Krausz Industries Ltd

PRODUCT APPRAISAL REPORT No 1701

HYMAX® Unrestrained Mechanical Couplings and Flanged Adapters

AS/NZS 4998: 2009 Bolted unrestrained mechanical couplings for waterworks purposes

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Product Appraisal Technical Advisory Group	WSAA	19 December 2019
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Peter Pittard, WSAA Consultant	WSAA	28 November 2019
Carl Radford, Product Appraisal Manager	WSAA	19 December 2019

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

Krausz Industries Ltd has an operating history dating back to the 1920's when Armin Krausz commenced a machining company in what is now modern day Bratislavia in the Slovak Republic. The World War 2 disruption led to re-establishment of the company in Tel Aviv, Israel in 1942 and the company has now developed to be a leading manufacturer and marketer of products and services used in transmission, distribution and measurement of water. USA based Mueller Water Products purchased the business in 2018.

This appraisal is for a range of HYMAX unrestrained mechanical couplings and flanged adapters in sizes DN 80 to DN 600 complying with AS/NZS 4998:2009 *Bolted unrestrained mechanical coupling for waterworks purposes*.

HYMAX couplings are unrestrained mechanical couplings designed to suit a wide range of pipe outside diameters and are intended for jointing spigot ends of pipes, other than PE, in water and sewerage applications, in either above or below ground situations.

The coupling range includes long and short barrel couplings, reducing couplings and flanged adapters.

The innovative design features of the couplings include:

- top operated fasteners to affect activation of the sealing mechanism, one on each end for sizes up to DN 300 and 2 on each end for sizes above DN 300.
- two-layer detachable gaskets and gaskets with a flip feature that allows a wider pipe outside diameter range (reach) to be accommodated, when compared to traditional couplings.
- gaskets with dual mechanical and hydraulic operation.

The couplings and flanged adapters are supplied with polymeric coated carbon steel barrels and end rings and Grade 316 stainless steel fasteners with an anti-galling compound. The sealing gaskets are manufactured from EPDM rubber. The flanges are compatible with AS/NZS 4087 PN16.

Krausz Pty Ltd has a Quality Management System licence to ISO 9001:2015 and the products are covered by an ISO Type 5 OceanaMark product certification to AS/NZS 4998:2009 *Bolted unrestrained mechanical coupling for waterworks purposes*.

The HYMAX couplings described within this appraisal meet the requirements of WSA PS 270 – *Mechanical Couplings Non-End Thrust Restraint for Pressure Applications – Water Supply and Sewerage* and are therefore deemed as 'fit for purpose'.

1.1 Recommendation

It is recommended that WSAA members and associates, subject to any specific requirements of the member, accept or authorise the HYMAX range of unrestrained couplings and flange adapters, as detailed 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.

2 THE APPLICANT

The Applicant is Krausz Industries Limited.

2.1 The Manufacturer

Krausz Industries Ltd has an operating history dating back to the 1920's when Armin Krausz commenced a machining company in what is now modern day Bratislavia in the Slovak Republic. The World War 2 disruption led to re-establishment of the company in Tel Aviv, Israel in 1942 and the company has now developed to be a leading manufacturer and marketer of products and services used in transmission, distribution and measurement of

water. The HYMAX® range of unrestrained couplings was introduced to the market in 1999 and the HYMAX GRIP® range of couplings was launched in 2014. USA based Mueller Water Products purchased the business in 2018.

3 THE PRODUCT

HYMAX unrestrained mechanical couplings and flanged adapters are designed to suit a wide range of pipe OD's and are suitable for joining spigot ends of pipe manufactured from grey or ductile cast iron, steel, PVC-U, PVC-M, PVC-O and asbestos cement. The coupling is suitable for use in contact with drinking water and neutral fluids (sewage) to a maximum temperature of 40ºC.

The PN16 coupling range includes long and short barrel couplings, reducing couplings and flanged adapters in sizes from DN 80 to DN 600. See Figure 1.

Short Coupling Long Coupling Reducing Coupling Flanged Adapter

FIGURE 1 HYMAX COUPLING RANGE

The couplings and flanged adapters are supplied with polymeric coated carbon steel barrels and end rings with Grade 316 stainless steel fasteners coated with an anti-galling compound. The sealing gaskets are manufactured from EPDM rubber. The flanges are compatible with with AS/NZS 4087 PN16.

The maximum allowable deflection at each end of the coupling is nominated as 4 degrees for all pipe OD's within the reach.

The innovative design features of the couplings include:

- top operated fasteners to affect activation of the sealing mechanism, one on each end for sizes up to DN 300 and 2 on each end for sizes above DN 300.
- a flip feature on gasket sizes from DN 80 to DN 300 and two-layer detachable gaskets for sizes DN 300 to DN 600. These designs allow a wider pipe outside diameter range (reach) to be accommodated, when compared to traditional couplings.

  Krausz literature provides a dual range of pipe OD's for each coupling. For the larger nominated range, the inner layer of the gasket can either be flipped toward the entry prior to installation (DN 80 to DN 300) or be removed using a screw driver (DN 300 to DN 600).
- gaskets with a dual sealing mechanism. The mechanical seal is activated by tightening the fasteners and the enhanced sealing feature is due to hydraulic action of the medium.

Details of the product range are given in Table 1, 2 and 3.

TABLE 1 HYMAX COUPLINGS

DN	Barrel Length mm		Reach (mm)		No of Fasteners
	Short	Long	Min	Max	
80	158	300	88	108	2
100	158	300	108	143	2
125	213	410	130	162	2
150	213	410	158	190	2
150	213	410	163	195	2
200	213	410	190	222	2
200	213	410	217	250	2
200	213	410	222	252	2
250	213	410	272	305	2
250	213	410	278	311	2
300	213	410	315	347	2
300	213	410	334	366	2
375	216	382	375	431	4
375	216	382	378	434	4
450	216	382	434	488	4
450	216	382	488	542	4
500	216*	382	540	594	4
600	216*	382	606	660	4
600	216*	382	624	678	4

*Note: AS/NZS 4998 does not specify a minimum barrel length for short barrel couplings for sizes above DN 450, however the length nominated for the HYMAX short barrel couplings exceeds the specified minimum length for long barrel couplings.

TABLE 2 HYMAX REDUCING COUPLINGS

DN	Barrel Length mm	Reach mm		No of Fasteners
80-100	154	88-108	108-143	2
100-125	182	108-143	130-162	2
100-150	182	108-143	158-190	2
125-150	210	130-162	158-190	2
150-200	210	158-190	217-250	2
150-200	210	163-195	190-222	2
150-200	210	163-195	217-250	2
200-200	210	190-222	217-250	2
200-250	210	217-250	272-305	2
200-250	210	222-252	272-305	2
250-300	210	272-305	315-347	2
250-300	210	278-311	315-347	2
300-300	210	315-347	334-366	2

DN	Barrel Length mm	Reach mm		No of Fasteners
300-375	443	315-347	375-431	3
300-375	443	315-347	378-434	3
300-375	443	334-366	375-431	3
375-450	443	334-366	378-434	3
375-450	525	375-431	434-488	4
375-450	525	378-434	434-488	4
450-450	525	434-488	488-542	4
450-500	525	488-542	540-594	4
500-600	525	540-594	624-678	4

TABLE 3 HYMAX FLANGED ADAPTERS

Flange DN	Barrel Length mm	Reach (mm)		No of Fasteners
		Min	Max	
80	150	88	108	1
100	150	108	143	1
125	205	130	162	1
150	205	158	190	1
150	205	163	195	1
200	205	190	222	1
200	205	217	250	1
250	205	272	305	1
250	205	278	311	1
300	205	315	347	1
300	205	334	366	1
375	312	375	431	2
375	312	378	434	2
450	312	434	488	2
450	312	488	542	2
500	312	540	594	2
600	312	606	660	2
600	312	624	678	2

4 SCOPE OF THE APPRAISAL

The scope of this appraisal covers PN16 HYMAX unrestrained mechanical couplings and flanged adapters in sizes from DN 80 to DN 600.

5 APPRAISAL CRITERIA

5.1 Quality Assurance Requirements

The WSAA Product Appraisal Technical Advisory Group accepts unrestrained mechanical couplings and flanged adapters manufactured in compliance with AS/NZS 4998:2009 *Bolted unrestrained mechanical coupling for waterworks purposes* and duly certified by means of an ISO Type 5 product certification scheme undertaken by a JAS-ANZ accredited Conformity

Assessment Body (CAB) or 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

HYMAX couplings and flanged adapters have been appraised for compliance with AS/NZS 4998:2009 *Bolted unrestrained mechanical couplings for waterworks purposes*.

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 270 – *Mechanical Couplings Non-end Thrust Restraint for Pressure Applications – Water Supply and Sewerage.*

A copy of the above Product Specification can be found in Appendix C or downloaded from the WSAA website.

6 COMPLIANCE WITH APPRAISAL CRITERIA

6.1 Compliance with Quality Assurance Requirements

Krausz has submitted the following quality certificates:

- ISO 9001:2015 Certificate of Registration No 90452 issued to Krausz Industries Ltd by The Standards Institute of Israel (SII).
- AS 4998:2009 StandardsMark ISO Type 5 OceanaMark product certification licence No OMK 30069 issued to Krausz Industries Ltd by IAPMO R&T Oceana.
- ISO 9001:2015 Certificate of Registration No IL - 103803 issued to Ein Shemer Rubber Industries Ltd by The Standards Institution of Israel.

Copies of the primary Quality Assurance and Product Certification licences have been included in Appendix B and other copies are available from WSAA.

6.2 Compliance with Performance Requirements

6.2.1 Material Requirements

6.2.1.1 *End rings and Barrel*

AS/NZS 4998 specifies allowable material requirements for the coupling components which allows end rings and barrels manufactured from carbon steel to minimum Grade HU 250 to AS/NZS 1594.

Test reports have been supplied by Krausz to demonstrate equivalence with the material requirements.

6.2.1.2 *Elastomeric seals*

AS/NZS 4998 allows for EPDM, NBR or SBR elastomeric joint seals in compliance with AS 1646 and AS 681.1.

HYMAX coupling seals are manufactured from EPDM. Test reports have been supplied to demonstrate compliance with the performance requirements of AS 1646 and AS 681.1.

6.2.1.3 *Stainless Steel Fasteners*

The HYMAX couplings utilise Grade 316 stainless steel fasteners.

An anti-galling compound is applied to the fastener threads.

6.2.1.4 *Polymeric Coatings*

AS/NZS 4998 specifies that steel components shall be coated with a thermal bonded polymeric coating in accordance with AS/NZS 4158.

The components of the HYMAX couplings and flanged adapters are fully coated with Akzo Nobel Resicoat R4-FB, a fusion bonded epoxy powder coating. The coating is StandardsMark product certified by SAI-Global and a copy is retained on file by WSAA.

The coating is applied in house by Krausz utilising the fluidized bed technique to the thickness, continuity, adhesion and cure requirements of AS/NZS 4158.

A type test was conducted by Prove Standards and Engineering, a NATA certified laboratory (Accreditation No.18640) based in Melbourne, on a HYMAX coupling sample to demonstrate AS/NZS 4158 compliance.

It should be noted that the batch release procedures are in accordance with EN 14901 which have less stringent testing frequencies compared to AS/NZS 4158.

The coating application process is audited as part of the product certification licensing procedures by IAPMO R&T Oceana.

6.2.1.5 *Contamination of Drinking Water*

The materials in contact with water are the polymeric coating and the EPDM seal. Akzo Nobel maintains AS/NZS 4020 certification as a component of their product certification and a test report is held on file by WSAA.

Krausz has supplied a copy of a test report from Australian Water Quality Centre dated May 2016 to demonstrate compliance of the EPDM material to AS/NZS 4020:2005.

6.2.2 Design, Manufacture and Operation

6.2.2.1 *Design*

The HYMAX coupling includes some innovative design features that differentiates it from traditional wide tolerance couplings. See section 3.

6.2.2.2 *Barrel lengths*

AS/NZS 4998 specifies minimum barrel lengths for couplings and flanged adapters.

The HYMAX barrel lengths for all products easily exceed the minimum requirements specified in AS/NZS 4998.

6.2.2.3 *Nominated Joint Deflection*

AS/NZS 4998 requires the manufacturer to nominate the maximum joint deflections allowable at each coupling end, for both minimum and maximum pipe outside diameters within the nominated coupling reach.

Krause advises that a minimum deflection of 4^{o} can be achieved at each end of the coupling for both minimum and maximum pipe diameters within the reach of the coupling when installed using the recommended minimum insertion depth and pipe setting gap.

This information is included in Appendix A and also included on the markings for each coupling.

6.2.2.4 *Minimum pipe setting gap and insertion depth*

Krausz has nominated a minimum pipe setting gap and minimum pipe insertion depth for each coupling size to ensure the maximum nominated pipe deflection sealing security is achieved. See Appendix A.

6.2.2.5 *Flanges*

The flanges incorporated on the flanged adapters are manufactured from carbon steel with a flat face and drilled to match AS/NZS 4087 PN16 configuration. The thicknesses of the flanges are shown in Table 4 below and are compared to AS/NZS 4087 steel and DI PN16 flange thicknesses.

TABLE 4 COMPARISON OF FLANGE THICKNESSES

DN	HYMAX Steel Flange Thickness	AS/NZS 4087 PN 16 Steel Flange Thickness	AS/NZS 4087 PN16 DI Flange Thickness
80	14.3	11	18
100	17.5	13	20
125	17.5	-	-
150	17.5	13	23
200	19	19	23
250	19	19	24
300	23	23	30
375	30	30	33
450	30	30	33
500	38	38	35
600	48	48	42

The flanges on the HYMAX flanged adapters are equal to or thicker than the flange thicknesses specified in AS/NZS 4087 Table B7 for steel flanges and are therefore considered suitable for PN16 rating. However, when connecting the flanged adapters to AS/NZS 4087 Fig B5 PN16 DI flanges, the required bolt lengths should be checked to accommodate the difference in thickness between the mating flanges.

6.2.2.6 *Welding carbon steel*

Welding is required to be carried out in accordance with AS 4041, Category 2.

Krausz has declared that welding procedures comply with European Standards that are equivalent to AS 4041, Category 2.

6.2.3 Performance Tests

Krausz has submitted test reports to demonstrate conformance to the Type Test requirements of AS/NZS4998:2009.

Queensland Testing Laboratory (NATA Accreditation No: 14783) conducted the type tests on a coupling of each nominal size from DN 80 to DN 600.

The Type Tests were successfully completed for:

- Hydrostatic leak-tightness test
- Joint infiltration test
- Assembly test

6.2.3.1 Hydrostatic leak-tightness test

These tests were carried out using pipe pieces equal to the minimum outside diameter of the nominated reach of the coupling. The test was undertaken at the nominated angular joint deflection of 4º and the recommended minimum pipe insertion depth with a test pressure of 2400 kPa for 2 hours.

The couplings displayed no leakage, seal cracking or other failure.

6.2.3.2 Joint infiltration test

These tests were carried out using pipe pieces with outside diameters equal to the minimum outside diameter of the nominated reach of the couplings. The test was undertaken at the nominated angular joint deflection of 4º and the recommended minimum pipe insertion depth with a test pressure of –80 to –85 kPa for 2 hours.

The couplings met the requirement of no greater than 10% increase in pressure over that period.

