



E. Hawle Armaturenwerke GmbH

PRODUCT APPRAISAL REPORT 1208 Issue 5

Synoflex Restrained Joint Couplings, Flanged Adapters and End Caps

EN 14525:2005 Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, Grey iron, Steel, PVC-U, PE, Fibre- cement

Issue 1 Published: 23 February 2016

Issue 2 Published: 24 March 2017

Issue 3 Published: 4 June 2019

Issue 4 Published: 30 October 2020

Issue 5 Published: 28 January 2021

Document History

The following information indicates the changes made to this document.

Date	Version
22 December 2015	Peer Review
23 February 2016	Publication
24 March 2017	Issue 2 Publication
4 June 2019	Issue 3 Publication
30 October 2020	Client Review
30 October 2020	Issue 4 Publication
28 January 2021	Issue 5 Publication

Peer Reviewers

Name/Title	Organisation	Date
Product Appraisal Technical Advisory Group	WSAA	15 January 2016
WSAA Expert Panel	WSAA	15 January 2016
Peter Pittard, WSAA Consultant	WSAA	23 December 2015
Carl Radford, Product Appraisal Manager	WSAA	23 February 2016
Carl Radford, Product Appraisal Manager	WSAA	24 March 2017
Peter Pittard, WSAA Consultant	WSAA	3 June 2019
Carl Radford, Product Appraisal Manager	WSAA	4 June 2019
Peter Pittard, WSAA Consultant	WSAA	15 June 2020
Carl Radford, Product Appraisal Manager	WSAA	30 October 2020
Peter Pittard, WSAA Consultant	WSAA	27 January 2021
Carl Radford, Product Appraisal Manager	WSAA	28 January 2021

Overview of WSAA

The Water Services Association of Australia (WSAA) is the peak industry body representing the urban water industry. Our members provide water and sewerage services to over 20 million customers in Australia and New Zealand and many of Australia's largest industrial and commercial enterprises.

Based around our vision of 'customer driven, enriching life', WSAA facilitates collaboration, knowledge sharing, networking and cooperation within the urban water industry. We are proud of the collegiate attitude of our members which has led to industry-wide approaches to national water issues.

WSAA can demonstrate success in the standardisation of industry performance monitoring and benchmarking, as well as many research outcomes of national significance. The WSAA Executive retains strong links with policy makers and legislative bodies and their influencers, to monitor emerging issues of importance to the urban water industry.

WSAA was formed in 1995 as a non-profit organisation to foster the exchange of information between industry, government and the community, and to promote sustainable water resource management.

The urban water industry is committed to anchoring its services to customers' values, and to enrich communities where water services have broad economic, environmental and social values. In line with this our main activities focus on four areas:

1. influencing national and state policies on the provision of urban water services and sustainable water resource management
2. promoting debate on environmentally sustainable development and management of water resources and the community health requirements of public water supplies
3. improving industry performance and establishing benchmarks and industry leading practices for water service processes; and
4. fostering the exchange of information on education, training, research, water and wastewater management and treatment and other matters of common interest.

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1 EXECUTIVE SUMMARY

E. Hawle Armaturenwerke GmbH is a family owned company based in Vöcklabruck, Austria and established in 1948. Hawle is a leading manufacturer of valves and pipeline fittings for the water and gas industries, with plants and subsidiary operations throughout Europe.

The Synoflex fittings submitted for Appraisal are polymeric coated ductile iron restrained joint couplings and end caps manufactured to EN 14525:2005 *Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, grey iron, steel, PVC-U, PE, Fibre- cement*.

This Issue 5 is a replacement for the previous version of the appraisal which had reached its 5-year expiry date.

This Appraisal is for a range of PN16 wide tolerance restrained joint couplings and flanged adapters in sizes DN 50 to DN 300 and end caps in sizes DN 80 to DN 100. See Section 4 for details.

The patented Hawle Synoflex socket is a restrained joint intended for coupling various pipe materials including DI, AC, CI, PE, PVC¹ and steel with a wide range of outside diameters. The design of the socket consists of an elastomeric seal with an engineering thermoplastic, polyoxymethylene (POM) ring, incorporating Grade 316 locking segments. Sealing is accomplished by tightening a number of Grade 316 stainless steel fasteners to engage the ductile iron locking ring onto the socket.

Flanges incorporated on the fittings are compatible with AS4087 Fig B5 (PN16) or AS 2129 Table D dimensions. See Section 6.2.7 for further details.

When using the fittings on PE pipes of \geq SDR 17 pipe, (PN10 or less) Hawle advise that a stainless-steel stiffener must be inserted into the end of the pipe prior to installation of the fitting.

E Hawle Armaturenwerke GmbH holds an ISO 9001:2015 Quality Management System licence.

The Hawle Synoflex couplings have ISO Type 5 StandardsMark product certification to EN 14525:2005 *Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, grey iron, steel, PVC-U, PE, Fibre- cement*.

The Hawle Synoflex couplings, flanged adapters and end caps described within this appraisal meet the requirements of WSA PS 271 *Ductile iron wide tolerance mechanical couplings and flanged adapters, end thrust restraint for pressure applications – Drinking water, non-drinking water supply and sewerage* and are therefore deemed as 'fit for purpose'.

