WSAA PRODUCT APPRAISAL CERTIFICATE

Kwik-Zip Pty Ltd

kwik-ZIP® HD, HDX and HDXT Casing Spacers

This appraisal is for a range of kwik-ZIP® HD, HDX and HDXT casing spacers that are used to maintain the position of a carrier pipe (watermain or sewer) within an encasing pipe for pipe-in-pipe applications such as slip lining and cased crossings. This Issue 4 is to add the range of HD casing spacers to this Appraisal.

The various systems can be used for light to heavy weight pipe materials including steel, ductile iron, GRP, FRP, concrete, PVC and PE and is suitable for both pressure and non-pressure pipelines in grouted and un-grouted installations.

The casing spacers utilise a segmented design that allows the system to be used on a range of carrier pipes from 100mm OD and beyond, with no upper limit.

The number of segments required for each spacer is determined by the outside diameter of the carrier pipe.

The HD casing spacers are offered with four bow heights: 30mm, 50mm, 75mm and 100mm.

The HDX casing spacers are offered with four runner heights: 38mm, 65mm, 90mm and 125mm

The HDXT casing spacers are offered with five runner heights: 43mm, 58mm, 63mm, 103mm, and 153mm

Quality Certification details are referenced in Schedule A.

Product Category	Casing Spacers
PA Number	PA 1523 Issue 4
Supplier	Kwik-ZIP Pty Ltd
Brand	Kwik-ZIP
WSAA Product Specification	WSA PS - 324 *Casing Spacers*
Issue date	22 June 2024
Expiry date	20 April 2026
Recommendations	It is recommended that WSAA members, subject to any specific requirements of the member, accept or authorise the kwik-ZIP HD, HDX and HDXT casing spacers, as detailed in this report, for use in pipe-in-pipe pressure or non-pressure applications such as slip lining and cased crossings for carrier pipes from 100mm OD to 3000mm OD, provided the casing spacers are designed and installed in accordance with WSAA Codes and manufacturer's requirements.
Disclaimer	The disclaimer on Page 2 explains a number of very important limits on your ability to rely on the information in this Product Appraisal Certificate and the assessment criteria used to underlie it. Please read it carefully and take into account when considering the content in this Certificate.

1. Disclaimer

This Product Appraisal Certificate (Certificate) is issued by WSAA on the understanding that:

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

To maintain the recommendations of this Certificate any such changes shall be detailed and notified to the Product Appraisal Manager for consideration and review of the Certificate including the product appraisal criteria underlying it 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. Certificates will be reviewed and reissued at regular intervals not exceeding five (5) years.

WSAA reserves the right to withdraw this Certificate at any time in its sole and absolute discretion for any reason.

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

Any enquiries regarding this Certificate should be directed to the Product Appraisal Manager Phone: 03 8605 7601 email carl.radford@wsaa.asn.au.

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The Certificate and the underlying product appraisal criteria have been prepared for use within Australia only by technical specialists that have expertise in the function of products such as those appraised in the Certificate (the Recipients).

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1.4. 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 Certificate, or the accuracy, completeness or reasonableness of any recommendation in this Certificate.

QUALITY CERTIFICATION

A copy of the following Quality Certificate is available from WSAA.

SCHEDULE A1

KWIK-ZIP PTY LTD – MANAGEMENT SYSTEMS

4 Wicks Street Bayswater WA	
Quality Systems Standard	ISO 9001:2015
Certification Licence No.	C0C3C5DD208D428CCA258A820003F201
Certifying Agency	Global-Mark Pty Ltd
First Date of Certification	24 October 2022
Current Date of Certification	1 December 2023
Expiry Date of Certification	13 December 2026

PRODUCT LITERATURE

HD Series - Horizontal

kwik-ZIP®

Application

A non-corroding, non-metallic heavy duty bow spring casing spacer for horizontal pipe-in-pipe (PIP) and open bore applications such as wastewater and sewer pipelines, slip lining and cased crossings. Suitable for light to medium weight carrier pipe materials including steel, ductile, MSCL, GRE, PVC, and HDPE. Will fit diameters from 110mm OD (4.33") to greater than 1600mm OD (63") by addition of multiple segments.

For heavy carrier pipe materials and diameters greater than 355mm (14") in non-grouted, pressure installations the kwik-ZIP® HDX or HDXT Series is recommended.

