White Paper

Multi-purpose Rubber Composite Adjustment Risers

Adjust any manhole or catch basin to grade on your resurfacing projects, new installations, or rehabilitation work – and maintain the integrity of your infrastructure.



The Problem

Making sure your manhole assembly is to final grade with the road surface is an essential part of a new manhole installation, rehabilitation, or road resurfacing project. The top of the manhole structure may not always meet the surface of the road due to pitch, cross-slope and other factors. Adjusting the manhole access assembly to properly match the finished grade of the road surface can be a challenge. There are many products available to adjust manhole assemblies vertically, but most offer minimal options for matching proper surface alignment while maintaining full bearing between the frame and structure, as well as absorbing and dispersing traffic impact and vibration. Additionally, when a riser made of a rigid material is placed directly onto a concrete or brick surface, unwanted stormwater or groundwater may seep into the structure where those two materials meet. Impact and vibrations from vehicular traffic will cause the concrete or brick structure to degrade over time, allowing water infiltration to increase. This causes a snowball effect of continual damage to the underground structure and road surface. It's



Constant vehicular traffic has caused cracked pavement around this manhole and has likely created damage to the underground structre.

important to choose the right adjustment product from the beginning of the project to avoid significant problems and expensive, time-consuming repair or replacement projects down the line.

Traffic Vibration and Road Stress

Vehicle traffic creates a chronic stress on manhole frames. When two rigid surfaces are in constant high-stress contact with each other, the impact and vibration transferred from above will create damage to the surrounding road surface. The issue is often more severe below the surface, which can cause permanent damage to the manhole structure and its attached network.



Water penetrates between rigid and irregular surfaces.

Unwanted Water Infiltration

Manhole assemblies that are installed on uneven surfaces, such as masonry structures or shimmed precast structures, allow unwanted water infiltration into the storm/sanitary sewer collection system. Shimming may be done to a manhole assembly to ensure the cover matches the road's pitch and cross-slope. While shims are economical, they tend to be poorly installed and lack proper grout support, and concentrate load impact and stress to sections of the manhole structure below. This dramatically increases potential damage, especially in areas of weak mortar joints. Shims also leave gaps between the manhole frame and the top of the manhole structure, allowing excessive l&l that undermines roadbed paving aggregates and leaves voids beneath the road. This causes unsupported pavement and sinking of the road surface around manhole. The top of the casting becomes exposed and susceptible to further disturbance from vehicular traffic or snowplows. The increased infiltration due to this damage means that more water must be treated and can lead to overflows and fines from state and/or federal agencies.



Water penetrates shimming material and through cavities.

To make repairs to fix the damage imposed upon the road surface and underground infrastructure can be both costly and untimely.

The Solution

There is an evident need for absorption of traffic vibration, and also the prevention of unwanted water infiltration into systems that are underneath the road. Multi-purpose rubber composite adjustment risers are engineered to adjust manhole covers and catch basins to grade and are a simple, economic, and long-lasting solution that separates the surfaces of the manhole assembly and concrete structure, preventing water infiltration and traffic vibration damage to concrete and masonry structures.

Rubber composite risers can be used for new installations, resurfacing projects, or rehabilitation work and come in a variety of shapes and sizes. Beneath the surface, the rubber riser reduces traffic vibration and road stress that can cause permanent damage to the infrastructure. It also uniformly distributes traffic loads over the entire supporting structure.

Rubber composite adjustment risers dissipate the energy transferred between the casting and the manhole structure and reduces traffic vibration damage. Since the surfaces are separated by the adjustment riser, the friction/stress component is drastically reduced. These two elements then work together, rather than against each other, to help maintain the integrity of the infrastructure support system. Due to the compression properties of the rubber composite adjustment riser, traffic loads are more uniformly distributed over the entire supporting structure, rather than concentrated in specific, high-stress areas.

When installed according to guidelines, these adjustment risers help prevent the flow of water infiltration. They create a virtual tight seal between the manhole chimney structure and the manhole or catch basin frame.