1.1 Recommendations

It is recommended that WSAA members subject to any specific requirements of the member, accept or authorise Hawle Synoflex fittings, as listed in this report, for use in water supply and sewerage pressure pipelines, provided they are installed in accordance with any relevant conditions relating to the design, installation, and acceptance testing provided in relevant standards, WSAA Codes and the manufacturer's requirements.

¹ WSAA does not recommend the use of gripping mechanisms on PVC or GRP pipes, due to the known propensity of failure at points of induced scratches or scores in the pipe wall. Accordingly, the use of Synoflex products on PVC or GRP pipes is not endorsed in this Appraisal.

2 THE APPLICANT

The Applicant is E. Hawle Armaturenwerke GmbH.

2.1 The Manufacturer

Hawle is a family owned company based in Vöcklabruck, Austria. The Hawle Company (pronounced 'Havela') was founded by Engelbert Hawle in Vöcklabruck, Austria, in 1948. Hawle has a history of innovation and was the manufacturer of the first resilient seated gate valve in the world. Today Hawle is a leading manufacturer of valves and pipeline fittings for the water and gas industries with plants and subsidiary operations throughout Europe. Hawle products from Austria are exported to more than 60 countries world-wide. In addition, nine licensees currently manufacture Hawle products on all continents. More information is available about Hawle on their web site at <http://www.hawle.at>

3 THE PRODUCT

This appraisal applies to the range of DI Synoflex wide tolerance restrained joint couplings, flanged adapters and end caps as listed in Section 4.

The Hawle product range of polymeric coated Synoflex fittings are manufactured to comply with EN14525 *Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, Grey iron, Steel, PVC-U, PE, Fibre-cement.*

The PN16 range includes couplings and flanged adapters in sizes from DN 50 to DN 300 and end caps in sizes DN 80 to DN 150. Flanges incorporated on the fittings are compatible with AS4087 Fig B5 (PN16) or AS 2129 Table D dimensions. See Section 6.2.7 for further details.

The patented Hawle Synoflex socket is a restrained joint intended for coupling various pipe materials including DI, AC, CI, PE, PVC¹ and steel with a wide range of outside diameters. The design of the socket consists of an elastomeric seal with an engineering thermoplastic, polyoxymethylene (POM), ring, incorporating Grade 316 locking segments. Sealing is accomplished by tightening a number of Grade 316 stainless steel fasteners to engage the ductile iron locking ring onto the socket.

When using the fittings on PE pipes of \geq SDR 17 (PN10 or less for PE100 pipe) Hawle advise that a stainless-steel stiffener must be inserted into the end of the pipe prior to installation of the fitting.

Hawle applies polymeric coating in accordance with AS/NZS4158 at their Austrian manufacturing facility using Akzo Nobel Resicoat R4.

EPDM elastomeric seals comply with EN 681.1.

4 SCOPE OF THE APPRAISAL

The scope of this appraisal includes a range of Synoflex fittings summarised below in Tables 1 to 4 and included in the StandardsMark product schedule shown in Appendix B.

¹ WSAA does not recommend the use of gripping mechanisms on PVC or GRP pipes, due to the known propensity of failure at points of induced scratches or scores in the pipe wall. Accordingly, the use of Synoflex products on PVC or GRP pipes is not endorsed in this Appraisal.



FIGURE 1 SYNOFLEX COUPLING (MODEL 7974)

**TABLE 1
SYNOFLEX COUPLINGS (MODEL 7974)**

DN	Reach
50	56-71
65	71-88
80	85-105
100	104-132
125	131-160
150	155-192
200	198-230
225	230-260
250	265-310
300	313-356



FIGURE 2 SYNOFLEX FLANGED ADAPTERS (MODEL 7994).

TABLE 2
SYNOFLEX FLANGED ADAPTERS (MODEL 7994)

Flange DN	Socket DN	Reach
50	50	56-71
80	80	85-105
80	65	71-88
80	100	104-132
100	100	104-132
100	80	85-105
100	125	131-160
150	125	131-160
150	150	155-192
200	200	198-230
250	250	265-310
300	300	313-356



FIGURE 3 SYNOFLEX STEPPED COUPLING (MODEL 7974)

TABLE 3
SYNOFLEX STEPPED COUPLINGS (MODEL 7974)

DN	Reach 1	Reach 2
80-65	85-105	71-88
100-80	104-132	85-105
150-100	155-192	104-132



FIGURE 4 SYNOFLEX END CAPS WITH BSP OUTLET (MODEL 7980)

**TABLE 4
SYNOFLEX END CAPS WITH BSP OUTLET (MODEL 7980)**

Socket DN	Reach	BSP Tapping	
80	85-105	2"	Radial
100	104-132	2"	Radial
150	155-192	2"	Radial
80	85-105	2"	Axial
100	104-132	2"	Axial
150	155-192	2"	Axial

5 APPRAISAL CRITERIA

5.1 Quality Assurance Requirements

The WSAA Product Appraisal Technical Advisory Group accepts ductile iron thrust restraint mechanical couplings and flanged adapters manufactured in compliance with EN14525 *Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, Grey iron, Steel, PVC-U, PE, Fibre-cement* and duly certified by means of an ISO Type 5 product certification scheme undertaken by a JAS-ANZ accredited Certification Assessment Body (CAB) or by a CAB accredited by an international accreditation system recognised by JAS-ANZ.