6.2.3.3 Assembly test

These tests were carried out on pipe pieces that have an outside diameter equal to the maximum outside diameter of the nominated reach of the coupling.

There was no interference observed between the coupling and the pipes.

7 FITTING INSTRUCTIONS, TRAINING AND INSTALLATION

A copy of HYMAX Installation Instructions is included in Appendix A. Additional training is available through the Australian agent. See Appendix D for contact details.

8 PRODUCT MARKING

The couplings are marked in accordance with AS/NZS 4998. A label is adhered to each product and contains the following minimum information:

- Name of Manufacturer: Krausz
- Batch identification:
- Bolt torque: e.g. 80Nm
- Nominal diameter: e.g. DN150
- The number of this standard: AS/NZS 4998
- Reach in mm: e.g. 158-190
- PN rating: 16 bar
- Maximum angle of deflection: 4 º
- Product certification licence number: OMK 30069

FIGURE 2 EXAMPLE OF MARKING

9 PACKAGING AND TRANSPORTATION

The HYMAX couplings are packaged in cardboard cartons designed to prevent damage during handling or transport. Each product has its own cardboard carton.

FIGURE 3 PACKAGING

10 PRODUCT WARRANTY

The products are covered by the normal commercial and legal requirements of the *Competition and Consumer Act 2010 (Cth)*, which covers manufacture to the relevant standard, and details of Krausz's warranty is included in their terms and conditions of sale.

11 WATER AGENCY EXPERIENCE WITH THE PRODUCT OR FIELD TESTING REPORT

Krausz couplings have been supplied extensively within Europe and USA since they were first introduced into the market in 1999. This Appraisal is a pre-requisite to obtain water agency approvals in Australia. Similar products have been in general use within the industry for many years and a field trial is not deemed necessary.

12 OUTCOMES OF EXPERT PANEL PRODUCT REVIEW

There were no issues raised.

13FUTURE WORKS

There are no outstanding future works items.

14 DISCLAIMER

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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.

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APPENDIX A – PRODUCT LITERATURE

Krausz Industries Ltd

KRAUSZ
Repair the past. Connect the future.

HYMAX® Family Features

HYMAX. Wide-Range Coupling Solutions.

Krausz HYMAX® coupling solutions feature advanced engineering and innovative design, enabling fast installation, outstanding flexibility, and extreme durability in varied conditions. These benefits make the Krausz HYMAX® the high-performance, cost-effective choice for a broad variety of applications. A revolutionary product line, that has set a new industry standard, the HYMAX products have been field-proven in millions of installations world-wide.

Fast and easy installation

- Advanced wide-range coupling with a patented flip gasket (in sizes 50-300 mm) eliminates gasket removal mistakes and maximizes installer work efficiency.
- Lightweight construction enables fast and easy installation, with minimum manpower, reducing time in the ditch and improving worker safety.
- Unique top-facing bolts enable easy installation access.
- Ready-to-use, stab-on design eliminates the need for extensive under-pipe digging and work.
- Installation by stabbing eliminates the need for product disassembly before use.

Multiple applications

- Broad variety of products, from couplings to flange adaptors and reducers.
- Extensive portfolio of products with 40mm-1500mm nominal pipe size.
- All products work with a variety of pipe materials: ductile iron, cast iron, steel, PE, PVC, AC, and GRP.
- One single product can connect pipes of two different materials, allowing nominal diameter range of up to 54mm.

Flexible connection

- Efficient mechanical sealing for low-pressure conditions and hydraulic inflatable gasket for enhanced sealing in pressurized conditions.
- During installation, allows for up to 4° angular deflection on each end, as well as for misaligned pipes.
- Absorbs post-installation dynamic pipe deflection of up to 4° on each end, reducing the risk of damage and cracking due to ground shifts and temperature changes.
- Adapts to out-of-round pipe shape (up to 10mm), for optimum fit on both ends.

High durability

- Patented sealing solution is the pressure-assisted gasket featuring two-stage sealing: mechanical sealing that is effective under vacuum or non-pressure, and self-inflating gasket using water pressure.
- Fusion-bonded epoxy coating enables an insulated product and prevents corrosion.
- Nuts, bolts and other components are made of stainless steel.
- Innovative radial closing design and sealing systems eliminate installation errors.
- Unique MAG treatment prevents galling and enables repeated bolt tightening. It also eliminates the need for grease, preventing dust and dirt build-up.

Cost-saving

- Hymax products suit a wide range of pipe diameters, replacing the need to use dedicated products and thus reducing inventory costs and saving shelf space.
- Fast and easy installation saves time and money.

HYMAX® Product Information *

KRAUSZ 90 Years of Innovation

HYMAX® Product Information *

KRAUSZ 90 Years of Innovation

Products meet or exceed standards NSF-61, NSF-372, AS/NZS 4998, BM, ITS and EN 10025.

Body:

- 40mm-1500mm: Grade S235JR Steel, EN 10025-2

End Rings:

- 40mm - 1500mm: Grade S235JR Steel, EN 10025-2.
- 350mm - 800mm: Grade S295JR Steel, EN 10025-2. (Or Ductile Iron Casting ASTM A536 Grade 60-40-18).

Two types of sealing

- Efficient mechanical sealing for low-pressure conditions and hydraulic inflatable gasket for enhanced sealing in pressurized conditions.
- DN 40mm - 300mm: flipping gasket
- DN 350mm - 1,500mm: double layer detachable gasket

Gasket:

EPDM compounded for water and sewerage, meets international standards for contact with drinking water: NSF-61, GBA Elastomer Guideline (KTW), W270, KP P 41-250, AS/NZS 4020, and BS 6920. Meets DIN EN 681-1 for water and drainage applications.

Nuts & Bolts:

- AISI 316 Stainless Steel. Rolled thread and MAG treatment.
- Top-facing bolts for maximum installer safety.

Gasket Bridge:

- AISI 316 Stainless Steel.

Coating:

- 100% fusion bonded epoxy for enhanced corrosion protection. Average thickness 250 microns. Meets NSF-61, BS 6920, W270, GNF/DVGW G 5014-1, KP P 41-250, AS/NZS 4020, AS/NZS 4158 and GBA Coatings Guideline.

Dynamic Deflection:

- Up to 4° per side (one side only for Flange Adapter).

Working Pressure:

- Up to 16 Bar.

Rated Pressure:

- Up to 24 Bar.

Working Temperature:

- -30°C up to +50°C.

Vacuum Test:

- 0.8 Bar.

350mm - 1,500mm: Two layer detachable Gasket allows adjusting to pipe diameter

40mm - 300mm: Flip gasket

* Data may vary according to product type and size. For complete technical information please refer to product specification sheet.

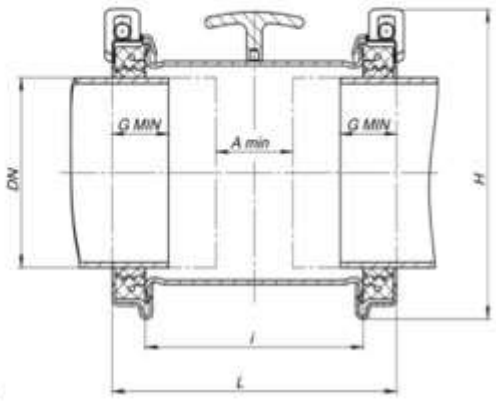
90 YEARS OF INNOVATIVE PIPE JOIN AND REPAIR SOLUTIONS

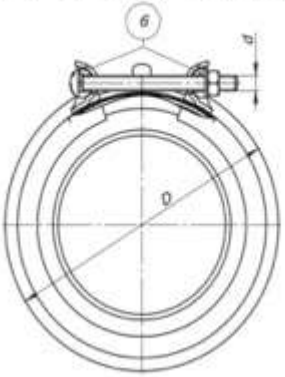
Krausz Industries develops, designs, and manufactures market-leading smart products for repairing and connecting different types of pipes for potable water and sewage.

During more than 90 years of industry leadership, Krausz has earned a solid reputation for innovative, high-quality products that are exceptionally easy to use and are extremely durable; products that save significant time and cost in installation, inventory and maintenance.

With millions of installations worldwide, Krausz products expertly meet immediate connection and repair needs and prevent future pipe damage, delivering long-lasting value.

REVISIONS					
REV	DESCRIPTION	ECO	DRAWN	APPROVED	DATE
B1	UPDATING NOTES	10000090	Yaron K.	Tzah Gr.	02/06/2019





Weight: SEE TABLE			Part Name: HYMAX 2 80-300 SS316 COATING 350 µm	Scale
	Date	Name	Catalog No. SD860-828-01	DO NOT SCALE DRAWING
Design	12/03/2017	Galina E.		
Check	31/01/2017	Galina E.	Drawing No. SD860-828-01	Sheet 1 of 2
Appr.	31/01/2017	Tzah Gr.		
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REVISIONS					
REV	DESCRIPTION	ECO	DRAWN	APPROVED	DATE
B1	UPDATING NOTES	10000090	Yaron K.	Tzah Gr.	02/06/2019

Krausz Part Number	DN (mm)	Overall Range (mm)	Range Before Flipping Gasket (mm)	Range After Flipping Gasket (mm)	D (mm)	H (mm)	I (mm)	L (mm)	A min (mm)	Bolts Qty. - Size d(mm)	Torque (Nm)	Approx. Weight (Kg)
860-828-0088-16	80	88-108	88-99	98-108	Ø170	200	158	222	20	2 -M12	70	4.9
860-828-0108-16	100	108-143	108-126	125-143	Ø220	250	158	223	35	2 -M14	80	6.0
860-828-0130-16	125	130-162	130-146	145-162	Ø240	270	213	275	85	2 -M14	80	7.6
860-828-0158-16	150	158-190	158-174	173-190	Ø270	295	213	275	105	2 -M14	80	9.3
860-828-0163-16	150	163-195	163-179	178-195	Ø273	298	213	275	105	2 -M14	80	9.3
860-828-0190-16	200	190-222	190-206	205-222	Ø298	325	213	275	105	2 -M14	80	11.5
860-828-0217-16	200	217-250	217-233	232-250	Ø328	355	213	275	115	2 -M14	80	11.7
860-828-0222-16	200	222-252	222-238	237-252	Ø328	355	213	275	115	2 -M14	80	11.7
860-828-0272-16	250	272-305	272-289	288-305	Ø382	408	213	275	115	2 -M14	100	12.7
860-828-0278-16	250	278-311	278-295	294-311	Ø388	415	213	275	115	2 -M14	100	12.7
860-828-0315-16	300	315-347	315-331	330-347	Ø422	445	213	275	105	2 -M14	110	14.0
860-828-0334-16	300	334-366	334-350	349-366	Ø440	465	213	275	85	2 -M14	110	17.5

Material information:

1) Center Ring - EN 10025-2 grade S235JR steel with Yield strength min. 290Mpa
   according to Krausz spec MS0781.
   (for ranges 1.5" and 2" without handle)
2) End Rings - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa
   according to Krausz spec MS0780.
3) Gaskets - EPDM compounded for water
   and sewerage, meets international
   standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30°C up to +85°C.
   for short time operations: up to +100°C.
4) Bolts and Nuts - AISI 316 stainless steel.
   Rolled thread and anti galling coating.
5) Bridge - AISI 316 stainless steel.
6) Spherical spacers - AISI 316 stainless steel.
7) Coating - 100% Fusion bonded epoxy
   for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50°C.
   under ground applications: up to +65°C.

Product performace		
Dynamic deflection per side		up to 4°
G - Min. pipe insertion		55 mm
A - Min. gap (to enable max dynamic deflection)		see table
Maximum offset for misaligned pipe	DN 80	10 mm
	DN 100-300	13 mm
Maximum out of roundness	DN 80	5 mm
	DN 100-300	8 mm
Working Pressure		16 atm
Test Pressure		24 atm
Vacuum Test		0.8 atm