Construction & Features

- Made from Kwik-ZIP's engineered thermoplastic blend with high flexural strength, high temperature resistance, low co-efficient of friction, abrasion resistance and outstanding chemical resistance.
- Integrated rubber grip pads under collars to prevent slippage. No requirement to pre-wrap pipe.
- Load sharing bow spring system allowing heavy loads to be shared across multiple bows reducing point loading and increasing the overall load capacity of the spacer.
- The flexible bows can deflect under force to pass minor obstructions in the borehole.
- Requires only a flat blade screwdriver for installation.

Models

Model	Runner (Bow) Height	Part #	Operating Temp (Deg C / F)	Recommended for use on Pipe Diameter	Units per carton	Carton Dimensions (L x W x H)	Gross Carton Weight
HD 30	30mm / 1 3/16"	00992	- 20 C to 80 C - 4 F to 176 F in certain applications (temperatures above 50 C / 122 F may require closer intervals)	110mm / 4" NPS & greater (consider the HDX or HDXT for pipe dia greater than 355mm / 14")	30	325mm x 325mm x 375mm 12.8" x 12.8" x 14.8"	8.36 Kg / 18.43 lbs
HD 50	50mm / 2"	00991			30	340mm x 325mm x 375mm 13.4" x 12.8" x 14.8"	8.48 Kg / 18.69 lbs
HD 75	75mm / 3"	00993			30	385mm x 325mm x 375mm 15.1" x 12.8" x 14.8"	9.26 Kg / 20.41 lbs
HD 100	100mm / 4"	00100			30	460mm x 325mm x 375mm 18.1" x 12.8" x 14.8"	10.25 Kg / 22.55 lbs

Compliance

- Manufactured under a certified ISO 9001 Quality Management System.
- Compliant with AS/NZS 4020:2018 Products for use in contact with drinking water.
- Compliant with lead free requirements of Section 1417 of the US Safe Water Drinking Act
- Compliant with WSAA Product Specification # 324 – Casing Spacers.
- Approved by MRWA and SEQ IPAM..

Sizing Table - HD Series - Horizontal

Nominal Pipe Size (NPS)	OD of Pipe (mm)	OD of Pipe (Inches)	Suggested Number of Segments	Approx Setting Guide Position
	110	4.33	2	0
4	114.30	4.50	2	15
4.5	127.00	5.00	2	30
5	141.30	5.563	2	55
	160	6.30	3	0
6	168.27	6.625	3	5
	180	7.09	3	20
	200	7.87	3	40
8	219.08	8.625	3	65
	250	9.84	4	25
10	273.05	10.75	**4	45
12	323.85	12.75	**5	80
14	355.60	14.00	**6	50
16	406.40	16.00	**7	35
18	457.20	18.00	**8	65
20	508.00	20.00	**8	55
24	609.60	24.00	**10	65
	650	25.59	**11	50
	710	27.95	**12	70
	800	31.50	**14	75
	900	35.43	**15	60
	1000	39.37	**17	65
	1100	43.30	**19	70
	1200	47.24	**20	45

Please refer to the relevant product series installation guide for additional information.

For pipe installed in the horizontal position, (e.g. Cased Crossings), it is recommended that the No. of bows be maximised to enable the highest load capacity per spacer.

Use the following formula to calculate the No. of segments per spacer for such pipe:

No. of Segments = [Pipe OD (mm) x 3.1428] ÷ 180. (Round the result down to nearest whole number).

Spacer intervals of 2m (approx. 6ft) are generally suitable for light weight pipe up to 300mm NPS (12" NPS).

**For heavy weight or large diameter carrier pipes installed in the horizontal position, kwik-ZIP's heavier duty HDX or HDXT Series spacer models should be considered, especially if the pipeline annulus will not be grouted after installation.

HD Series - Vertical

kwik-ZIP®

Application

A non-corroding, non-metallic heavy duty bow spring centralizer for vertical applications such as production wells, gravel packed well screens, pump torque arrestor, water well casing, coal seam methane casing, pump riser/submersible pump installation, and piling and is suitable for all pipe materials including PVC, Poly, Stainless Steel, Fibreglass and GRP, etc. Will fit diameters from 110mm OD (4.33") to greater than 1600mm OD (63") by addition of multiple segments.