The manufacturer is generally expected to have a production management and control system that has been duly accredited in accordance with AS/NZS ISO 9001 as a prerequisite to undergoing a product certification audit.

The ISO Type 5 Product Certification Scheme shall meet the criteria described in WSA TN-08.

5.2 Performance Requirements

The Hawle range of Synoflex wide tolerance couplings, flanged adapters and end caps has been appraised for compliance to EN14525 *Ductile iron wide tolerance couplings and flange adaptors for use with pipes of different materials: ductile iron, Grey iron, Steel, PVC-U, PE, Fibre-cement*

Appraisal criteria are also determined by the WSAA Product Appraisal Technical Advisory Group and regularly reviewed to ensure that the criteria reflect the requirements of WSAA members.

The following Product Specification is relevant to this application:

WSA PS 271 *Ductile iron wide tolerance mechanical couplings and flanged adapters, end thrust restraint for pressure applications – Drinking water, non-drinking water supply and sewerage.*

A copy of the Product Specification is available at the following link:

<https://www.wsaa.asn.au/shop/product/35716>

6 COMPLIANCE WITH APPRAISAL CRITERIA

6.1 Compliance with Quality Assurance Requirements

Hawle has submitted the following quality certificates:

- ISO 9001:2015 Certificate of Registration No. AT-00545/0 issued to E Hawle Armaturenwerke GmbH by Quality Austria.
- EN 14525:2004 ISO Type 5 StandardsMark product certification licence No SMK40252 to E Hawle Armaturenwerke GmbH by SAI-Global.

Copies of the Quality Assurance and Product Certification licences have been included in Appendix B and are also available for downloading from the WSAA members website.

6.2 Compliance with Performance Requirements

6.2.1 Ductile Iron

EN14525 Clause 4.3.1 specifies that DI shall have a minimum tensile strength of 420 MPa and a minimum elongation of 5%.

Hawle has submitted a typical material test certificate to demonstrate compliance with this requirement.

6.2.2 Wall thickness

The minimum wall thicknesses are specified in EN 14525 as 4mm for fittings less than or equal to DN 200 and 5mm for fittings greater than DN 200 and less than or equal to DN 300. Hawle has confirmed that the fittings exceed these minimum requirements.

6.2.3 Socket joint

The Hawle Synoflex socket is a patented restrained joint intended for coupling various pipe materials with a wide range of outside diameters. The design of the socket consists of an elastomeric seal with an engineering thermoplastic, polyoxymethylene (POM), ring, incorporating Grade 316 locking segments. Sealing is accomplished by tightening a number of Grade 316 stainless steel fasteners to engage the ductile iron locking ring onto the socket.

EN 14525 nominates that Type Testing carried out on at least one joint in the range from DN 32 to DN 125 will qualify all sizes in that range where the design is based on the same design parameters. Similarly, a Type Test on one joint in the range DN 150 to DN 300 will qualify all sizes in that range.

Hawle has submitted copies of Type Test reports for DN 80 and DN 200 couplings conducted by the Federal Institute of Technology in Austria to demonstrate compliance to the requirements of EN14525.

The tests nominate positive pressure tests, negative pressure tests and dynamic pressure tests with 24,000 cycles. The test parameters include testing without external restraint at maximum annulus and are conducted with and without joint deflection. A shear load is applied to the tests undertaken on rigid pipes.

6.2.4 Elastomeric seals

The elastomeric seals are EPDM conforming to EN681.1 and has been certified accordingly by DVGW.

6.2.5 Joint gap, depth of engagement and angular deflection

Hawle has advised that the allowable joint deflection is 4° degrees per joint, which exceeds the minimum joint deflection requirements of 3° in EN 14525.

The maximum allowable joint gap and minimum depth of engagement is nominated in Table 3.

TABLE 3
SYNOFLEX MAXIMUM JOINT GAP AND MINIMUM DEPTH OF ENGAGEMENT

DN	Maximum Joint Gap	Minimum Depth of Engagement
50	27	84
65	32	85
80	38	86
100	41	119
125	51	119
150	49	126
200	57	143
225	52	149
250	52	155
300	57	161

6.2.6 Polymeric coatings.

Hawle Synoflex fittings are coated with Akzo Nobel, Resicoat R4 FBE powder coating, applied by the fluidised bed process in accordance with AS/NZS 4158:2003. The Resicoat R4 powder has a product certification StandardsMark licence issued by SAI Global. SAI Global also undertakes audits of the coating application system in accordance with the terms of the various StandardsMark licences held by Hawle.

An Akzo Nobel in house type test report (No.528), demonstrating compliance with the requirements of AS/NZS 4158:2003, has also been submitted.