Manhole frames can be easily adjusted to match the road's pitch and cross-slope with tapered risers while maintaining full bearing under the frame, rather than using miscellaneous materials as shims. Perfect grade adjustments can be made in moments with uniform precision.

These products are a great tool for Departments of Transportation and municipalities seeking to maximize the performance and extend the lifetime of infrastructures, while achieving significant cost savings.

*Use of the recommended polyurethane moisture-curing sealant is required for prevention of water infiltration and vacuum testing.



Rubber adjustment risers provide uniform distribution of traffic loads while dissipating vibrations.



With the effective gasket-like seal* of the INFRA-RISER® multi-purpose rubber composite adjustment riser by EJ, stormwater is prevented from entering the sewer system.

Product Details and Technical Specifications

INFRA-RISER adjustment risers are available in a variety of shapes (round, square and rectangular) and sizes (matching flange width: 3", 4", 5", 6"; length: 12" – 60"; standard thickness: 1/2", 1", 1 1/2", 2", 2 1/2", 3"), flat and tapered risers, and select bolt hole patterns. Its tough rubber composite material is made from 92% recycled rubber tires, fortifying additives and urethane binders, and will not break, split, rot, crack, or chip (lasts indefinitely). The riser is appropriate for new installations, resurfacing projects, or rehabilitation work and is made in the USA.

MINIMUM REQUIREMENTS

DENSITY

64.214 lbs/cubic ft, ASTM D3574-05, TEST A

DUROMETER HARDNESS Molded surfaces 77A±5, ASTM D2240-05

TENSILE STRENGTH 304 psi (not less than 145 psi), ASTM D412-06

COMPRESSION DEFORMATION Initial Compression Deformation 2.9% += 4% Compression Set 1.5% += 4% ASTM D575-91 (01) HEAT AGED PROPERTIES 70 hrs @ 158°F, 3 hrs. @ 300°F, ASTM D573-04

TENSILE STRENGTH RETAINED 100%

DUROMETER RETAINED 100%

COMPRESSION DEFORMATION RETAINED 100%

LOW TEMPERATURE BRITTLENESS 5 hrs. exposure @ -40°C, 24 hrs. @ -40°C No signs of cracks, ruptures or degradation.

Case Study

The intersection of Route 13 and Route 40 in New Castle County, Delaware is one of the most heavily trafficked in the state. Hares Corners, as it is known, is Delaware's main north-south transit corridor for the entire state. With a 50-mph speed limit and four lanes of traffic, this intersection suffers a constant flow of tractor-trailers, cement trucks, 18-wheelers and thousands of cars.

Sinking manholes, breakage, cracked pavement, and water infiltration—the problem goes back several decades and existed throughout the county.

As vehicles traveled over the manhole covers, their weight was transferred onto the underground structure and surrounding area, causing tremendous vibration. This stress caused material breakage and structural failure that allowed groundwater to infiltrate the manholes, causing further damage. The freeze-thaw cycles during winter months increased the rate of deterioration exponentially and resulted in "sinking manholes," depressions, and roadway damage.

"It was the most brutal application we could come up with," said Assistant County Engineer Dave Hofer.

The damage at this intersection was so extreme that every two years the county was forced to shut down one lane of traffic in both directions for costly and disruptive repair work. This repair work required a crew of 14 people to dedicate a full day to redo just three manholes at this intersection. Travelers experienced traffic delays and slowdowns as a result. This old remedy was expensive, inconvenient, and inefficient.

A Solution

In a quest to rid the county of this problem, the county installed the INFRA-RISER multipurpose rubber composite adjustment risers on a trial basis in 2009. Without pavement cracks and holes, the opportunity for water to infiltrate is prevented, further extending the life of the structure and quality of travel. Municipalities that use a combination of a ring and an EJ bolted and gasketed manhole cover can virtually eliminate water infiltration.

Success

"Our crews installed the rings on each manhole at that intersection and we didn't have to rebuild them again," Hofer said. "The problem fell off our radar screen."