Weight: SEE TABLE			Part Name: HYMAX 2 80-300 SS316 COATING 350 µm	Scale
	Date	Name	Catalog No. SD860-828-01	DO NOT SCALE DRAWING
Design	12/03/2017	Galina E.		
Check	31/01/2017	Galina E.	Drawing No. SD860-828-01	Sheet 2 of 2
Appr.	31/01/2017	Tzah Gr.		
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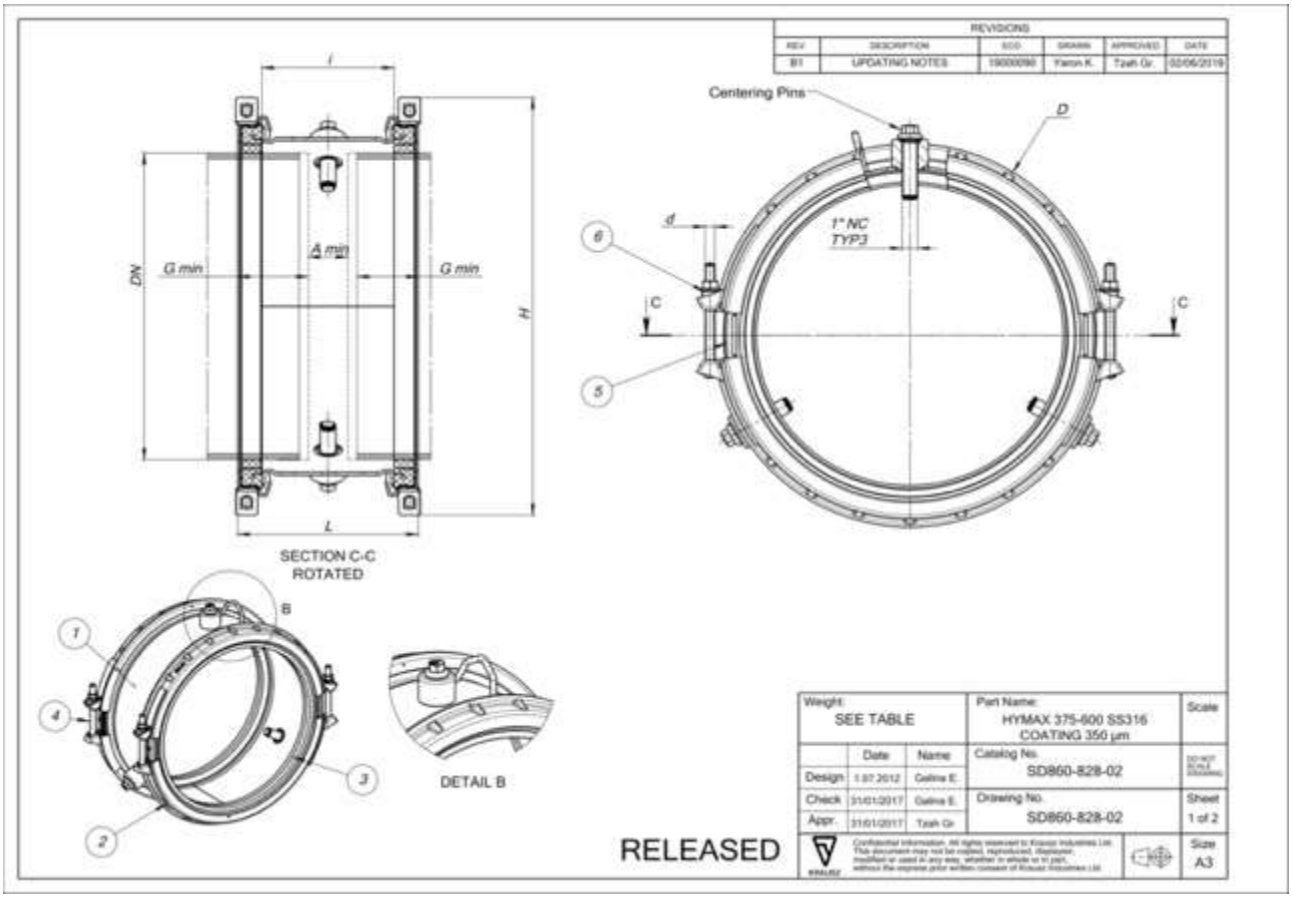
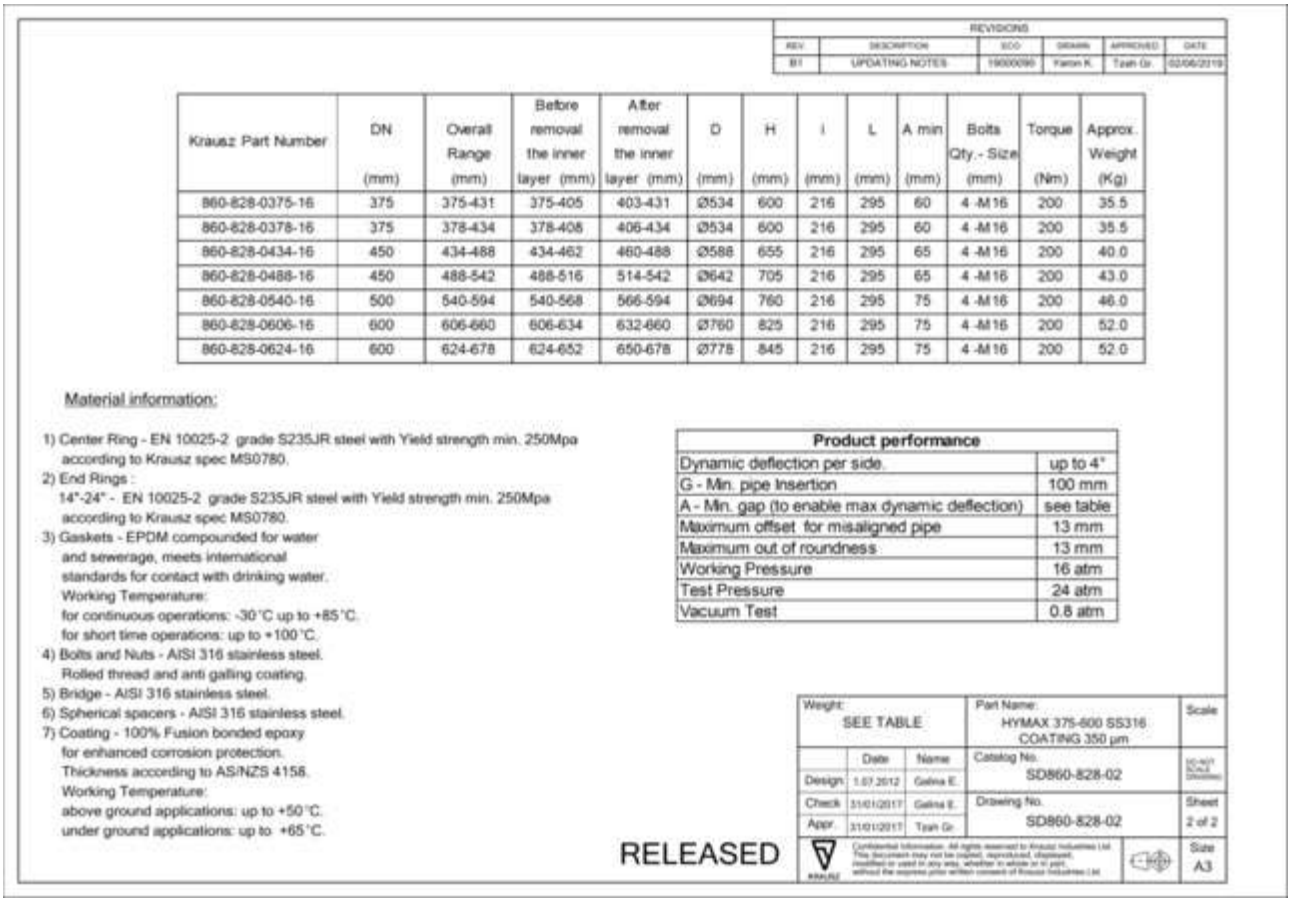




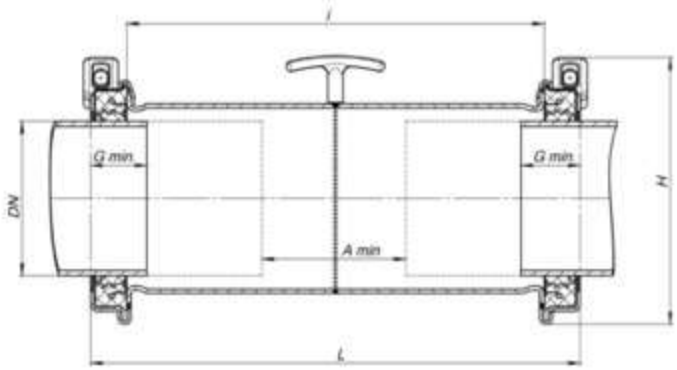
Krausz Part Number	DN (mm)	Overall Range (mm)	Before removal the inner layer (mm)	After removal the inner layer (mm)	D (mm)	H (mm)	I (mm)	L (mm)	A min (mm)	Bolts Qty. - Size (mm)	Torque (Nm)	Approx. Weight (Kg)
860-828-0375-16	375	375-431	375-405	403-431	Ø534	600	216	295	60	4 -M16	200	35.5
860-828-0378-16	375	378-434	378-408	406-434	Ø534	600	216	295	60	4 -M16	200	35.5
860-828-0434-16	450	434-488	434-462	460-488	Ø588	655	216	295	65	4 -M16	200	40.0
860-828-0488-16	450	488-542	488-516	514-542	Ø642	705	216	295	65	4 -M16	200	43.0
860-828-0540-16	500	540-594	540-568	566-594	Ø694	760	216	295	75	4 -M16	200	46.0
860-828-0606-16	600	606-660	606-634	632-660	Ø760	825	216	295	75	4 -M16	200	52.0
860-828-0624-16	600	624-678	624-652	650-678	Ø778	845	216	295	75	4 -M16	200	52.0

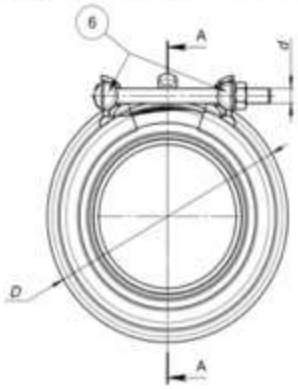
Material information:

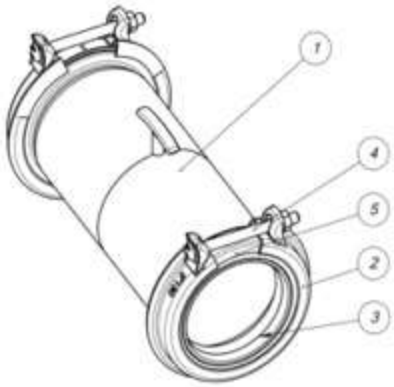
1) Center Ring - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
2) End Rings :
   14°-24° - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
3) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30 °C up to +85 °C.
   for short time operations: up to +100 °C.
4) Bolts and Nuts - AISI 316 stainless steel.
   Rolled thread and anti galling coating.
5) Bridge - AISI 316 stainless steel.
6) Spherical spacers - AISI 316 stainless steel.
7) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50 °C.
   under ground applications: up to +65 °C.

Product performance	
Dynamic deflection per side.	up to 4°
G - Min. pipe Insertion	100 mm
A - Min. gap (to enable max dynamic deflection)	see table
Maximum offset for misaligned pipe	13 mm
Maximum out of roundness	13 mm
Working Pressure	16 atm
Test Pressure	24 atm
Vacuum Test	0.8 atm

REVISIONS					
REV	DESCRIPTION	ECO	DRAWN	APPROVED	DATE
C1	Adding handle	19000132	Galina E.	Tzah Gr.	15/08/2019







RELEASED

Weight: see table			Part Name: HYMAX 2 LONG 80-300 SS316 COATING 350 µm	Scale
	Date	Name	Catalog No. SD862-828-01	DO NOT SCALE DRAWING
Design	26.10.2015	Galina E.		
Check	31/01/2017	Galina E.	Drawing No. SD862-828-01	Sheet 1 of 2
Appr.	31/01/2017	Tzah Gr.		
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REVISIONS					
REV	DESCRIPTION	ECO	DRAWN	APPROVED	DATE
C1	Adding handle	19000132	Galina E.	Tzah Gr.	15/08/2019

Krausz Part Number	DN (mm)	Overall Range (mm)	Range Before Flipping Gasket (mm)	Range After Flipping Gasket (mm)	D (mm)	H (mm)	i (mm)	L (mm)	A min (mm)	Bolts Qty. - Size d(mm)	Torque (Nm)	Approx. Weight (Kg)
862-828-0088-16	80	88-108	88-99	98-108	Ø170	200	300	367	155	2 -M12	70	6.4
862-828-0108-16	100	108-143	108-126	125-143	Ø220	250	300	365	175	2 -M14	80	9.5
862-828-0130-16	125	130-162	130-146	145-162	Ø240	270	410	475	285	2 -M14	80	12.5
862-828-0158-16	150	158-190	158-174	173-190	Ø270	296	410	475	305	2 -M14	80	14.0
862-828-0163-16	150	163-195	163-179	178-195	Ø273	298	410	475	305	2 -M14	80	14.7
862-828-0190-16	200	190-222	190-206	205-222	Ø298	325	410	475	305	2 -M14	80	16.4
862-828-0217-16	200	217-250	217-233	232-250	Ø328	355	410	475	315	2 -M14	80	19.1
862-828-0272-16	250	272-305	272-289	288-305	Ø382	408	410	475	315	2 -M14	100	22.7
862-828-0278-16	250	278-311	278-295	294-311	Ø388	415	410	475	315	2 -M14	100	24.1
862-828-0315-16	300	315-347	315-331	330-347	Ø422	445	410	475	315	2 -M14	110	24.5
862-828-0334-16	300	334-366	334-350	349-366	Ø440	465	410	475	285	2 -M14	110	25.4

Material information:

1) Center Ring - EN 10025-2 grade S235JR steel with Yield strength min. 290Mpa according to Krausz spec MS0781.
2) End Rings - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
3) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30 °C up to +85 °C.
   for short time operations: up to +100 °C.
4) Bolts and Nuts - AISI 316 stainless steel.
   Rolled thread and anti galling coating.
5) Bridge - AISI 316 stainless steel.
6) Spherical spacers - AISI 316 stainless steel.
7) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50 °C.
   under ground applications: up to +65 °C.

Product performance		
Dynamic deflection per side		up to 4°
A - Min. gap (to enable max dynamic deflection)		see table
G - Min. pipe insertion		55 mm
Maximum offset for misaligned pipe	DN 80	10 mm
	DN 100-300	13 mm
Maximum out of roundness	DN 80	5 mm
	DN 100-300	8 mm
Working Pressure		16 atm
Test Pressure		24 atm
Vacuum Test		0.8 atm