Hawle has provided MDS information relating to the epoxy repair compound Resicoat® RS 2K Component A, blue epoxy resin 506523 and Component B, transparent Hardener 506020,

6.2.7 Flanges

The DN 50 to DN 200 flanges incorporated on the Synoflex fittings comply with the physical dimensions of EN 1092-2 (PN16) and are drilled to match AS/NZS 4087 Fig B5 (PN16) or AS 2129 Table D configurations.

EN 1092-2 flanges have minor differences in outside diameter and raised face diameter compared to the AS/NZS flanges, however these differences do not prevent compatibility.

EN 1092-2 flanges generally incorporate additional or/and larger bolts than AS/NZS bolting configurations, which facilitates slightly thinner flanges for some sizes. The effect on the pressure rating of the thinner flanges cannot be quantified from a desktop analysis.

EN flanges drilled to AS/NZS configurations are known to have been commonly supplied within Australia for many years in sizes up to DN 200 without any adverse reports. It is also known that the thicknesses of AS/NZS 4087 Fig B5 flanges were originally determined on the basis of a PN20 rating and are therefore oversized.

The DN 250 and DN 300 flanges are supplied to AS/NZS 4087 dimensions.

A comparison of flange thicknesses is provided in Table 4.

TABLE 4 FLANGE THICKNESSES

DN	Hawle Nominal Thickness	EN1092-2 PN16 +4, -3	AS/NZS4087/AS2129 Min
50	18	19	19
80	18	19	19
100	18	19	20
150	18	19	23
200	19	20	23
250	24	22	24
300	30	24.5	30

Measurement of the flange thicknesses indicates compliance with the nominated Hawle nominal thicknesses. The flanges proposed for this appraisal are deemed acceptable.

6.2.8 Contact with drinking water

Hawle has submitted a test report from Eurofins ams (NATA Accreditation No. 15773) for a DN 65 Synoflex flanged adapter dated 8 September 2020 to demonstrate compliance with AS/NZS 4020:2018. A copy of a test report for Akzo Nobel Resicoat R4 FBE coating from NSF International (UKAS Accreditation No 0626) dated 22nd February 2018 to demonstrate compliance with AS/NZS 4020:2005 is also held on file by WSAA.

7 FITTING INSTRUCTIONS, TRAINING AND INSTALLATION

Hawle maintains an extensive library of literature, covering all aspects of the products submitted for this appraisal, including installation instructions. Installation Instructions are included in Appendix A.

The literature can be referenced at www.hygradewater.com.au or www.hawle.at/en/products/water.html

On-site training is also available by arrangement.

8 PRODUCT MARKING

Marking requirements as specified in EN14525 are as follows:

- a) Manufacturer's name or mark
- b) Year of manufacture
- c) "Ductile" or "D.I."
- d) DN
- e) PN
- f) EN14525 and StandardsMark Logo
- g) Range of applicable OD's

In addition, the following information accompanies the product:

- h) Maximum joint gap
- i) Minimum depth of engagement
- j) Maximum allowable angular deflection
- k) Pipe materials compatible
- l) Need for supporting sleeves
- m) Bolt torque
- n) Jointing instructions

Please note that the markings on the fittings will nominate PVC as a compatible pipe material, however WSAA does not recommend the use of mechanical gripper mechanisms on PVC pipes.



FIG 4 MARKING

9 PACKAGING AND TRANSPORTATION

Hawle Synoflex fittings are wrapped separately before being packed into wooden crates for despatch. Cardboard liners separate each layer from each other to prevent damage to coatings during transport.

10 PRODUCT WARRANTY

HAWLE guarantees perfect functionality for a period of ten years of delivery from the works for all original HAWLE fittings marked with the "HAWLE" label. This guarantee applies for all fittings used for their specified purpose in water for human consumption projects in compliance with the Directive 98/83/EC.

Should a fitting lose its functionality during the guarantee period, HAWLE shall at its own choice either repair the fitting or supply a replacement of an equal value. Exceptions to this guarantee are expendable parts and any damage caused by incorrect storage, transport, assembly, failure to follow instructions for use, failure to carry out pressure testing, inadequate service and maintenance, subsequent product manipulation or the use of unsuitable fluids or gases.

This guarantee does not apply in the case of unusual environmental conditions, vibrations or where there are remnant quantities of a medium left or similar external effect, nor in the case of actions carried out by third parties, accidents or other events over which HAWLE has no influence.

Please observe the exceptions and special rules applicable for specific products as given in the catalogue on our homepage www.hawle.at. Any warranty claims derived from the sales contract will not be restricted through this guarantee certificate.

Austrian law applies to this guarantee.

The Hygrade 'Terms and Conditions of Sale' set out the limitation of liability for any defects in material or workmanship provided that the defect can be established by the principal to have existed prior to delivery.

11 WATER AGENCY EXPERIENCE WITH THE PRODUCT OR FIELD-TESTING REPORT

The Hawle Synoflex range of products have a long history of use within Europe and have been used within Australia for at least since 2015 with no known complaints.