Construction & Features

- Made from Kwik-ZIP's engineered thermoplastic blend with high flexural strength, high temperature resistance, low co-efficient of friction, abrasion resistance and outstanding chemical resistance.
- Integrated rubber grip pads under collars to prevent slippage.
- Load sharing bow spring system allowing heavy loads to be shared across multiple bows reducing point loading and increasing the overall load capacity of the spacer.
- The flexible bows can deflect under force to pass minor obstructions in the borehole.
- Requires only a flat blade screwdriver for installation.

Models

Model	Runner (Bow) Height	Part #	Operating Temp (Deg C / F)	Recommended for use on Pipe Diameter	Units per carton	Carton Dimensions (L x W x H)	Gross Carton Weight
HD 30	30mm / 1 3/16"	00992	- 20 C to 80 C - 4 F to 176 F in certain applications (temperatures above 50 C / 122 F may require closer intervals)	110mm / 4" NPS & greater	30	325mm x 325mm x 375mm 12.8" x 12.8" x 14.8"	8.36 Kg / 18.43 lbs
HD 50	50mm / 2"	00991			30	340mm x 325mm x 375mm 13.4" x 12.8" x 14.8"	8.48 Kg / 18.69 lbs
HD 75	75mm / 3"	00993			30	385mm x 325mm x 375mm 15.1" x 12.8" x 14.8"	9.26 Kg / 20.41 lbs
HD 100	100mm / 4"	00100			30	460mm x 325mm x 375mm 18.1" x 12.8" x 14.8"	10.25 Kg / 22.55 lbs

Compliance

- Manufactured under a certified ISO 9001 Quality Management System.
- Compliant with AS/NZS 4020:2018 Products for use in contact with drinking water.
- Compliant with lead free requirements of Section 1417 of the US Safe Water Drinking Act

Sizing Table - HD Series - Vertical

Nominal Pipe Size (NPS)	OD of Pipe (mm)	OD of Pipe (Inches)	Suggested Number of Segments	Approx Setting Guide Position
	110	4.33	2	0
4	114.30	4.50	2	15
4.5	127.00	5.00	2	30
5	141.30	5.563	2	55
	160	6.30	3	0
6	168.27	6.625	3	5
	180	7.09	3	20
	200	7.87	3	40
8	219.08	8.625	3	65
	250	9.84	4	25
10	273.05	10.75	4	45
12	323.85	12.75	4	80
14	355.60	14.00	5	50
16	406.40	16.00	6	35
18	457.20	18.00	6	65
20	508.00	20.00	7	55
24	609.60	24.00	8	65
	650	25.59	9	50
	710	27.95	9	70
	800	31.50	10	75
	900	35.43	12	60
	1000	39.37	13	65
	1100	43.30	14	70
	1200	47.24	17	45

Please refer to the relevant product series installation guide for additional information

HDX Series

kwik-ZIP®

Application

A non corroding, non-metallic casing spacer for Pipe-in-Pipe (PIP) applications such as slip lining and cased crossings for all medium to heavy weight pipe materials including steel, DICL, MSCL, GRE, PVC and HDPE. Suitable for all diameters from 100mm OD to 1600mm OD and beyond by addition of multiple segments.

Construction & Features

- Made from Kwik-ZIP's modified Acetal (POM) engineering thermoplastic blend with high flexural strength, high temperature resistance, low co-efficient of friction, abrasion resistance and outstanding chemical resistance.
- Integrated rubber grip pads under collars to prevent slippage. No requirement to pre-wrap pipe.
- Load sharing suspension system allowing heavy loads to be shared across multiple runners reducing point loading and increasing the overall load capacity of the spacer.
- Minimizes spacer weight bearing capacity and reduces point loading via a unique load sharing runner system.
- Ability to combine different runner heights in the same spacer ring to assist in borehole grade correction.
- Larger diameters are accommodated by joining additional segments.
- Requires only a flat blade screwdriver for installation.

