For any connection to products made of an annulated thermoplastic material, place the sleeve clamp against a convex point of the annulated surface.