12 OUTCOMES OF EXPERT PANEL PRODUCT REVIEW

The following query was raised during the original appraisal:

Question: What engineering criteria is used to determine when a stiffener insert is required and when it is not?

Hawle Answer: Based on the design of the Synoflex POM ring, the constriction on the PE pipe is minimal so that only thin wall PE pipes require a stiffener insert. We have conducted extensive testing on PE pipes to determine that a stiffener insert is only necessary for pipes with a Standard Dimension Ratio greater than or equal to 17. (PN10 or less for PE100 pipe)

WSAA Comment: EN 14525 includes the following clause: Supporting sleeves (inserts) may be necessary depending on pipe material, on pipe wall thickness, on joint design and on local authorities. They shall provide adequate support over the entire compression area of the gasket. The manufacturer shall indicate when supporting sleeves are required.

WSA PS 271 has been amended to include a requirement for the Water Agency to nominate whether stiffener inserts are required.

13 FUTURE WORKS

There are no future work items.

14 DISCLAIMERS

This Product Appraisal Report (Report) is issued by the Water Services Association of Australia Limited on the understanding that:

This Report applies to the product(s) as submitted. Any changes to the product(s) either minor or major shall void this Report.

To maintain the recommendations of this Report any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the Report and appropriate action. Appraisals and their recommendations will be the subject of continuous review dependent upon the satisfactory performance of products.

WSAA reserves the right to undertake random audits of product manufacture and installation. Where products fail to maintain appraised performance requirements the appraisal and its recommendations may be modified and reissued. Appraisal reports will be reviewed and reissued at regular intervals not exceeding five (5) years.

The following information explains a number of very important limits on your ability to rely on the information in this Report. Please read it carefully and take it into account when considering the contents of this Report.

Any enquiries regarding this report should be directed to the Program Manager, Carl Radford, Phone: 03 8605 7601 email carl.radford@wsaa.asn.au.

14.1 Issue of Report

This Report has been published and/or prepared by the Water Services Association of Australia Limited and nominated Project Manager and peer group of technical specialists (the Publishers).

The Report has been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Report (the Recipients).

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Recipients should seek independent evidence of any matter which is material to their decisions in connection with an assessment of the Product and consult their own advisers for any technical information required. Any decision to use the Product should take into account the reliability of that independent evidence obtained by the Recipient regarding the Product.

Recipients should also independently verify and assess the appropriateness of any recommendation in the Report, especially given that any recommendation will not take into account a Recipient's particular needs or circumstances.

WSAA has not evaluated the extent of the product liability and professional indemnity insurance that the provider of the product maintains. Recipients should ensure that they evaluate the allocation of liability for product defects and any professional advice obtained in relation to the product or its specification including the requirements for product liability and professional indemnity insurance.

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14.4 No Warranty

The Publisher(s) do[es] not, in any way, warrant that steps have been taken to verify or audit the accuracy or completeness of the information in this Report, or the accuracy, completeness or reasonableness of any recommendation in this Report.

APPENDIX A – PRODUCT LITERATURE



Synoflex Couplers

Fully restrained, this is a multifit pipe coupling and flange adapter system suited to most pipe materials.



TECHNICAL GUIDE: **APF2.3**

Applications

Pump stations

Treatment plants

Pipelines

Pipe repairs

Product Attributes

Fits most common pipe materials

Restraint coupler

Wide fitting range

Reversible bolts

4 degrees of alignment each end

Approvals/Standards

Kiwa BRL-K 775/03

EN 14525

Flanges to AS4087 B5

RAL

Quality

ISO 9001 Quality Management

An easy to install quality range of restraint couplings from Hawle. High tolerance range to accept most pipe materials with separate torque zones, reversible stainless steel captive fasteners and full end restraint.



FIG. 1

Product Attributes

- Can connect all common types of pipe
- Restraint coupler
- Wide fitting range
- Reversible bolts
- 4 degrees of alignment each end
- 10 year Hawle warrantee
- Patented restraint system
- Liner not required for SDR 11 - SDR 17 (and thicker) pipes under pressure

APP2.3 HAWLE SYNOFLEX COUPLERS AND FLANGE ADAPTORS | PIPE & PIPE FITTINGS | PG 2



FIG. 2 Synoflex connector



FIG. 3 Synoflex flange adaptor



Synoflex flange adaptor

Socket / Flange adaptor for all common types of pipe (DCI, PE, PVC, steel)

Features

- Flanges according to AS4087 Figure B5 or AS 2129 Table D PN16 rated
- Body and lock ring of ductile iron EN 681-1 epoxy powder coated
- Flexible elastomer gasket to EN681-1 (suitable for potable water)
- Flexible Synoflex ring of POM
- Tension locks of 316 stainless steel
Each support element holds a tension lock element
- Bolts and nuts of 316 stainless steel, coated against seizing
- Bolt head locking devices of 316 stainless steel, with protective cap of elastomer
- Reversible bolts
- Spacer bush made of plastic
- Angle compensation max. 4°