Models

Model	Runner Height	Part #	Operating Temp (Deg C / F)	Recommended for use on Pipe Diameter	Units per carton	Carton Dimensions (L x W x H)	Gross Carton Weight
HDX 38	38mm / 1 ½"	00038	- 20 C to 80 C - 4 F to 176 F in certain applications (temperatures above 50 C / 122 F may require closer intervals)	100mm OD & greater	20	370mm x 350mm x 300mm 14.6" x 13.8" x 11.8"	11 Kg / 24.2 lbs
HDX 65	65mm / 2.56"	00065			20	370mm x 350mm x 330mm 14.6" x 13.8" x 12.9"	13 Kg / 28.6 lbs
HDX 90	90mm / 3.54"	00090			20	370mm x 350mm x 365mm 14.6" x 13.8" x 14.4"	14.6 Kg / 32.1 lbs
HDX 125	125mm / 4.92"	00125			20	370mm x 350mm x 405mm 14.6" x 13.8" x 15.9"	17 Kg / 37.4 lbs

Compliance

- Manufactured under a certified ISO 9001 Quality Management System.
- Compliant with AS/NZS 4020:2005 Products for use in contact with drinking water.
- Compliant with lead free requirements of Section 1417 of the US Safe Water Drinking Act.
- Compliant with WSAA Product Specification # 324 – Casing Spacers.
- Approved by MRWA and SEQ IPAM.

Size table & setting guide

NPS (ASME)	*Carrier Pipe OD (mm)	*Carrier Pipe OD (Inches)	**Carrier Pipe Nominal Size (DN)	Rec # Segments	Banding	Approx Setting Guide Position
3.5	101.60	4.00		2	No	0
	110.00	4.33		2	No	10
	122.00	4.80	100	2	No	30
4.5	127.00	5.00		2	No	40
5	141.30	5.56		2	No	65
	160.00	6.30		3	No	15
6	168.27	6.62		3	No	20
	177.00	6.97	150	3	No	30
	200.00	7.87		3	No	55
8	219.08	8.63		4	No	10
	232.00	9.13	200	4	No	20
	259.00	10.20	225	4	No	40
10	273.05	10.75		5	No	10
	286.00	11.26	250	5	No	20
12	323.85	12.75		5	No	40
	345.00	13.58	300	6	No	20
16	406.40	16.00		7	No	20
	426.00	16.77	375	7	No	30
	453.00	17.83	400	8	No	20
20	507.00	19.96	450	9	No	20
22	560.00	22.05	500	10	No	15
24	609.60	24.00		11	No	15
	630.00	24.80		11	No	20
	667.00	26.26	600	12	No	15
28	711.20	28.00		12	No	25
30	762.00	30.00		13	No	25
	800.00	31.50		14	Yes	20
	826.00	32.52	750	14	Yes	25
	900.00	35.43		15	Yes	25
	1000.00	39.37		17	Yes	25
42	1066.80	42.00		18	Yes	30
44	1117.60	44.00		19	Yes	30
48	1219.20	48.00		21	Yes	30
52	1320.80	52.00		22	Yes	35
	1400.00	55.12		23	Yes	30
	1564.00	61.57		25	Yes	35
	1600.00	62.99		26	Yes	35
	1668.00	65.67		27	Yes	35

Please refer to the relevant product series installation guide for additional information

* For PE Pipe refer to the nearest Carrier Pipe OD.
** OD for Nominal Size (DN) designations is a guide only. If unsure please confirm actual carrier pipe OD.

For pipe greater than 800mm OD (e.g. DN 750 and above), for very heavy weight pipe, or if the pipe material is slippery, it is recommended that 12mm stainless steel worm drive banding be applied over the collars. Contact kwik-ZIP for further information.

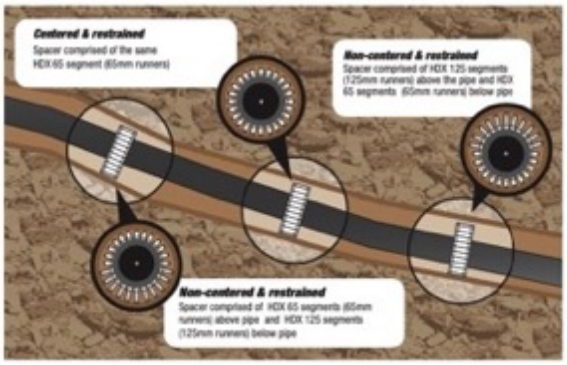
HDX Spacers are generally suitable for heavy pipe run lengths up to 300m (approx. 1,000 ft) in good condition casings. Longer run lengths may be possible with casing lubrication, banding, and/or closer spacer intervals. Contact kwik-ZIP for further advice.