RELEASED

Weight: see table			Part Name: HYMAX 2 LONG 80-300 SS316 COATING 350 µm	Scale
	Date	Name	Catalog No. SD862-828-01	DO NOT SCALE DRAWING
Design	26.10.2015	Galina E.		
Check	31/01/2017	Galina E.	Drawing No. SD862-828-01	Sheet 2 of 2
Appr.	31/01/2017	Tzah Gr.		
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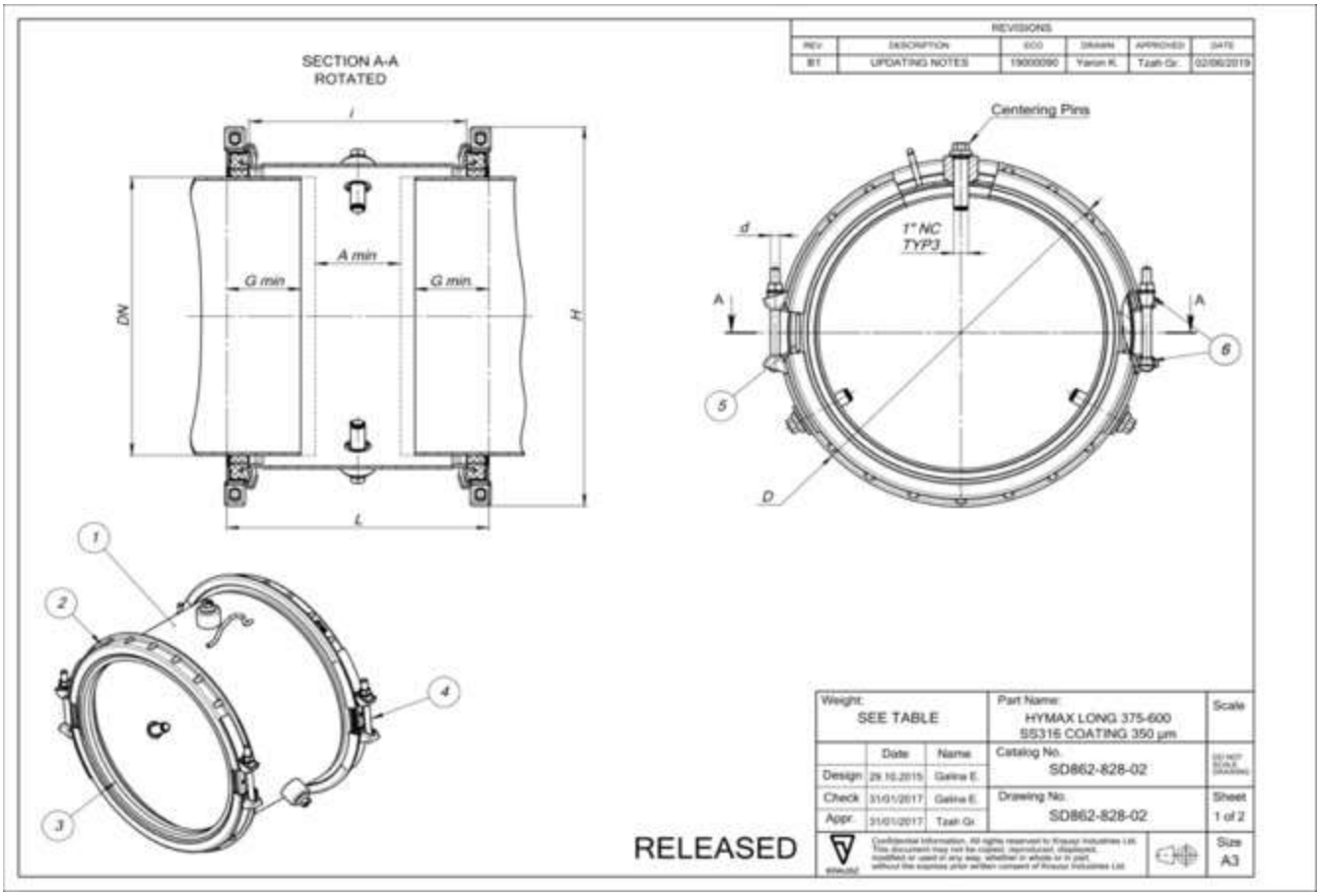
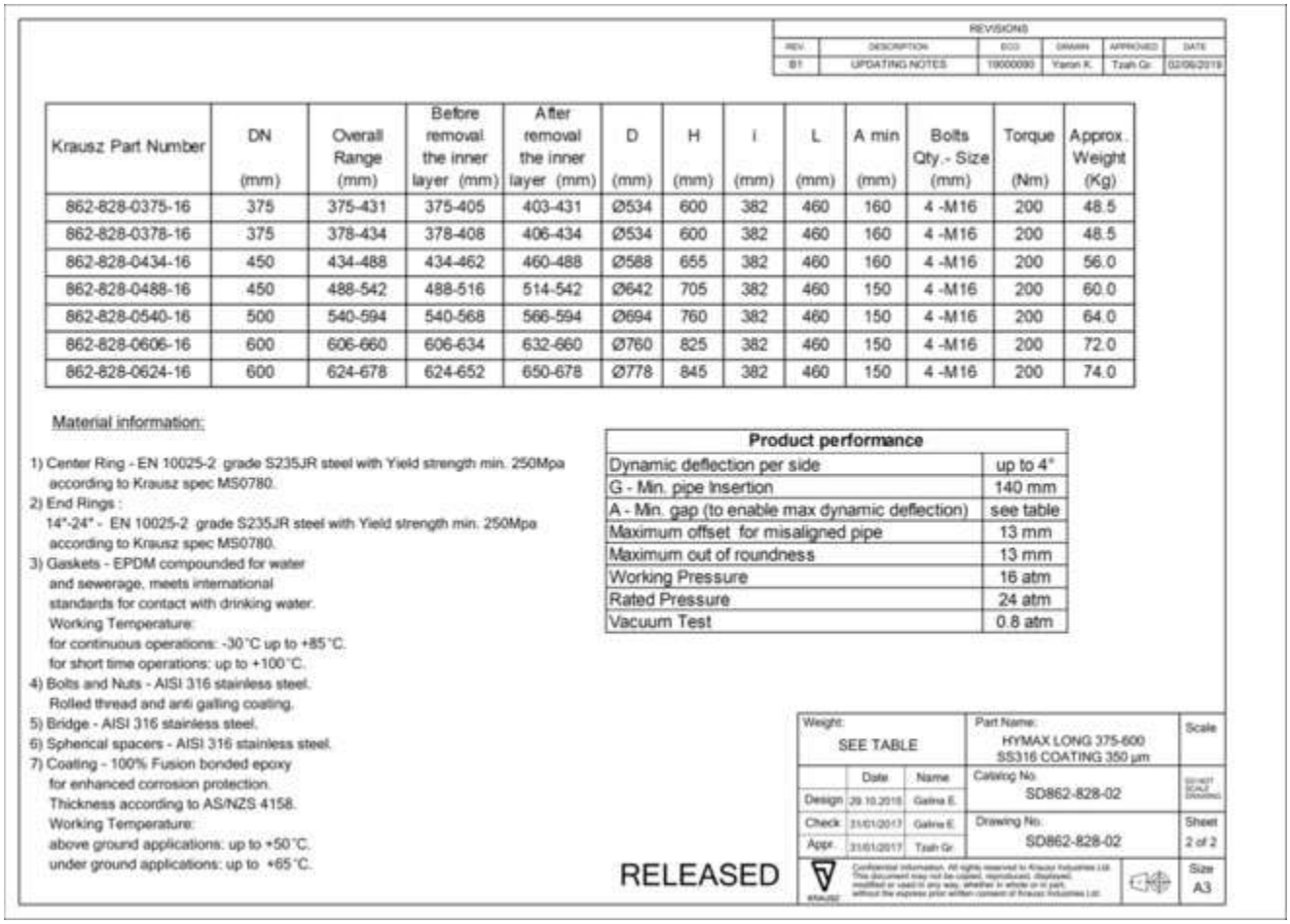




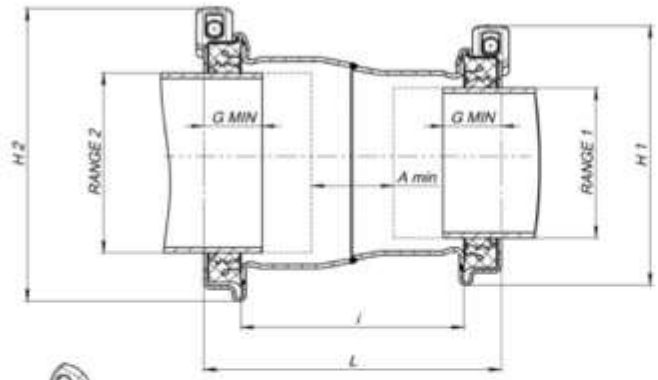
Krausz Part Number	DN (mm)	Overall Range (mm)	Before removal the inner layer (mm)	After removal the inner layer (mm)	D (mm)	H (mm)	i (mm)	L (mm)	A min (mm)	Bolts Qty.- Size (mm)	Torque (Nm)	Approx. Weight (Kg)
862-828-0375-16	375	375-431	375-405	403-431	Ø534	600	382	460	160	4 -M16	200	48.5
862-828-0378-16	375	378-434	378-408	406-434	Ø534	600	382	460	160	4 -M16	200	48.5
862-828-0434-16	450	434-488	434-462	460-488	Ø588	655	382	460	160	4 -M16	200	56.0
862-828-0488-16	450	488-542	488-516	514-542	Ø642	705	382	460	150	4 -M16	200	60.0
862-828-0540-16	500	540-594	540-568	566-594	Ø694	760	382	460	150	4 -M16	200	64.0
862-828-0606-16	600	606-660	606-634	632-660	Ø760	825	382	460	150	4 -M16	200	72.0
862-828-0624-16	600	624-678	624-652	650-678	Ø778	845	382	460	150	4 -M16	200	74.0

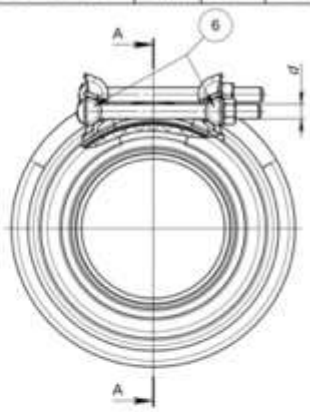
Material information:

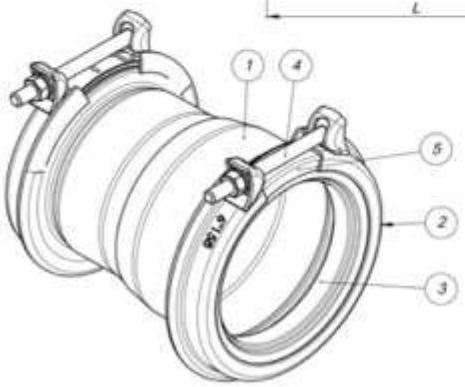
1) Center Ring - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
2) End Rings :
14"-24" - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
3) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
Working Temperature:
for continuous operations: -30°C up to +85°C.
for short time operations: up to +100°C.
4) Bolts and Nuts - AISI 316 stainless steel.
Rolled thread and anti galling coating.
5) Bridge - AISI 316 stainless steel.
6) Spherical spacers - AISI 316 stainless steel.
7) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
Thickness according to AS/NZS 4158.
Working Temperature:
above ground applications: up to +50°C.
under ground applications: up to +65°C.

Product performance	
Dynamic deflection per side	up to 4°
G - Min. pipe Insertion	140 mm
A - Min. gap (to enable max dynamic deflection)	see table
Maximum offset for misaligned pipe	13 mm
Maximum out of roundness	13 mm
Working Pressure	16 atm
Rated Pressure	24 atm
Vacuum Test	0.8 atm

REVISIONS					
REV	DESCRIPTION	ECO	DRAWN	APPROVED	DATE
B1	UPDATING NOTES	19000090	Yaron K.	Tzah Gr.	02/06/2019







Weight: SEE TABLE			Part Name: HYMAX 2 REDUCER 80-300 SS316 COATING 350 µm	Scale
	Date	Name	Catalog No. SD861-828-01	DO NOT SCALE DRAWING
Design	28/06/2017	Galina E.		
Check	31/01/2017	Galina E.	Drawing No. SD861-828-01	Sheet 1 of 2
Appr.	31/01/2017	Tzah Gr.		
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REVISIONS					
REV	DESCRIPTION	ECO	DRAWN	APPROVED	DATE
B1	UPDATING NOTES	19000090	Yaron K.	Tzah Gr.	02/06/2019

Krausz Part Number	DN (mm)	Overall Range 1 (mm)	Range Before Flipping Gasket 1 (mm)	Range After Flipping Gasket 1 (mm)	H 1 (mm)	Overall Range 2 (mm)	Range Before Flipping Gasket 2 (mm)	Range After Flipping Gasket 2 (mm)	H 2 (mm)	l (mm)	A min (mm)	L (mm)	Bolts Qty.-Size d (mm)	Torque Side 1 (Nm)	Torque Side 2 (Nm)	Approx. Weight (Kg)
8618280088010816	80 x 100	88-108	88-99	98-108	200	108-143	108-126	125-143	250	154	60	224	2-M14	70	80	6.8
8618280108013016	100 x 125	108-143	108-126	125-143	250	130-162	130-146	145-162	270	182	70	250	2-M14	80	80	7.4
8618280108015816	100 x 150	108-143	108-126	125-143	250	158-190	158-174	173-190	295	182	70	250	2-M14	80	80	8.3
8618280130015816	125 x 150	130-162	130-146	145-162	270	158-190	158-174	173-190	295	210	75	275	2-M14	80	80	9.0
8618280158021716	150 x 200	158-190	158-174	173-190	295	217-250	217-233	232-250	355	210	110	275	2-M14	80	80	11.0
8618280163019016	150 x 200	163-195	163-179	178-195	298	190-222	190-206	205-222	325	210	110	275	2-M14	80	80	10.3
8618280163021716	150 x 200	163-195	163-179	178-195	298	217-250	217-233	232-250	355	210	110	275	2-M14	80	80	11.5
8618280190021716	200 x 200	190-222	190-206	205-222	325	217-250	217-233	232-250	355	210	115	275	2-M14	80	80	12.0
8618280217027216	200 x 250	217-250	217-233	232-250	355	272-305	272-289	288-305	408	210	115	275	2-M14	80	100	13.2
8618280222027216	200 x 250	222-252	222-238	237-252	355	272-305	272-289	288-305	408	210	110	275	2-M14	80	100	13.2
8618280272031516	250 x 300	272-305	272-289	288-305	408	315-347	315-331	330-347	445	210	110	275	2-M14	100	110	16.1
8618280278031516	250 x 300	278-311	278-295	294-311	415	315-347	315-331	330-347	445	210	110	275	2-M14	100	110	16.1
8618280315033416	300 x 300	315-347	315-331	330-347	445	334-366	334-350	349-366	465	210	110	275	2-M14	110	110	16.6

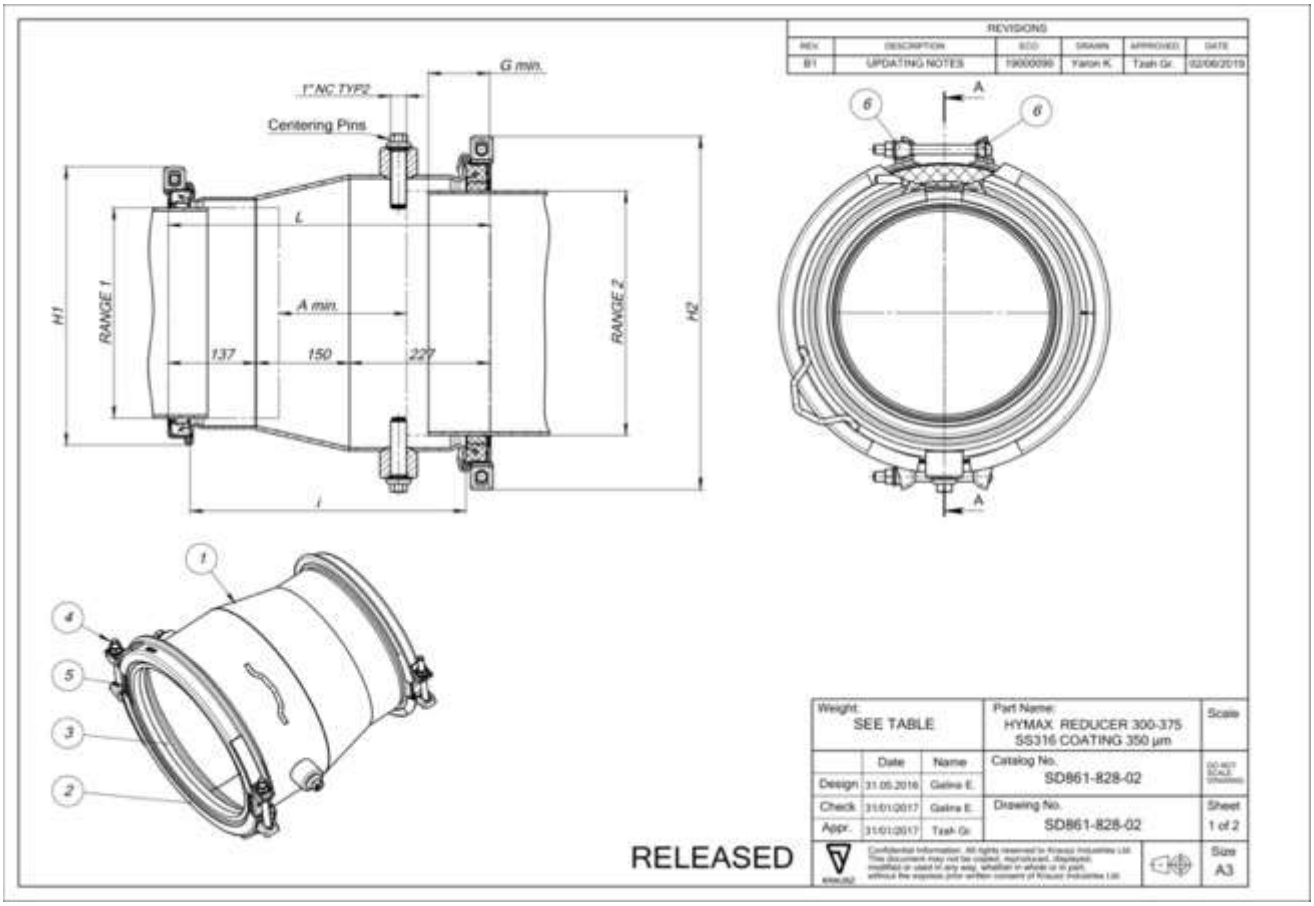
Material information:

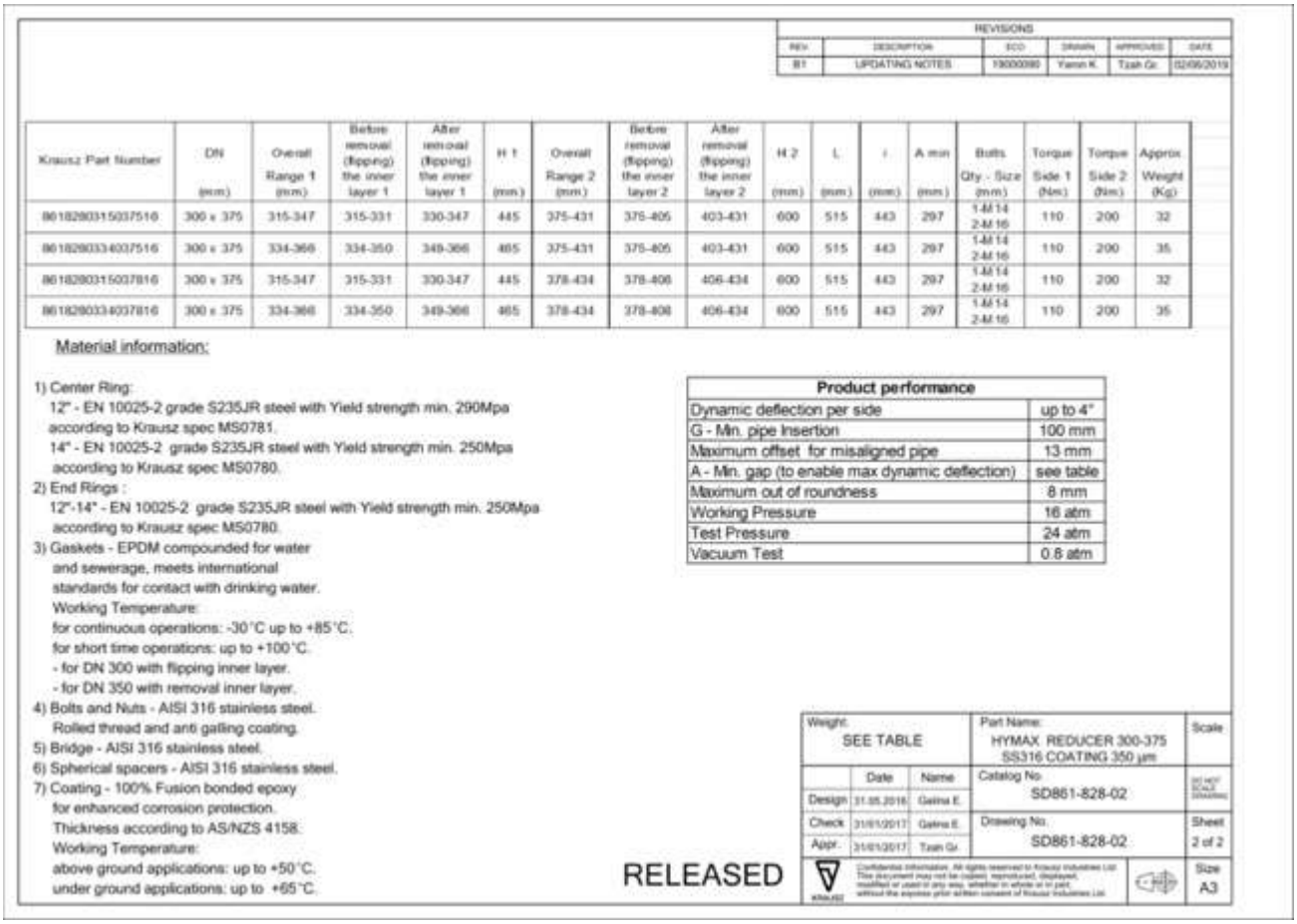
1) Center Ring - EN 10025-2 grade S235JR steel with Yield strength min. 290Mpa according to Krausz spec MS0781.
2) End Rings - EN 10025-2 grade S235JR with Yield strength min. 250Mpa steel according to Krausz spec MS0780.
3) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30°C up to +85°C.
   for short time operations: up to +100°C.
4) Bolts and Nuts - AISI 316 stainless steel.
   Rolled thread and anti galling coating.
5) Bridge - AISI 316 stainless steel.
6) Spherical spacers - AISI 316 stainless steel.
7) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50°C.
   under ground applications: up to +65°C.

Product performance		
Dynamic deflection per side		up to 4°
A - Min. gap (to enable max dynamic deflection)		see table
G - Min. pipe Insertion		55 mm
Maximum offset for misaligned pipe	DN 80	10 mm
	DN 100-300	13 mm
Maximum out of roundness	DN 80	5 mm
	DN 100-300	8 mm
Working Pressure		16 atm
Test Pressure		24 atm
Vacuum Test		0.8 atm

Weight: SEE TABLE			Part Name: HYMAX 2 REDUCER 80-300 SS316 COATING 350 µm	Scale
	Date	Name	Catalog No. SD861-828-01	DO NOT SCALE DRAWING
Design	28/06/2017	Galina E.		
Check	31/01/2017	Galina E.	Drawing No. SD861-828-01	Sheet 2 of 2
Appr.	31/01/2017	Tzah Gr.		
KRAUSZ	Confidential information. All rights reserved to Krausz Industries Ltd. This document may not be copied, reproduced, displayed, modified or used in any way, whether in whole or in part, without the express prior written consent of Krausz Industries Ltd.			Size A3

RELEASED





Krausz Part Number	DN (mm)	Overall Range 1 (mm)	Before removal (flipping) the inner layer 1	After removal (flipping) the inner layer 1	H 1 (mm)	Overall Range 2 (mm)	Before removal (flipping) the inner layer 2	After removal (flipping) the inner layer 2	H 2 (mm)	L (mm)	i (mm)	A min (mm)	Bolts Qty. - Size (mm)	Torque Side 1 (Nm)	Torque Side 2 (Nm)	Approx Weight (Kg)
86182803150375I6	300 x 375	315-347	315-331	330-347	445	375-431	375-405	403-431	600	515	443	297	14-M 14 2-M 16	110	200	32
86182803340375I6	300 x 375	334-366	334-350	349-366	465	375-431	375-405	403-431	600	515	443	297	14-M 14 2-M 16	110	200	35
86182803150378I6	300 x 375	315-347	315-331	330-347	445	378-434	378-408	406-434	600	515	443	297	14-M 14 2-M 16	110	200	32
86182803340378I6	300 x 375	334-366	334-350	349-366	465	378-434	378-408	406-434	600	515	443	297	14-M 14 2-M 16	110	200	35

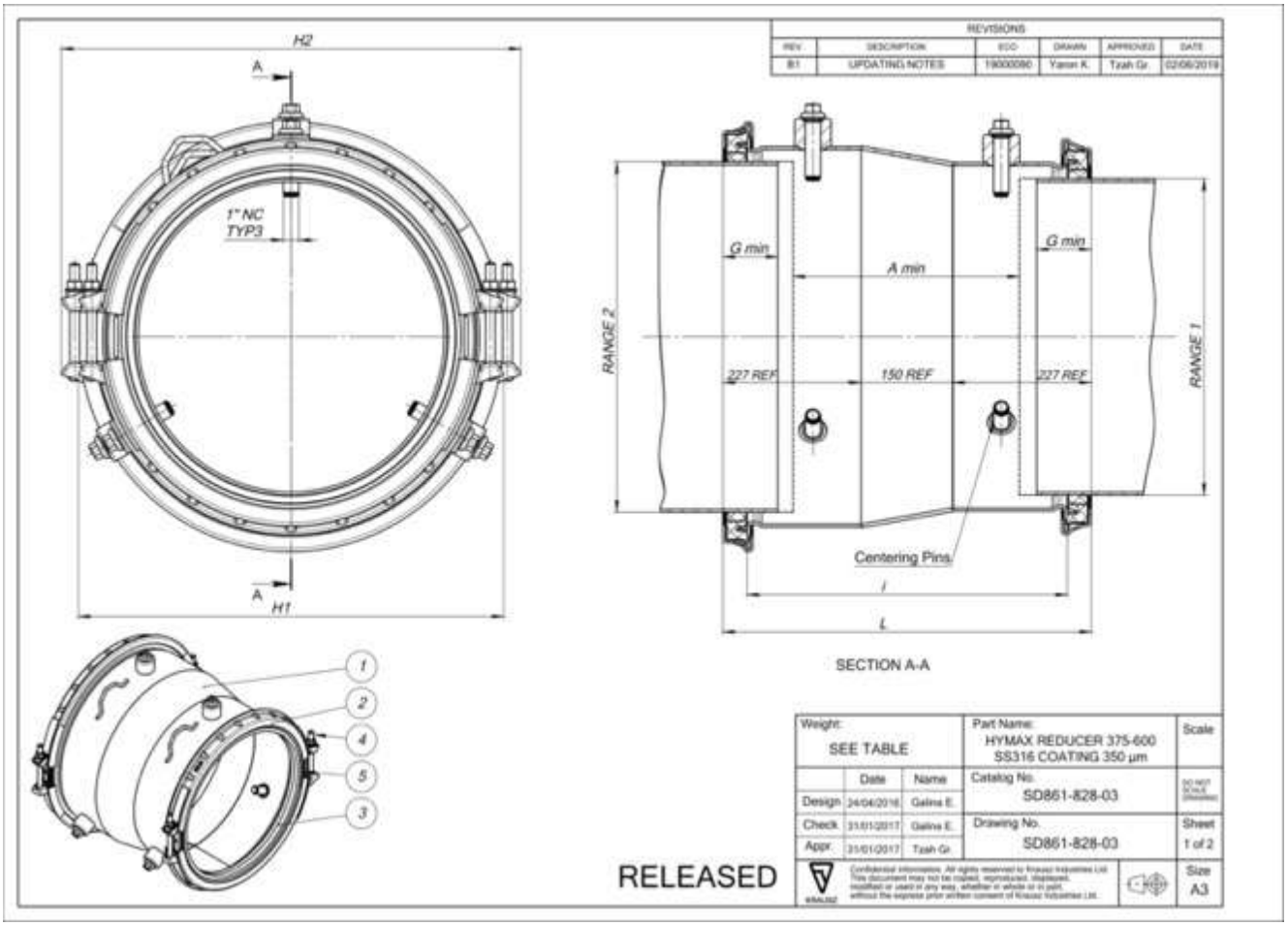
Material information:

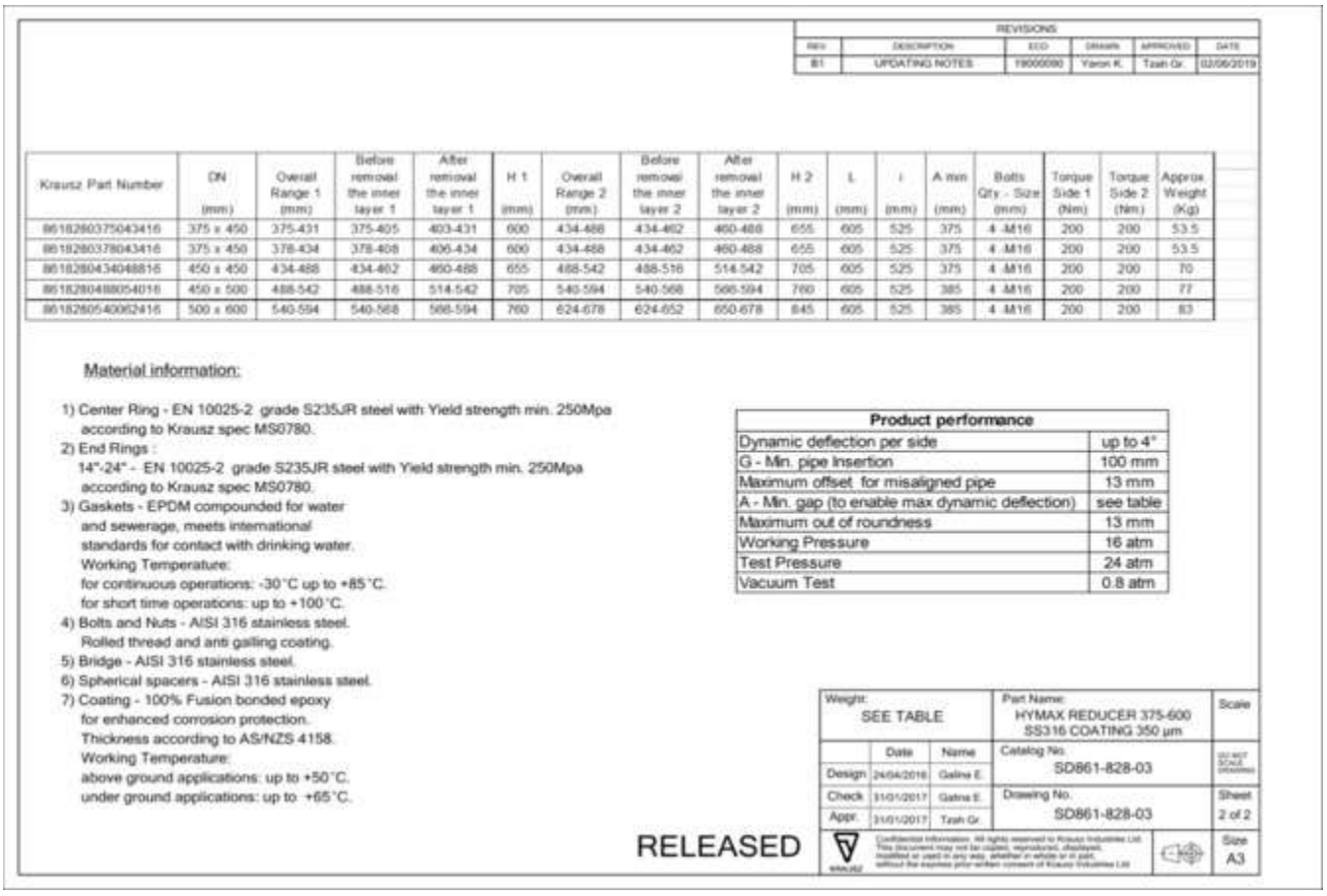
1) Center Ring:
   12" - EN 10025-2 grade S235JR steel with Yield strength min. 290Mpa according to Krausz spec MS0781.
   14" - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
2) End Rings :
   12"-14" - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
3) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30˚C up to +85˚C.
   for short time operations: up to +100˚C.
   - for DN 300 with flipping inner layer.
   - for DN 350 with removal inner layer.
4) Bolts and Nuts - AISI 316 stainless steel. Rolled thread and anti galling coating.
5) Bridge - AISI 316 stainless steel.
6) Spherical spacers - AISI 316 stainless steel.
7) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50˚C.
   under ground applications: up to +65˚C.