FIG. 4

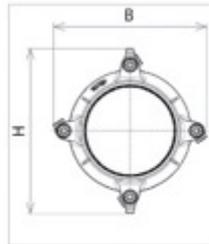


FIG. 5

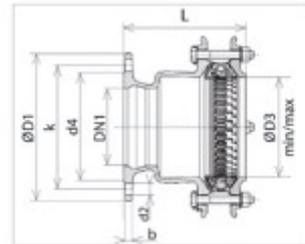


FIG. 6

Synoflex connector

Restrained system for various kinds of pipes (DCI, PE, PVC, steel)

Features

- Body and lock ring of ductile iron EN-GJS-400 epoxy powder coated
- Flexible gasket of elastomer to EN 681-1 suitable for potable water
- Flexible Synoflex ring of POM
- Tension locks of stainless steel. Each support element holds a tension lock element.
- Bolts and nuts of stainless steel, coated against seizing
- Bolt head locking devices of stainless steel A4 with protective cap of elastomer
- Reversible bolts
- Spacer bushes of plastic
- Angle compensation max. 8° (+/- 4° each socket)



FIG. 7

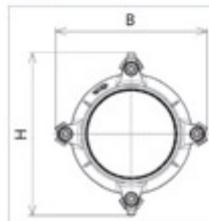


FIG. 8

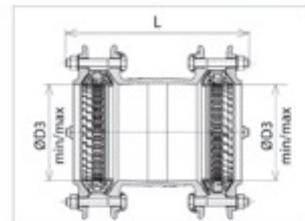


FIG. 9

TABLE 1 Synoflex flange - Socket / Flange adaptor for various kinds of pipes (DCI, PE, PVC, steel)

Flange DNI	Socket DN	PN	Flange			Bolts (Flange)			B	H	Pipe øD3 min / max	L	Bolts	Weight kg	
			øD1	b	k	d4	Qty.	Thread							d2
50	50		165	18	114	98	4	M16	18	141	170	56 – 71	203	3xM12 – 80	5.1
65	65		185	18	127	118	4	M16	18	156	187	71 – 88	203	3xM12 – 80	6.1
80	65		198	18	146	133	4	M16	18	156	187	71 – 88	203	3xM12 – 80	6.3
80	80		198	18	146	133	4	M16	18	171	204	85 – 105	193	3xM12 – 80	6.7
80	100		198	18	146	133	4	M16	18	226	260	104 – 132	263	3xM16 – 100	10.0
100	80		220	18	178	153	4	M16	18	171	204	85 – 105	188	3xM12 – 80	7.3
100	100		220	18	178	153	4	M16	18	226	260	104 – 132	228	3xM16 – 100	10.3
100	125	16	220	18	178	153	4	M16	18	250	290	131 – 160	278	3xM16 – 110	12.5
125	125		250	18	210	183	8	M16	18	250	290	131 – 160	248	3xM16 – 110	12.9
150	125		285	18	235	209	8	M20	18	250	290	131 – 160	245	3xM16 – 110	13.8
150	150		285	18	235	209	8	M16	18	315	350	155 – 192	258	4xM16 – 110	16.5
200	200		340	19	292	264	8	M16	18	326	405	198 – 230	277	6xM16 – 120	25.4
200	225		340	19	292	264	8	M16	18	361	445	230 – 260	322	6xM20 – 130	32.8
250	250		405	24	356	319	8	M20	22	408	499	265 – 310	335	6xM20 – 130	42.7
300	300		455	30	406	367	12	M24	28	510	510	313 – 356	344	8xM20 – 130	59.1
350	350	10	520	20	470	427	16	M24	26	550	550	352 – 396	358	12xM20 – 130	71.0
400	400	10	580	21	521	477	16	M24	26	596	596	398 – 442	373	12xM20 – 130	83.0

TABLE 2 Synoflex connector - Socket / Socket connector for various kinds of pipes (DCI, PE, PVC, steel)

Socket 1 DN	Socket 2 DN	PN	Socket 1				Socket 2				L	Weight kg
			B	H	Pipe øD3 min / max	Bolts	B	H	Pipe øD3 min / max	Bolts		
50	50		141	170	56 – 71	3xM12-80	141	170	56 – 71	3xM12 – 80	253	5.0
65	65		156	187	71 – 88	3xM12-80	156	187	71 – 88	3xM12 – 80	264	5.6
80	65		171	204	85 – 105	3xM12-80	156	187	71 – 88	3xM12 – 80	274	6.2
80	80		171	204	85 – 105	3xM12-80	171	204	85 – 105	3xM12 – 80	270	6.5
100	80		226	260	104 – 132	3xM16-100	171	204	85 – 105	3xM12 – 80	312	9.5
100	100		226	260	104 – 132	3xM16-100	226	260	104 – 132	3xM16 – 100	332	11.7
125	125	16	250	290	131 – 160	3xM16-110	250	290	131 – 160	3xM16 – 110	357	14.5
150	100		315	350	155 – 192	4xM16-110	226	260	104 – 132	3xM16 – 100	361	16.2
150	150		315	350	155 – 192	4xM16-110	315	350	155 – 192	4xM16 – 110	367	18.7
200	200		326	405	198 – 230	6xM16-120	326	405	198 – 230	6xM16 – 120	406	31.1
225	225		361	445	230 – 260	6xM20-130	361	445	230 – 260	6xM20 – 130	429	41.8
250	250		408	499	265 – 310	6xM20-130	408	499	265 – 310	6xM20 – 130	441	51.0
300	300		510	545	313 – 356	8xM20-130	510	545	313 – 356	8xM20 – 130	460	68.0
350	350	10	550	550	352 – 396	12xM20-130	550	550	352 – 396	12xM20 – 130	499	86.0
400	400	10	596	596	398 – 442	12xM20-130	596	596	398 – 442	12xM20 – 130	519	100.0