Since the project started in 2009, New Castle County required every manhole structure in the county to be installed with the adjustment riser. The cost savings for a system supporting over 40,000 manholes have been substantial.

For repaving projects, the INFRA-RISER ring offers workers an option to align the structure quickly and easily to the proper grade, saving considerable time and money. Discarded tires make up 92% of the recycled content of this environmentally friendly product.

An EJ INFRA-RISER rubber composite adjustment riser installed on a precast concrete structure.

Pavement remains smooth surrounding a manhole assembly that was installed over top of a rubber composite adjustment riser.





Reference Letters

April 11, 2017

Dave Badgley City of Troy Department of Public Utilities 25 Water Plant Road Troy, NY 12182

RE: EJ INFRA-RISER

Dear Brian Mohorter

I wanted to take this opportunity to tell you about why The City of Troy, NY started using Infra-Risers. We were shown a sample of the Infra-Riser about 5 years ago. Almost immediately I ordered several sizes for our guys to install, we now stock both Infra-Risers for MH and CB applications in various heights. In the beginning we used the risers for a quick fix under the frame instead of Brick and Mortar or precast concrete rings. Fast forward 5 years we now see the benefits of using the Infra-Risers, now we are NOT replacing the top course of brick in high traffic areas due to the constant pounding of heavy trucks. Being in the North-East we are not replacing the top course due to salt erosion. Also with the adjustability of different heights our crews can adjust the final frame for paving. Our crews incorporate these risers in almost every application.

Sincerely,

Dave Badgley Project Supervisor

County of Summit · The High Point of Ohio



Department of Sanitary Sewer Services

Michael A. Weant, Director

April 18, 2017 MJC: 5267:04:17

EJ 4160 Glenridge Road South Euclid, Ohio 44121-2802

Attn: Mr. Floyd Crooks

RE: INFRA-RISER RUBBER ADJUSTMENT RISERS

Dear Floyd:

Please be advised our office has approved the use of EJ's INFRA-RISER for sanitary manhole grade adjustment and require their use on all new sanitary manholes located within paved areas. We also require the riser's use in all existing manholes located within paved areas that require grade adjustment subsequent to other construction activities.

Our latest approved Standards & Specifications, on file with the Ohio EPA, includes the use of the INFRA-RISER rubber adjustment riser.

In an effort to "Go Green," I would like to thank you and your staff for helping our office approve and place in practical use a product that is made from 92% recycled material.

Respectfully,

MATTHEW J. CALCEI, P.E.

MJC/sdc



1180 South Main Street, Suite 201 • Akron, Ohio 44301-1254 • 330.926.2400 • fax: 330.926.2470 • www.co.summitoh.net



May 5, 2017

Brian Mohorter EJ 6177 South Bay Rd. Cicero, NY 13039

Brian:

CFR has been using the Infra-Riser for two years now. Since using these we have found that we have increased our productivity in the field. Once the structure is uncovered it takes one man a very short time to get the new grade established. Previously we would two men mixing mortar and adjusting with bricks or concrete rings.

This product also extends the life of the work completed. The Infra-Riser acts as a shock absorber to traffic. It almost totally eliminates the vibration from traffic running over the structure, thus not having concrete failures.

Yours Truly,

Michael A. Costello President

Test Reports

"Progress Through Innovation, Technology and Customer Satisfaction"



AKRON RUBBER DEVELOPMENT LABORATORY, INC. 2887 Gilchrist Road • Akron, Ohio 44305 1-800-830-ARDL • (330) 794-6600 • FAX (330) 794-6610 Website: www.ardl.com • E-mail: info@ardl.com

August 2, 2007

TEST REPORT -

PN 73309B

PO 1124771

Physical Testing Department

Prepared For:

Mr. Brian Durkin East Jordan Iron Works, Inc. 4150 Simon Road Youngstown, Ohio 44512

Approved B Prepared By: Jim Drummond Teresa Gragg Physical Testing, Manager Project Technician An A2LA Accredited Testing Laboratory - Certificate Numbers 255.01 & 255.02 ISO 9001:2000 Registered Member of ACIL: The American Council of Independent Laboratories MBE F ISO 9001:2000 Registered ACCREDITED A Testing Lat

Letters and reports are for the exclusive use of the clients to whom they are addressed and shall not be reproduced, except in full, without the written permission of Akron Rubber Development Laboratory, Inc. (ARDL). The information contained herein applies to the specific material, products or processes tested or evaluated. No warranty of any kind is herein construed or implied. The liability of ARDL, Inc. shall be limited to the amount of consideration paid for services. ARDL, Inc. is accredited by A2LA for the test methods listed on the attached scope.