Load sharing

Using a unique "load sharing runner" system, each HDX segment maximises its weight bearing capacity by distributing the pipe load across multiple runners. This reduces point loading at any one location, boosting and optimising the overall support capacity of the spacer exponentially as pipe size increases. The "load sharing runner" system also delivers a suspension and dampening effect, reducing the transfer of potentially damaging vibration and movement from the outer casing to the carrier pipe. This may be beneficial in tectonically active regions or high traffic areas where ongoing external vibration affects the outer casing.

When used in accordance with the Installation Guide, HDX Spacers will easily handle weights equivalent to a standard Ductile Iron Cement Lined (DICL) pipe full of fluid.

For specific advice on load capacities please contact sales@kwikzip.com (Australasia) or usa@kwikzip.com (USA).



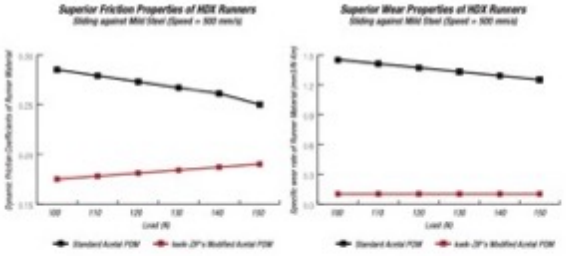
Friction and Wear capabilities

Acetal (POM) is well known as being one of the best materials for applications requiring excellent abrasion / wear resistance and a low coefficient of friction. It performs better than alternative materials such as Nylon and HDPE.

HDX Spacers are fitted with wear pads made from kwik-ZIP's modified Acetal (POM) engineering thermoplastic blend to achieve even better abrasion resistance and a lower coefficient of friction, especially under high load conditions.

These properties allow for greater run lengths and lower insertion forces during carrier pipe installation.

The graphs below compare the dynamic coefficient of friction, and the wear rate (against carbon steel) of the material used to make the HDX wear pads versus standard Acetal (POM).



HDXT Series

kwik-ZIP®

Application

A completely non corroding, non-metallic casing spacer for Pipe-in-Pipe (PIP) applications such as slip lining and cased crossings for all heavy weight pipe materials including steel, ductile, MSCL, GRE, PVC, HDPE. Suitable for all diameters from 300mm (11.81") OD and beyond by addition of multiple segments.

Construction & Features

- Made from Kwik-ZIP's engineered thermoplastic blend with high flexural strength, high temperature resistance, low co-efficient of friction, abrasion resistance and outstanding chemical resistance.
- Integrated rubber grip pads under collars to prevent slippage. No requirement to pre-wrap pipe.
- Load sharing suspension system allowing heavy loads to be shared across multiple runners reducing point loading and increasing the overall load capacity of the spacer.
- Minimizes spacer weight bearing capacity and reduces point loading via a unique load sharing runner system.
- Ability to combine different runner heights in the same spacer ring to assist in borehole grade correction.
- Larger diameters are accommodated by joining additional segments.

Models

Model	Runner Height	Part #	Operating Temp (Deg C / F)	Recommended for use on Pipe Diameter	Units per carton	Carton Dimensions (L x W x H)	Gross Carton Weight
HDXT 43	43mm / 1.69"	00002	- 20 C to 80 C - 4 F to 176 F in certain applications **(HDXT Hi Load Inserts should be used for service temperatures above 50 C / 122 F)**	300mm (11.81") OD & greater	20	640mm x 360mm x 330mm 25.20" x 14.17" x 12.99"	20.2 Kg / 44.5 lbs
HDXT 58W	58mm / 2.30"	00014			20	640mm x 350mm x 510mm 25.20" x 14.20" x 13.00"	24.55 Kg / 54.1 lbs
HDXT 63	63mm / 2.48"	00004			20	640mm x 360mm x 375mm 25.20" x 14.17" x 14.76"	22.8 Kg / 50.2 lbs
HDXT 103	103mm / 4.05"	00006			20	640mm x 360mm x 445mm 25.20" x 14.17" x 17.52"	26.2 Kg / 57.8 lbs
HDXT 153	153mm / 6.02"	00008			20	640mm x 360mm x 570mm 25.20" x 14.17" x 22.44"	31.2 Kg / 68.8 lbs

Compliance

- Manufactured under a certified ISO 9001 Quality Management System.
- Compliant with AS/NZS 4020:2018 Products for use in contact with drinking water.
- Compliant with lead free requirements of Section 1417 of the US Safe Water Drinking Act.
- Compliant with WSAA Product Specification # 324 – Casing Spacer.