Product performance	
Dynamic deflection per side	up to 4°
G - Min. pipe Insertion	100 mm
Maximum offset for misaligned pipe	13 mm
A - Min. gap (to enable max dynamic deflection)	see table
Maximum out of roundness	8 mm
Working Pressure	16 atm
Test Pressure	24 atm
Vacuum Test	0.8 atm

RELEASED

Weight: SEE TABLE
Part Name: HYMAX REDUCER 300-375 SS316 COATING 350 µm
Scale
Date | Name
Design 31.05.2016 Galina E.
Check 31/01/2017 Galina E.
Appr. 31/01/2017 Tzah Gr.
Catalog No. SD861-828-02
Drawing No. SD861-828-02
Sheet 2 of 2
Size A3



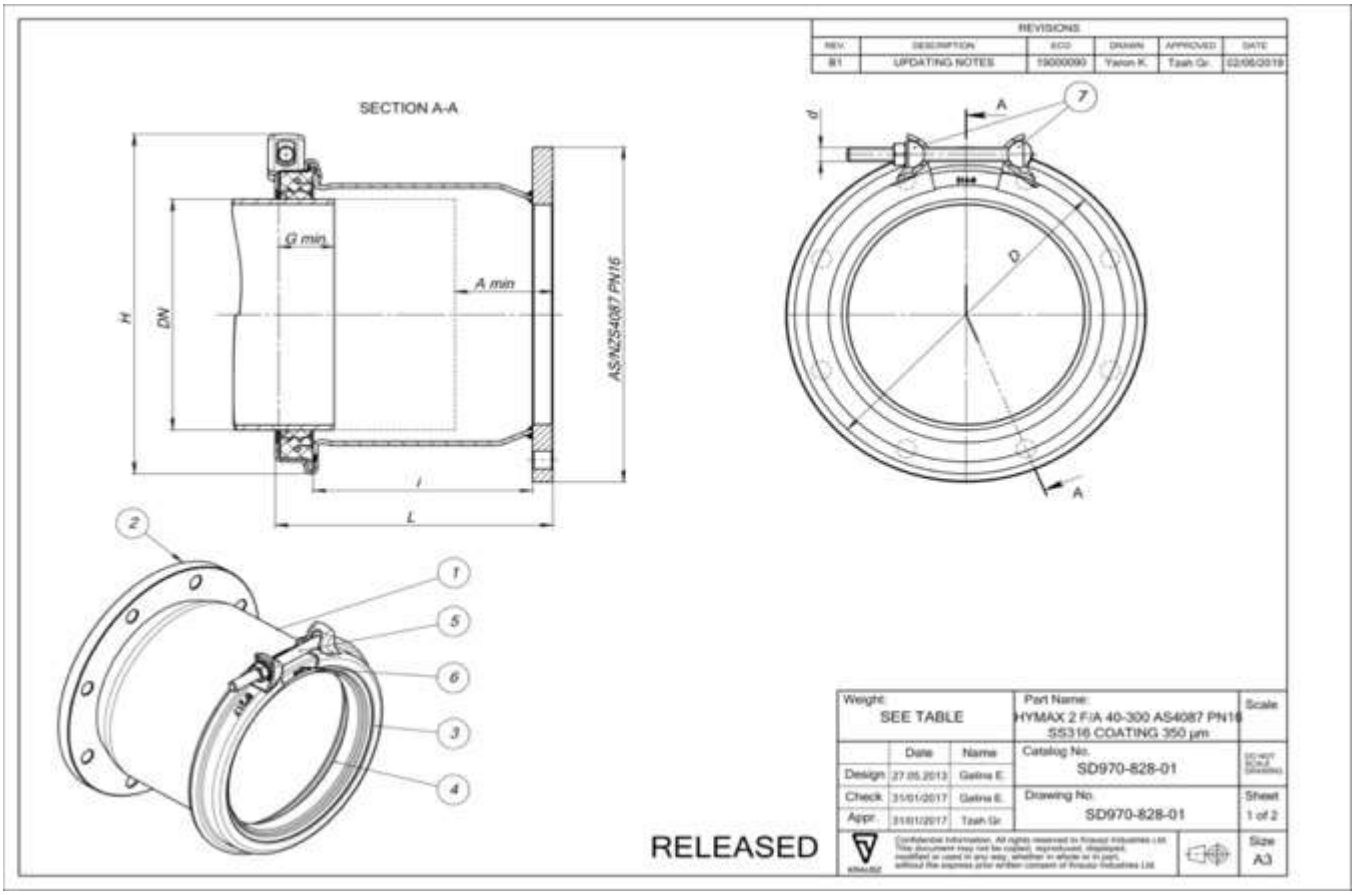


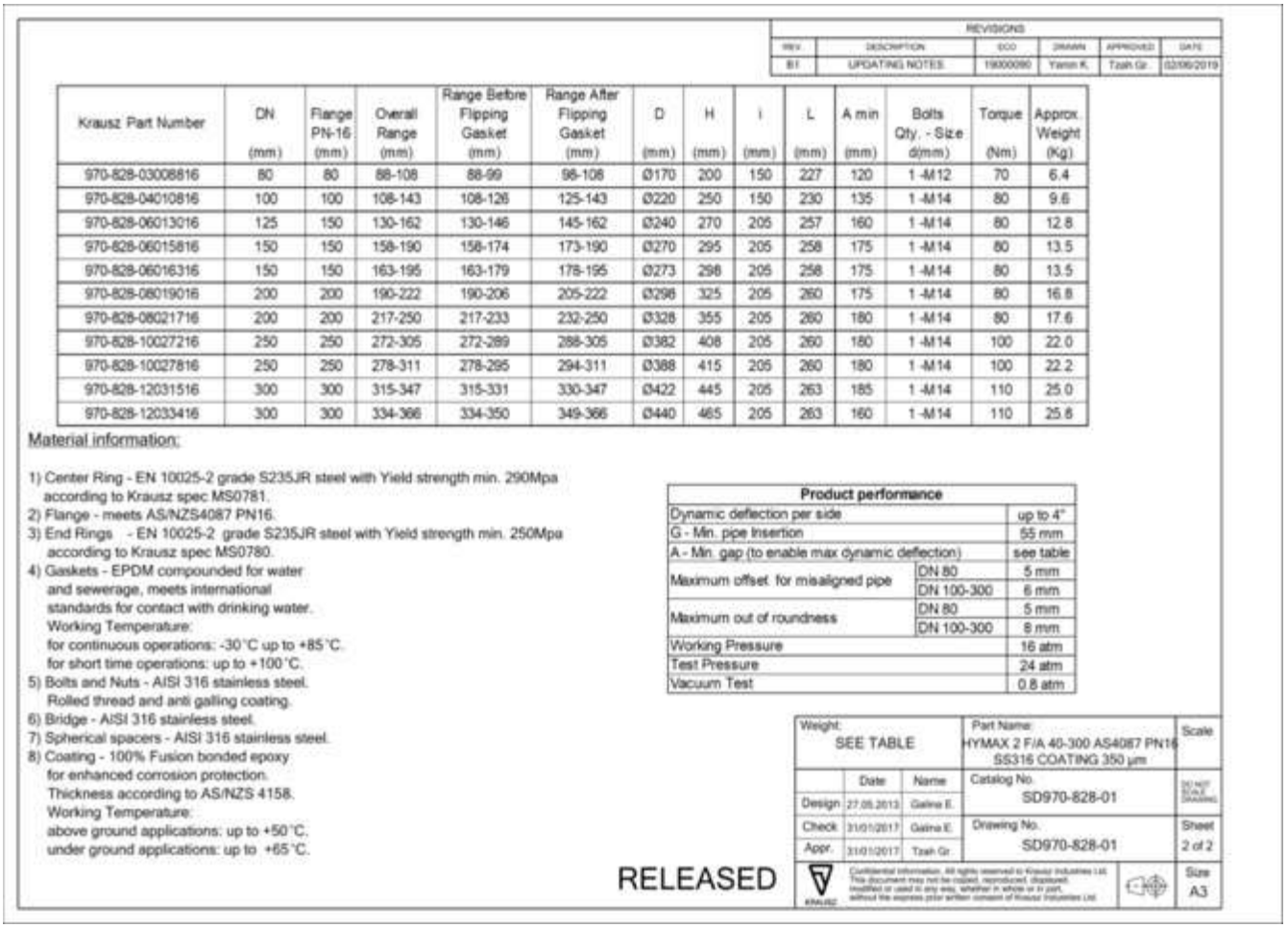
Krausz Part Number	DN (mm)	Overall Range 1 (mm)	Before removal the inner layer 1	After removal the inner layer 1	H 1 (mm)	Overall Range 2 (mm)	Before removal the inner layer 2	After removal the inner layer 2	H 2 (mm)	L (mm)	l (mm)	A min (mm)	Bolts Qty - Size (mm)	Torque Side 1 (Nm)	Torque Side 2 (Nm)	Approx. Weight (Kg)
86182803750434I6	375 x 450	375-431	375-405	403-431	600	434-488	434-462	460-488	655	605	525	375	4 -M16	200	200	53.5
86182803780434I6	375 x 450	378-434	378-408	406-434	600	434-488	434-462	460-488	655	605	525	375	4 -M16	200	200	53.5
86182804340488I6	450 x 450	434-488	434-462	460-488	655	488-542	488-516	514-542	705	605	525	375	4 -M16	200	200	70
86182804880540I6	450 x 500	488-542	488-516	514-542	705	540-594	540-568	596-594	760	605	525	385	4 -M16	200	200	77
86182805400624I6	500 x 600	540-594	540-568	568-594	760	624-678	624-652	650-678	845	605	525	385	4 -M16	200	200	83

Material information:

1) Center Ring - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
2) End Rings :
   14"-24" - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
3) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30˚C up to +85˚C.
   for short time operations: up to +100˚C.
4) Bolts and Nuts - AISI 316 stainless steel. Rolled thread and anti galling coating.
5) Bridge - AISI 316 stainless steel.
6) Spherical spacers - AISI 316 stainless steel.
7) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50˚C.
   under ground applications: up to +65˚C.

Product performance	
Dynamic deflection per side	up to 4°
G - Min. pipe Insertion	100 mm
Maximum offset for misaligned pipe	13 mm
A - Min. gap (to enable max dynamic deflection)	see table
Maximum out of roundness	13 mm
Working Pressure	16 atm
Test Pressure	24 atm
Vacuum Test	0.8 atm





Krausz Part Number	DN (mm)	Flange PN-16 (mm)	Overall Range (mm)	Range Before Flipping Gasket (mm)	Range After Flipping Gasket (mm)	D (mm)	H (mm)	i (mm)	L (mm)	A min (mm)	Bolts Qty. - Size d(mm)	Torque (Nm)	Approx. Weight (Kg)
970-828-03008816	80	80	88-108	88-99	98-108	Ø170	200	150	227	120	1 -M12	70	6.4
970-828-04010816	100	100	108-143	108-126	125-143	Ø220	250	150	230	135	1 -M14	80	9.6
970-828-06013016	125	150	130-162	130-146	145-162	Ø240	270	205	257	160	1 -M14	80	12.8
970-828-06015816	150	150	158-190	158-174	173-190	Ø270	295	205	258	175	1 -M14	80	13.5
970-828-06016316	150	150	163-195	163-179	178-195	Ø273	298	205	258	175	1 -M14	80	13.5
970-828-08019016	200	200	190-222	190-206	205-222	Ø298	325	205	260	175	1 -M14	80	16.8
970-828-08021716	200	200	217-250	217-233	232-250	Ø328	355	205	260	180	1 -M14	80	17.6
970-828-10027216	250	250	272-305	272-289	288-305	Ø382	408	205	260	180	1 -M14	100	22.0
970-828-10027816	250	250	278-311	278-295	294-311	Ø388	415	205	260	180	1 -M14	100	22.2
970-828-12031516	300	300	315-347	315-331	330-347	Ø422	445	205	263	185	1 -M14	110	25.0
970-828-12033416	300	300	334-366	334-350	349-366	Ø440	465	205	263	160	1 -M14	110	25.8

Material information:

1) Center Ring - EN 10025-2 grade S235JR steel with Yield strength min. 290Mpa according to Krausz spec MS0781.
2) Flange - meets AS/NZS4087 PN16.
3) End Rings - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
4) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30˚C up to +85˚C.
   for short time operations: up to +100˚C.
5) Bolts and Nuts - AISI 316 stainless steel. Rolled thread and anti galling coating.
6) Bridge - AISI 316 stainless steel.
7) Spherical spacers - AISI 316 stainless steel.
8) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50˚C.
   under ground applications: up to +65˚C.

Product performance		
Dynamic deflection per side		up to 4°
G - Min. pipe Insertion		55 mm
A - Min. gap (to enable max dynamic deflection)		see table
Maximum offset for misaligned pipe	DN 80	5 mm
	DN 100-300	6 mm
Maximum out of roundness	DN 80	5 mm
	DN 100-300	8 mm
Working Pressure		16 atm
Test Pressure		24 atm
Vacuum Test		0.8 atm