Scan for more information

Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of Hygrade Water Infrastructure product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hygrade Water Infrastructure unless expressly stated in any sale and purchase agreement entered into between Hygrade Water Infrastructure and the user. **October 2020**

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APPENDIX B - QUALITY CERTIFICATIONS

Copies of the following Quality Certification Certificates are available for downloading from the WSAA members website.

**TABLE B1 E. HAWLE ARMATURENWERKE GMBH
MANAGEMENT SYSTEMS**

A-4840 Vocklabruk Wagrainer Strasse 13	
Quality Systems Standard	ISO 9001:2015
Certification licence no.	AT-00545/0
Certifying agency	Quality Austria
First date of certification	21 August 1995
Current date of certification	10 April 2018
Expiry date of certification	30 March 2021

**TABLE B2 E. HAWLE ARMATURENWERKE GMBH
PRODUCT CERTIFICATION**

A-4840 Vocklabruk Wagrainer Strasse 13	
Product Standard/Spec	EN 14525:2004
Certificate No.	SMK40252
Certifying agency	SAI-Global
First date of certification	11 June 2014
Current date of certification	14 November 2019
Expiry date of certification	10 June 2024



THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

Quality Austria
has issued an IQNet recognized certificate that the organization:

E. Hawle Armaturenwerke GmbH
A-4840 Vöcklabruck, Wagrainstraße 13

incl. site: A-4890 Frankenmarkt, Hawle Straße 1

for the following scope:

Development, production and sales of valves and fittings

EAC: 14; 17.2; 18

has implemented and maintains a

QUALITY MANAGEMENT SYSTEM

which fulfils the requirements of the following standard

ISO 9001:2015

Issued on: 2018-04-10

Validity date: 2021-03-30

Quality Austria certified since: 1995-08-21

This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document

Registration Number: AT-00545/0

Signatures removed for security reasons



Michael Drechsel
President of IQNet

Mag. Friedrich Khuen-Belasi
Authorised Representative
of Quality Austria



IQNet Partners*:

AENOR Spain AFNOR Certification France APCER Portugal CCC Cyprus CISQ Italy
 CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany FCAV Brazil
 FONDONORMA Venezuela ICONTEC Colombia Inspecta Sertifiointi Oy Finland INTECO Costa Rica
 IRAM Argentina JQA Japan KFQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland
 NYCE-SIGE México PCBC Poland Quality Austria Austria RR Russia SII Israel SIQ Slovenia
 SIRIM QAS International Malaysia SQS Switzerland SRAC Romania TEST St Petersburg Russia TSE Turkey YUQS Serbia
 IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc

* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com



STANDARDSMARK LICENCE

SAI Global hereby grants:

E. Hawle Armaturenwerke GmbH

Wagrainer Strabe 13, A-4840 Voecklabruck, Austria

StandardsMark Licence

Manufactured to:

EN 14525:2004 - Ductile Iron Wide Tolerance Couplings And Flange Adaptors For Use With Pipes Of Different Materials: Ductile Iron, Grey Iron, Steel, Pvc-u, Pe, Fibre-cement

"the StandardsMark Licensee" the right to use the STANDARDSMARK as shown below only in respect of the goods described and detailed in the Schedule which are produced by the Licensee or on behalf of the Licensee* and which comply with the appropriate Standard referred to above as from time to time amended. The Licence is granted subject to the rules governing the use of the STANDARDSMARK and the Terms and Conditions for certification and licence. The Licensee covenants to comply with all the Rules and Terms and Conditions.

Licence No: SMK40252

Issued : 15 November 2019

Expires : 10 June 2024

Originally Certified : 11 June 2014

Current Certification : 14 November 2019

Heather Mahon
General Manager Technical Services
SAI Global Assurance



* For details of manufacture, refer to the licensee

The STANDARDSMARK is a registered certification trademark of SAI Global Pty Limited (A.C.N. 050 644 642) and is issued under licence by SAI Global Certification Services Pty Limited (ACN 108 716 669) ("SAI Global") 680 George Street, Sydney NSW 2000, GPO Box 5420 Sydney NSW 2001. This certificate remains the property of SAI Global and must be returned to SAI Global upon its request. Refer to www.saiglobal.com, for the list of product models.