Size table

NPS (ASME)	*Carrier Pipe OD (mm)	*Carrier Pipe OD (inches)	Recommended # Segments	Banding
	300.00	11.81	3	
12	323.85	12.75	3	
14	355.60	14.00	3	
	400.00	15.75	4	
16	406.40	16.00	4	
	426.00	16.77	4	
18	457.00	17.99	4	
	500.00	19.69	5	
20	508.00	20.00	5	
22	560.00	22.05	5	
24	610.00	24.02	6	
26	660.00	25.98	6	
28	711.20	28.00	7	
30	762.00	30.00	7	
	800.00	31.50	8	
	826.00	32.52	8	
	900.00	35.43	8	
36	914.00	35.98	8	
	1000.00	39.37	9	
42	1066.80	42.00	10	Yes
44	1117.60	44.00	10	Yes
48	1219.20	48.00	11	Yes
52	1320.80	52.00	12	Yes
	1400.00	55.12	13	Yes
	1564.00	61.57	14	Yes
	1600.00	62.99	15	Yes
	1668.00	65.67	16	Yes
	1800.00	70.87	17	Yes
	1900.00	74.80	18	Yes
	2000.00	78.74	19	Yes
	2200.00	86.61	20	Yes
	2500.00	98.43	23	Yes
	3000.00	118.11	27	Yes
Contact kwik-ZIP for carrier pipe diameters greater than 3000 mm (118.11") OD				

* For PE Pipe refer to the nearest Carrier Pipe OD.

Important: Please read HDXT Spacer Installation Guide before use.

For pipe greater than 1000mm OD, or if the pipe material is slippery, it is recommended that 12mm stainless steel worm drive banding be considered for application over the collars.

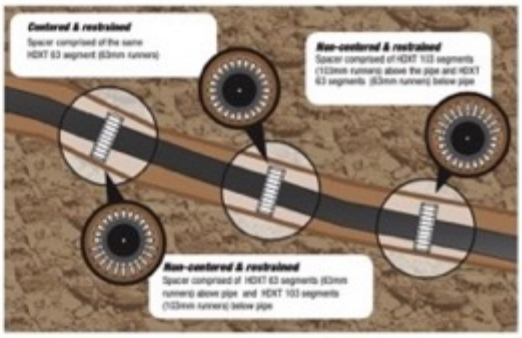
HDXT Spacers are generally suitable for heavy pipe run lengths up to 300m (approx. 1,000 ft) in good condition casings. Longer run lengths may be possible with casing lubrication, banding, and/or closer spacer intervals.

Contact kwik-ZIP for further advice.

Load sharing

Using a unique "load sharing runner" system, each HDXT segment maximises its weight bearing capacity by distributing the pipe load across multiple runners. This reduces point loading at any one location, boosting and optimising the overall support capacity of the spacer exponentially as pipe size increases. The "load sharing runner" system also delivers a suspension and dampening effect, reducing the transfer of potentially damaging vibration and movement from the outer casing to the carrier pipe. This may be beneficial in tectonically active regions or high traffic areas where ongoing external vibration affects the outer casing.

When used in accordance with the Installation Guide, HDXT Spacers will easily handle weights equivalent to a standard Ductile Iron Cement Lined (DICL) pipe full of fluid.



Friction and Wear capabilities

HDXT Spacers are fitted with wear pads made from kwik-ZIP's engineered thermoplastic blend to achieve superior abrasion resistance and a low coefficient of friction, especially under high load conditions.

These properties allow for greater run lengths and lower insertion forces during carrier pipe installation.

For specific advice on load, friction or wear capacities please contact sales@kwikzip.com (Australasia) or usa@kwikzip.com (USA).

SUPPLIER CONTACTS

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