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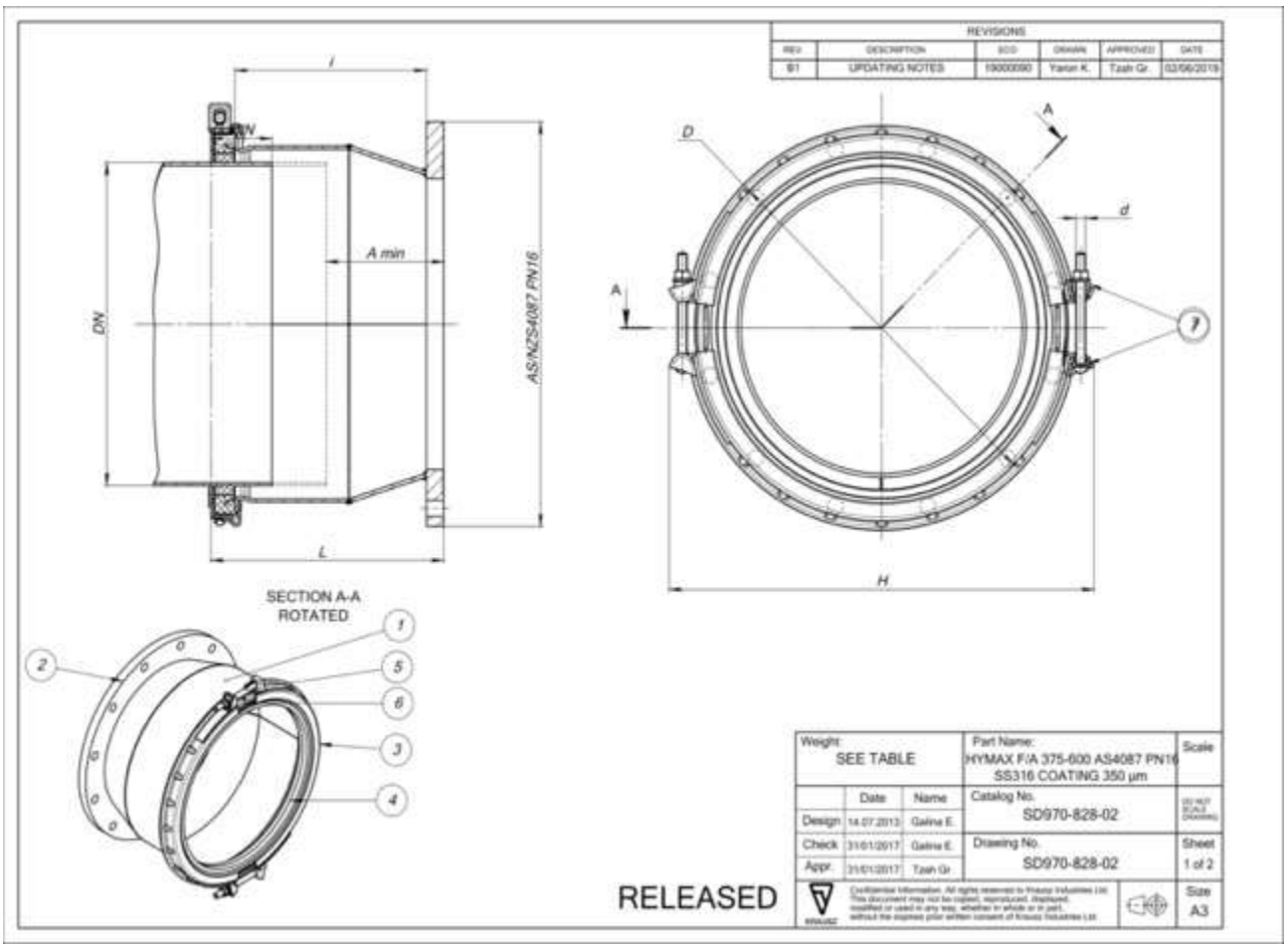
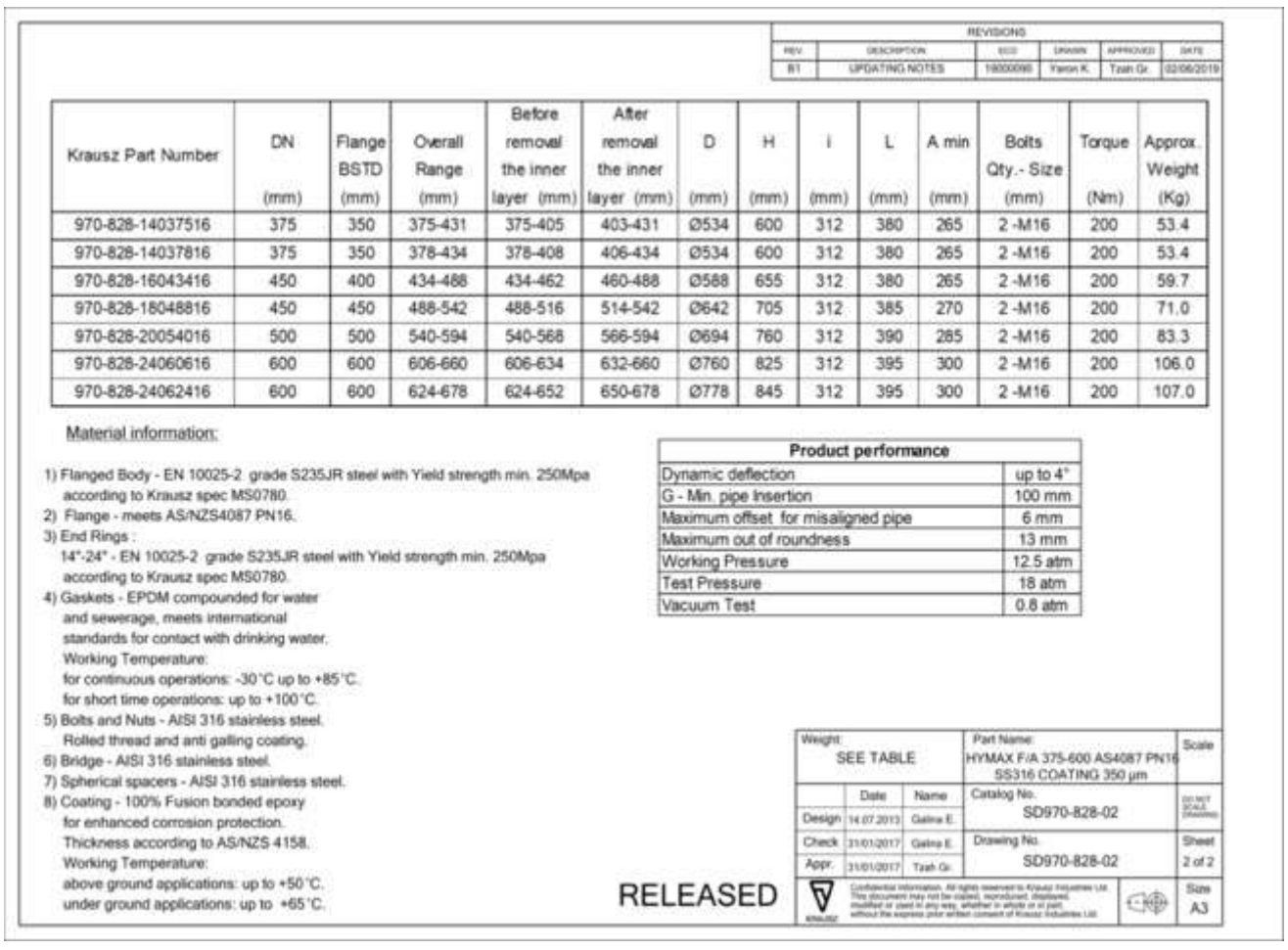
Weight: SEE TABLE
Part Name: HYMAX 2 F/A 40-300 AS4087 PN16 SS316 COATING 350 µm
Scale
Date Name
Design 27.05.2013 Galina E.
Check 31/01/2017 Galina E.
Appr. 31/01/2017 Tzah Gr.
Catalog No. SD970-828-01
Drawing No. SD970-828-01
Sheet 2 of 2
Size A3





Krausz Part Number	DN (mm)	Flange BSTD (mm)	Overall Range (mm)	Before removal the inner layer (mm)	After removal the inner layer (mm)	D (mm)	H (mm)	i (mm)	L (mm)	A min (mm)	Bolts Qty.- Size (mm)	Torque (Nm)	Approx. Weight (Kg)
970-828-14037516	375	350	375-431	375-405	403-431	Ø534	600	312	380	265	2 -M16	200	53.4
970-828-14037816	375	350	378-434	378-408	406-434	Ø534	600	312	380	265	2 -M16	200	53.4
970-828-16043416	450	400	434-488	434-462	460-488	Ø588	655	312	380	265	2 -M16	200	59.7
970-828-18048816	450	450	488-542	488-516	514-542	Ø642	705	312	385	270	2 -M16	200	71.0
970-828-20054016	500	500	540-594	540-568	566-594	Ø694	760	312	390	285	2 -M16	200	83.3
970-828-24060616	600	600	606-660	606-634	632-660	Ø760	825	312	395	300	2 -M16	200	106.0
970-828-24062416	600	600	624-678	624-652	650-678	Ø778	845	312	395	300	2 -M16	200	107.0

Material information:

1) Flanged Body - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
2) Flange - meets AS/NZS4087 PN16.
3) End Rings :
   14"-24" - EN 10025-2 grade S235JR steel with Yield strength min. 250Mpa according to Krausz spec MS0780.
4) Gaskets - EPDM compounded for water and sewerage, meets international standards for contact with drinking water.
   Working Temperature:
   for continuous operations: -30°C up to +85°C.
   for short time operations: up to +100°C.
5) Bolts and Nuts - AISI 316 stainless steel.
   Rolled thread and anti galling coating.
6) Bridge - AISI 316 stainless steel.
7) Spherical spacers - AISI 316 stainless steel.
8) Coating - 100% Fusion bonded epoxy for enhanced corrosion protection.
   Thickness according to AS/NZS 4158.
   Working Temperature:
   above ground applications: up to +50°C.
   under ground applications: up to +65°C.

Product performance	
Dynamic deflection	up to 4°
G - Min. pipe Insertion	100 mm
Maximum offset for misaligned pipe	6 mm
Maximum out of roundness	13 mm
Working Pressure	12.5 atm
Test Pressure	18 atm
Vacuum Test	0.8 atm

Weight: SEE TABLE
Part Name: HYMAX F/A 375-600 AS4087 PN16 SS316 COATING 350 µm
Scale
Date | Name
Design 14.07.2013 Galina E.
Check 31/01/2017 Galina E.
Appr. 31/01/2017 Tzah Gr.
Catalog No. SD970-828-02
Drawing No. SD970-828-02
Sheet 2 of 2
Size A3
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APPENDIX B - QUALITY ASSURANCE CERTIFICATES AND SCHEDULES

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

TABLE B1 KRAUSZ INDUSTRIES LTD – MANAGEMENT SYSTEMS

1, Hapatish St, Tel Aviv, Israel	
Quality Systems Standard	ISO 9001:2015
Certificate licence no.	90452
Certifying agency	The Standards Institute of Israel
First date of certification	17 October 1996
Current date of certification	8 January 2018
Expiry date of certification	22 November 2019

TABLE B2 KRAUSZ INDUSTRIES LTD – PRODUCT CERTIFICATION

1, Hapatish St, Tel Aviv, Israel	
Product Standard/Spec.	AS/NZS 4998:2009
Certificate No.	OMK30069
Issuing certification body	IAPMO R&T OCEANA
First date of certification	11 July 2019
Current date of certification	11 July 2019
Expiry date of certification	10 July 2024

CERTIFICATE

This is to certify that the Quality Management System of

KRAUSZ INDUSTRIES LTD.

1, Hapatish St. , Tel Aviv , Israel

Has been audited and registered by SII-QCD as conforming to the requirements of :

ISO 9001:2015

This Certificate is Applicable to

Develop, manufacture and sales of pipe joints and plastic forming of metal.

THE STANDARDS INSTITUTION OF ISRAEL

MGMT. SYS.
RvA C 096

Certificate No.: 90452
Initial Certification Date: 17/10/1996

Certificate Issue Date: 08/01/2018
Certification Expiry Date: 22/11/2019

SII-QCD assumes no liability to any party other than the client, and then only in accordance with the agreed upon Certification Agreement.
This certificate's validity is subject to the organization maintaining their system in accordance with SII-QCD requirements for system certification. The continued validity may be verified via scanning the code with a smartphone, or via website www.sii.org.il. This certificate remains the property of SII-QCD.

Ilan Carmit
Acting Director General

B.N 510560220

Eli Cohen-Kagan
Director, Quality & Certification Division

The Standards Institution of Israel

Page 1 of 2

Our Vision: To Enhance Both Global Competitiveness of our Services, with our Uncompromised Quality and Integrity

IAPMO R&T OCEANA

1040 Dandenong Road, Carnegie VIC 3163 AUSTRALIA

IAPMO R&T Oceana is a product certification body which inspects and arranges for the independent laboratory testing of samples taken from the manufacturer's stock or from the market or a combination of both, to verify compliance of the requirements of applicable Standards and Specifications. This activity is coupled with periodic surveillance of the certified product taken from the market place or the manufacturer's factory. This certification is subject to the conditions set forth in the characteristics below and is not to be construed as any recommendation, assurance or guarantee by IAPMO R&T Oceana of the product acceptance by Authorities Having Jurisdiction. The IAPMO R&T Oceana "OceanaMark" Product Certification Scheme is a JAS-ANZ accredited ISO Guide 67 Type 5 Product Certification Scheme.

OCEANAMARK CERTIFICATE

IAPMO R&T Oceana hereby grants to:

Krausz Industries Ltd.

6 Hapatish Street, Tel-Aviv, Israel, 6105301

the right to use the OceanaMark in accordance with IAPMO Oceana Pty Ltd 'Mark Rules' on the product as described in the attached OceanaMark Schedule. The Certificate is granted subject to IAPMO Oceana Pty Ltd 'Governance Rules'.

Evaluated to:

AS/NZS 4998:2009

Bolted unrestrained mechanical couplings for waterworks purposes

Manufacturer:

Krausz Industries Ltd.

Certificate No.:	OMK30069	Certified Date:	11 July 2019
Issue Date:	11 July 2019	Expiry Date:	10 July 2024

Russ Chaney

Chief Executive Officer of the IAPMO Group

This OceanaMark certification is for the period indicated herein and is void after the date shown above. Any change in material, manufacturing process, marking or design without having first obtained the approval of IAPMO R&T Oceana, or any evidence of non-compliance with applicable Standards, Specifications or of inferior workmanship, may be deemed sufficient cause for revocation of this certification. Reproduction of or reference to this certificate for advertising purposes may be made only by specific written permission of IAPMO R&T Oceana. Any alteration of this certificate could be grounds for revocation of this certification.

OCEANAMARK SCHEDULE

Certificate Holder: Krausz Industries Ltd.
Address: 6 Hapatish Street
Tel-Aviv, 6105301
ISRAEL
A.B.N.: N/A

Manufacturer: Krausz Industries Ltd.

Certificate No.: OMK30069
Issue Date: 11-Jul-19
Expiry Date: 10-Jul-24
First Certified: 11-Jul-19
Standards: AS/NZS 4998-2009
Bolted unrestrained mechanical couplings for waterworks purposes

Std/Spec: AS/NZS 4998-2009 *Certificate No.:* OMK30069

Brand Name	Model Name	Model ID	Product Type	Product Description	Nominal Size	Nominal Pressure	Material	Additional Product Information
Krausz	HYMAX 2 ®	860-828-0088-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 3"(88-108) SS316 fasteners	DN80	PN16	FBE coated + EPDM gaskets	88-108mm
Krausz	HYMAX 2 ®	860-828-0108-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 4"(108-143) SS316 fasteners	DN100	PN16	FBE coated + EPDM gaskets	108-143mm
Krausz	HYMAX 2 ®	860-828-0130-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 5"(130-162) SS316 fasteners	DN125	PN16	FBE coated + EPDM gaskets	130-162mm
Krausz	HYMAX 2 ®	860-828-0158-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 6"(158-190) SS316 fasteners	DN150	PN16	FBE coated + EPDM gaskets	158-190mm
Krausz	HYMAX 2 ®	860-828-0163-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 6"(163-195) SS316 fasteners	DN150	PN16	FBE coated + EPDM gaskets	163-195mm
Krausz	HYMAX 2 ®	860-828-0190-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 7"(190-222) SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	190-222mm
Krausz	HYMAX 2 ®	860-828-0217-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 8"(217-250) SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	217-250mm
Krausz	HYMAX 2 ®	860-828-0222-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 8"(222-252) SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	222-252mm
Krausz	HYMAX 2 ®	860-828-0272-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 10"(272-305) SS316 fasteners	DN250	PN16	FBE coated + EPDM gaskets	272-305mm