SCHEDULE TO STANDARDSMARK LICENCE

SAI Global hereby grants:

E. Hawle Armaturenwerke GmbH

Wagrainer Strabe 13, A-4840 Voecklabruck, Austria

StandardsMark Licence

Manufactured to:

EN 14525:2004 - Ductile Iron Wide Tolerance Couplings And Flange Adaptors For Use With Pipes Of Different Materials: Ductile Iron, Grey Iron, Steel, Pvc-u, Pe, Fibre-cement

Model identification of the goods on which the STANDARDSMARK may be used:

Model Identification	Model Name	Product Description	Brand Name	Nominal Size (DN)	Nominal Pressure (PN)	Joint Designation	Coating Designation	Date Endorsed
5005285	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	50 (56-71)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005289	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	80 (85-105)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005291	7994	SYNOFLEX FLANGE ADAPTOR REDUCED	E.Hawle Armaturenwerke	80 - 65 (71-88)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005293	7994	SYNOFLEX FLANGE ADAPTOR REDUCED	E.Hawle Armaturenwerke	80 - 100 (104-132)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005295	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	100 (104-132)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005297	7994	SYNOFLEX FLANGE ADAPTOR REDUCED	E.Hawle Armaturenwerke	100 - 80 (85-105)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005299	7994	SYNOFLEX FLANGE ADAPTOR REDUCED	E.Hawle Armaturenwerke	100 - 125 (131-160)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005301	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	150 (155-192)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005303	7994	SYNOFLEX FLANGE ADAPTOR REDUCED	E.Hawle Armaturenwerke	150 - 125 (131-160)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005305	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	200 (198-230)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005307	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	200 (230-260)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017

Licence No: SMK40252

Issued Date: 15 November 2019

This schedule supersedes all previously issued schedules



* For details of manufacture, refer to the licensee

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SCHEDULE TO STANDARDSMARK LICENCE

Model Identification	Model Name	Product Description	Brand Name	Nominal Size (DN)	Nominal Pressure (PN)	Joint Designation	Coating Designation	Date Endorsed
5005309	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	250 (285-310)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005311	7994	SYNOFLEX FLANGE ADAPTOR	E.Hawle Armaturenwerke	300 (313-356)	16	Flange / Socket	AKZO NOBEL	24 Oct 2017
5005313	7994	Synoflex Flange Adaptor	E. Hawle Armaturenwerke GmbH	350	16	Synoflex Flange	AKZO NOBEL	27 Mar 2019
5005315	7994	Synoflex Flange Adaptor	E. Hawle Armaturenwerke GmbH	400	16	Synoflex Flange	AKZO NOBEL	27 Mar 2019
5008037	7980	SYNOFLEX END CAP WITH FEM. THREAD 2" AXIAL	E.Hawle Armaturenwerke	80 (85-105)	16	Socket	AKZO NOBEL	24 Oct 2017
5008037	7980	SYNOFLEX END CAP WITH FEM. THREAD 2" RADIAL	E.Hawle Armaturenwerke	80 (85-105)	16	Socket	AKZO NOBEL	24 Oct 2017
5008041	7980	SYNOFLEX END CAP WITH FEM. THREAD 2" RADIAL	E.Hawle Armaturenwerke	100 (104-132)	16	Socket	AKZO NOBEL	24 Oct 2017
5008048	7980	SYNOFLEX END CAP WITH FEM. THREAD 2" RADIAL	E.Hawle Armaturenwerke	150 (155-192)	16	Socket	AKZO NOBEL	24 Oct 2017
5012904	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	50 (56-71)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012909	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	65 (71-88)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012914	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	80 (85-105)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012919	7974	SYNOFLEX CONNECTOR REDUCED	E.Hawle Armaturenwerke	80 x 65 (85-105) x (71-88)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012924	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	100 (104-132)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012929	7974	SYNOFLEX CONNECTOR REDUCED	E.Hawle Armaturenwerke	100 x 80 (104-132) x (85-105)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012934	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	125 (131-160)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012943	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	150 (155-192)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012948	7974	SYNOFLEX CONNECTOR REDUCED	E.Hawle Armaturenwerke	150 x 100 (155-192) x (104-132)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012956	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	200 (198-230)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012963	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	225 (230-260)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
5012971	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	250 (285-310)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017

Licence No: SMK40252

Issued Date: 15 November 2019

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SCHEDULE TO STANDARDSMARK LICENCE

Model Identification	Model Name	Product Description	Brand Name	Nominal Size (DN)	Nominal Pressure (PN)	Joint Designation	Coating Designation	Date Endorsed
5012981	7974	SYNOFLEX CONNECTOR	E.Hawle Armaturenwerke	300 (313-356)	16	Socket / Socket	AKZO NOBEL	24 Oct 2017
HDA10044300H	7980	SYNOFLEX END CAP WITH FEM. THREAD 2" AXIAL	E.Hawle Armaturenwerke	100 (104-132)	16	Socket	AKZO NOBEL	11 Jun 2014
HDA10049300H	7980	SYNOFLEX END CAP WITH FEM. THREAD 2" AXIAL	E.Hawle Armaturenwerke	150 (155-192)	16	Socket	AKZO NOBEL	10 Jul 2015

End of Record

Licence No: SMK40252

Issued Date: 15 November 2019

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APPENDIX D - SUPPLIER CONTACTS

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