Std/Spec: AS/NZS 4998-2009 Certificate No.: OMK30069

Brand Name	Model Name	Model ID	Product Type	Product Description	Nominal Size	Nominal Pressure	Material	Additional Product Information
Krausz	HYMAX 2 ®	860-828-0278-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 10"(278-311) SS316 fasteners	DN250	PN16	FBE coated + EPDM gaskets	278-311mm
Krausz	HYMAX 2 ®	860-828-0315-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 12"(315-347) SS316 fasteners	DN300	PN16	FBE coated + EPDM gaskets	315-347mm
Krausz	HYMAX 2 ®	860-828-0334-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 12"(334-366) SS316 fasteners	DN300	PN16	FBE coated + EPDM gaskets	334-366mm
Krausz	HYMAX ®	860-828-0375-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 14"(375-431) with pins SS316 fasteners	DN375	PN16	FBE coated + EPDM gaskets	375-431mm
Krausz	HYMAX ®	860-828-0378-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 14"(378-434) with pins SS316 fasteners	DN375	PN16	FBE coated + EPDM gaskets	378-434mm
Krausz	HYMAX ®	860-828-0434-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 16"(434-488) with pins SS316 fasteners	DN450	PN16	FBE coated + EPDM gaskets	434-488mm
Krausz	HYMAX ®	860-828-0488-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 18"(488-542) with pins SS316 fasteners	DN450	PN16	FBE coated + EPDM gaskets	488-542mm
Krausz	HYMAX ®	860-828-0540-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 20"(540-594) with pins SS316 fasteners	DN500	PN16	FBE coated + EPDM gaskets	540-594mm
Krausz	HYMAX ®	860-828-0606-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 24"(606-660) with pins SS316 fasteners	DN600	PN16	FBE coated + EPDM gaskets	606-660mm
Krausz	HYMAX ®	860-828-0624-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 24"(624-678) with pins SS316 fasteners	DN600	PN16	FBE coated + EPDM gaskets	624-678mm
Krausz	HYMAX 2 ®	862-828-0088-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 3"(88-108) SS316 fasteners	DN80	PN16	FBE coated + EPDM gaskets	88-108mm
Krausz	HYMAX 2 ®	862-828-0108-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 4"(108-143) SS316 fasteners	DN100	PN16	FBE coated + EPDM gaskets	108-143mm
Krausz	HYMAX 2 ®	862-828-0130-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 5"(130-162) SS316 fasteners	DN125	PN16	FBE coated + EPDM gaskets	130-162mm
Krausz	HYMAX 2 ®	862-828-0158-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 6"(158-190) SS316 fasteners	DN150	PN16	FBE coated + EPDM gaskets	158-190mm
Krausz	HYMAX 2 ®	862-828-0163-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 6"(163-195) SS316 fasteners	DN150	PN16	FBE coated + EPDM gaskets	163-195mm

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Brand Name	Model Name	Model ID	Product Type	Product Description	Nominal Size	Nominal Pressure	Material	Additional Product Information
Krausz	HYMAX 2 ®	862-828-0190-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 7"(190-222) SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	190-222mm
Krausz	HYMAX 2 ®	862-828-0217-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 8"(217-250) SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	217-250mm
Krausz	HYMAX 2 ®	862-828-0222-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 8"(222-252) SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	222-252mm
Krausz	HYMAX 2 ®	862-828-0272-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 10"(272-305) SS316 fasteners	DN250	PN16	FBE coated + EPDM gaskets	272-305mm
Krausz	HYMAX 2 ®	862-828-0278-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 10"(278-311) SS316 fasteners	DN250	PN16	FBE coated + EPDM gaskets	278-311mm
Krausz	HYMAX 2 ®	862-828-0315-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 12"(315-347) SS316 fasteners	DN300	PN16	FBE coated + EPDM gaskets	315-347mm
Krausz	HYMAX 2 ®	862-828-0334-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 LONG 12"(334-366) SS316 fasteners	DN300	PN16	FBE coated + EPDM gaskets	334-366mm
Krausz	HYMAX ®	862-828-0375-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX LONG 14"(375-431) with pins SS316 fasteners	DN375	PN16	FBE coated + EPDM gaskets	375-431mm
Krausz	HYMAX ®	862-828-0378-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX LONG 14"(378-434) with pins SS316 fasteners	DN375	PN16	FBE coated + EPDM gaskets	378-434mm
Krausz	HYMAX ®	862-828-0434-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX LONG 16"(434-488) with pins SS316 fasteners	DN450	PN16	FBE coated + EPDM gaskets	434-488mm
Krausz	HYMAX ®	862-828-0488-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX LONG 18"(488-542) with pins SS316 fasteners	DN450	PN16	FBE coated + EPDM gaskets	488-542mm
Krausz	HYMAX ®	862-828-0540-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX LONG 20"(540-594) with pins SS316 fasteners	DN500	PN16	FBE coated + EPDM gaskets	540-594mm
Krausz	HYMAX ®	862-828-0606-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX LONG 24"(606-660) with pins SS316 fasteners	DN600	PN16	FBE coated + EPDM gaskets	606-660mm
Krausz	HYMAX ®	862-828-0624-16	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX LONG 24"(624-678) with pins SS316 fasteners	DN600	PN16	FBE coated + EPDM gaskets	624-678mm
Krausz	HYMAX 2 ®	970-828-03008816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 3" (88-108)F3" AS/NZS4087 PN16 SS316 fasteners	DN80	PN16	FBE coated + EPDM gaskets	88-108mm

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Brand Name	Model Name	Model ID	Product Type	Product Description	Nominal Size	Nominal Pressure	Material	Additional Product Information
Krausz	HYMAX 2 ®	970-828-04010816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 4" (108-143)F4" AS/NZS4087 PN16 SS316 fasteners	DN100	PN16	FBE coated + EPDM gaskets	108-143mm
Krausz	HYMAX 2 ®	970-828-06013016	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 5" (130-162)F6" AS/NZS4087 PN16 SS316 fasteners	DN125	PN16	FBE coated + EPDM gaskets	130-162mm
Krausz	HYMAX 2 ®	970-828-06015816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 6" (158-190)F6" AS/NZS4087 PN16 SS316 fasteners	DN150	PN16	FBE coated + EPDM gaskets	158-190mm
Krausz	HYMAX 2 ®	970-828-06016316	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 6" (163-195)F6" AS/NZS4087 PN16 SS316 fasteners	DN150	PN16	FBE coated + EPDM gaskets	163-195mm
Krausz	HYMAX 2 ®	970-828-08019016	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 7" (190-222)F8" AS/NZS4087 PN16 SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	190-222mm
Krausz	HYMAX 2 ®	970-828-08021716	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 8" (217-250)F8" AS/NZS4087 PN16 SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	217-250mm
Krausz	HYMAX 2 ®	970-828-10027216	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 10"(272-305)F10" AS/NZS4087 PN16 SS316 fasteners	DN200	PN16	FBE coated + EPDM gaskets	272-305mm
Krausz	HYMAX 2 ®	970-828-10027816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 10"(278-311)F10" AS/NZS4087 PN16 SS316 fasteners	DN250	PN16	FBE coated + EPDM gaskets	278-311mm
Krausz	HYMAX 2 ®	970-828-12031516	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 12"(315-347)F12" AS/NZS4087 PN16 SS316 fasteners	DN300	PN16	FBE coated + EPDM gaskets	315-347mm
Krausz	HYMAX 2 ®	970-828-12033416	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 F/A 12"(334-366)F12" AS/NZS4087 PN16 SS316 fasteners	DN300	PN16	FBE coated + EPDM gaskets	334-366mm
Krausz	HYMAX ®	970-828-14037516	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX F/A 14"(375-431)F14" AS/NZS4087 PN16 SS316 fasteners	DN375	PN16	FBE coated + EPDM gaskets	375-431mm
Krausz	HYMAX ®	970-828-14037816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX F/A 14"(378-434)F14" AS/NZS4087 PN16 SS316 fasteners	DN375	PN16	FBE coated + EPDM gaskets	378-434mm
Krausz	HYMAX ®	970-828-16043416	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX F/A 16"(434-488)F16" AS/NZS4087 PN16 SS316 fasteners	DN450	PN16	FBE coated + EPDM gaskets	434-488mm
Krausz	HYMAX ®	970-828-18048816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX F/A 18"(488-542)F18" AS/NZS4087 PN16 SS316 fasteners	DN450	PN16	FBE coated + EPDM gaskets	488-542mm
Krausz	HYMAX ®	970-828-20054016	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX F/A 20"(540-594)F20" AS/NZS4087 PN16 SS316 fasteners	DN500	PN16	FBE coated + EPDM gaskets	540-594mm

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Brand Name	Model Name	Model ID	Product Type	Product Description	Nominal Size	Nominal Pressure	Material	Additional Product Information
Krausz	HYMAX ®	970-828-24060616	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX F/A 24"(606-660)F24" AS/NZS4087 PN16 SS316 fasteners	DN600	PN16	FBE coated + EPDM gaskets	606-660mm
Krausz	HYMAX ®	970-828-24062416	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX F/A 24"(624-678)F24" AS/NZS4087 PN16 SS316 fasteners	DN600	PN16	FBE coated + EPDM gaskets	624-678mm
Krausz	HYMAX 2 ®	8618280088010816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 3"(88-108)x4"(108-143)SS316 fasteners	DN80 x DN100	PN16	FBE coated + EPDM gaskets	88-108mm x 108-143mm
Krausz	HYMAX 2 ®	8618280108013016	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 4"(108-143)x5"(130-162)SS316 fasteners	DN100 x DN125	PN16	FBE coated + EPDM gaskets	108-143mm x 130-162mm
Krausz	HYMAX 2 ®	8618280108015816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 4"(108-143)x6"(158-190)SS316 fasteners	DN100 x DN150	PN16	FBE coated + EPDM gaskets	108-143mm x 158-190mm
Krausz	HYMAX 2 ®	8618280130015816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 5"(130-162)x6"(158-190)SS316 fasteners	DN125 x DN150	PN16	FBE coated + EPDM gaskets	130-162mm x 158-190mm
Krausz	HYMAX 2 ®	8618280158021716	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 6"(158-190)x8"(217-250)SS316 fasteners	DN150 x DN200	PN16	FBE coated + EPDM gaskets	158-190mm x 217-250mm
Krausz	HYMAX 2 ®	8618280163019016	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 6"+(163-195)x7"(190-222)SS316 fasteners	DN150 x DN200	PN16	FBE coated + EPDM gaskets	163-195mm x 190-222mm
Krausz	HYMAX 2 ®	8618280163021716	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 6"+(163-195)x8"(217-250)SS316 fasteners	DN150 x DN200	PN16	FBE coated + EPDM gaskets	163-195mm x 217-250mm
Krausz	HYMAX 2 ®	8618280190021716	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 7"(190-222)x8"(217-250)SS316 fasteners	DN200 x DN200	PN16	FBE coated + EPDM gaskets	190-222mm x 217-250mm
Krausz	HYMAX 2 ®	8618280217027216	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 8"(217-250)x10"(272-305)SS316 fasteners	DN200 x DN250	PN16	FBE coated + EPDM gaskets	217-250mm x 272-305mm
Krausz	HYMAX 2 ®	8618280222027216	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 8"(222-252)x10"(272-305)SS316 fasteners	DN200 x DN250	PN16	FBE coated + EPDM gaskets	222-252mm x 272-305mm
Krausz	HYMAX 2 ®	8618280272031516	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 10"(272-305)x12"(315-347)SS316 fasteners	DN250 x DN300	PN16	FBE coated + EPDM gaskets	272-305mm x 315-347mm
Krausz	HYMAX 2 ®	8618280278031516	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 10"(278-311)x12"(315-347)SS316 fasteners	DN250 x DN300	PN16	FBE coated + EPDM gaskets	278-311mm x 315-347mm
Krausz	HYMAX 2 ®	8618280315033416	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX 2 Reducer 12"(315-347)x12"(334-366)SS316 fasteners	DN300 x DN300	PN16	FBE coated + EPDM gaskets	315-347mm x 334-366mm

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Brand Name	Model Name	Model ID	Product Type	Product Description	Nominal Size	Nominal Pressure	Material	Additional Product Information
Krausz	HYMAX ®	8618280315037516	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 12"(315-347)x14"(375-431)SS316 fasteners	DN300 x DN375	PN16	FBE coated + EPDM gaskets	315-347mm x 375-431mm
Krausz	HYMAX ®	8618280315037816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 12"(315-347)x14"(378-434)SS316 fasteners	DN300 x DN375	PN16	FBE coated + EPDM gaskets	315-347mm x 378-434mm
Krausz	HYMAX ®	8618280334037516	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 12"(334-366)x14"(375-431)SS316 fasteners	DN300 x DN375	PN16	FBE coated + EPDM gaskets	334-366mm x 375-431mm
Krausz	HYMAX ®	8618280334037816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 12"(334-366)x14"(378-431)SS316 fasteners	DN300 x DN375	PN16	FBE coated + EPDM gaskets	334-366mm x 378-434mm
Krausz	HYMAX ®	8618280375043416	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 14"(375-431)x16"(434-488)SS316 fasteners	DN375 x DN450	PN16	FBE coated + EPDM gaskets	375-431mm x 434-488mm
Krausz	HYMAX ®	8618280378043416	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 14"(378-434)x16"(434-488)SS316 fasteners	DN375 x DN450	PN16	FBE coated + EPDM gaskets	378-434mm x 434-488mm
Krausz	HYMAX ®	8618280434048816	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 16"(434-488)x18"(488-542)SS316 fasteners	DN450 x DN450	PN16	FBE coated + EPDM gaskets	434-488mm x 488-542mm
Krausz	HYMAX ®	8618280488054016	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 18"(488-542)x20"(540-594)SS316 fasteners	DN450 x DN500	PN16	FBE coated + EPDM gaskets	488-542mm x 540-600mm
Krausz	HYMAX ®	8618280540062416	Bolted unrestrained mechanical couplings for waterworks purposes	HYMAX Reducer 20"(540-600)x24"(624-678)SS316 fasteners	DN500 x DN600	PN16	FBE coated + EPDM gaskets	540-600mm x 624-678mm

END RECORD **END RECORD**

Russ Chaney

Chief Executive Officer of the IAPMO Group

APPENDIX C - WSA PRODUCT SPECIFICATION

WATER SERVICES ASSOCIATION of Australia

PRODUCT SPECIFICATION

WSA PS – 270 MECHANICAL COUPLINGS, NON-END THRUST RESTRAINT FOR PRESSURE APPLICATIONS – WATER SUPPLY AND SEWERAGE

270.1 SCOPE

This specification covers non-end thrust restraint mechanical couplings for use with PVC and ductile iron pipes having "cast iron outside diameters" (CIOD) in pressure applications in water supply[1] and sewerage.

270.2 REQUIREMENTS

(a) Couplings for pipelines other than PE shall comply with AS/NZS 4998:2009.

(b) Couplings for PE pipelines shall comply with AS/NZS 4129:2008/Amdt 1:2013.

(c) Elastomeric joint seals shall be EPDM complying with AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) Flange adaptor connections shall comply with AS/NZS 4087:2011/Amdt 1:2012.

(e) For flanged adaptor end connections, full face and integral gaskets and O-rings shall comply with WSA 109:2011.

(f) Jointing lubricants shall comply with AS/NZS 4020:2005.

270.3 QUALITY ASSURANCE

(a) Couplings shall have product certification (ISO Type 5) to AS/NZS 4998:2009.

(b) Polymeric coatings shall have product certification (ISO Type 5) to AS/NZS 4158:2003/Amdt 1:2005.

(c) Elastomeric joint seals shall have product certification to AS 1646:2007 and AS 681.1:2008 (EN 681-1:1996).

(d) For flanged adaptor end connections, full face and integral gaskets and O-rings shall have a certificate of compliance to WSA 109:2011.

(e) Jointing lubricants shall have a certificate of compliance to AS/NZS 4020:2018.

(f) All products shall be marked in accordance with the conformity assessment body's requirements.

270.4 AGENCY OR PROJECT SPECIFIC REQUIREMENTS

Pressure Class, PN	
Pipe material(s) to be joined	
Coupling length i.e. short series or long series	
Coupling type e.g. straight, stepped, flange adaptor	
For stepped couplings nominate the range of outside diameters to be joined	
For flange adaptors nominate the flange drilling Figure from AS/NZS 4087:2011/Amdt 1:2012 or other nominated flange Standard	
Alternative elastomeric material for joint seals	

NOTE:

1 Includes drinking water and recycled water supply. Colour differentiation is not required.

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APPENDIX D - SUPPLIER CONTACTS

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