"Progress Through Innovation, Technology and Customer Satisfaction"



AKRON RUBBER DEVELOPMENT LABORATORY, INC. 2887 Gilchrist Road • Akron, Ohio 44305 1-800-830-ARDL • (330) 794-6600 • FAX (330) 794-6610 Website: www.ardl.com • E-mail: info@ardl.com

August 2, 2007

Mr. Brian Durkin East Jordan Iron Works, Inc. Page 2 of 3 PN 73309B

SUBJECT: Physical testing on material submitted by the above company. PO# 1124771

RECEIVED: Four (4) rubber adjustment risers.

ORIGINAL PHYSICAL PROPERTIES, ASTM D 412-06, D 2240-05

Die C dumbbells tested at 20 in/min.

	RESULTS
Shore A Durometer, points (inner)	73
Shore A Durometer, points (outer)	77
Tensile Strength, psi	304
Ultimate Elongation, %	22

DENSITY, ASTM D 3574-05, TEST A

	RESULTS
Density, lbs/ft ³	64.214

HEAT-AGED PROPERTIES, ASTM D 573-04

Specimens aged @ the following times and temperatures in a forced air oven.

	70 hrs. @ 158°F	<u>3 hrs. @ 300°F</u>
Durometer, point change	+3	+4
Tensile Strength, % change	-0.3	-4.2
Elongation, % change	-21.1	+3.5
Compression Deformation, %	6.1	

DECINTO

ARDL is accredited by A2LA for the test methods listed on the attached scope

August 2, 2007

Mr. Brian Durkin East Jordan Iron Works, Inc. Page 3 of 3 PN 73309B

FLUID IMMERSION PROPERTIES, ASTM D 471-06

Specimens immersed at the following times @ 23°C in a 20% Sulfuric Acid solution.

	15 DAYS	30 DAYS
Tensile Strength, % change		-19.7
Elongation, % change	-	-13.6
Mass Change, %	+0.8	+1.7

COMPRESSION DEFORMATION, ASTM D 575-91(01)

Median of three specimens reported.

	RESULTS
Initial Compression Deformation, %	2.9
Compression Set, %	1.5

THERMOMECHANICAL ANALYSIS (TMA), ASTM E 831-05

Instrument:	Perkin-Elmer Series 7 DMA/TMA
Gas Purge:	Helium
Sample Geometry	Rectangle
Temperature Range:	-40°C to 50°C
Heating Rate:	3°C/min.
Static Stress:	30 mN

TMA testing was performed following the test conditions listed above. The TMA plot, including calculations, is enclosed. The coefficient of thermal expansion was calculated from the plotted data and is expressed per inch / inch °F.

RESULTS

Coefficient of Thermal Expansion, °F 12.9543 x 10⁻⁵

LOW TEMPERATURE BRITTLENESS

A section of the gasket approximately ³/₄ of the total diameter was placed into a cold chamber for 5 hours @ -40°C. After the exposure the specimen was removed then bent and twisted back against it's self as well as twisted in a modified figure eight. The specimen was then returned to the cold chamber for another 19 hours then removed bent and twisted through a modified figure eight again.

RESULTS

5 hrs. exposure

24 hrs. exposure

Showed No Signs of Cracks, Ruptures or Degradation. Showed No Signs of Cracks, Ruptures or Degradation.

Assessment: The specimen preformed well at the -40°C temperature

Teresa Gragg

Project Technician

Prepared By:

ARDL is accredited by A2LA for the test methods listed on the attached scope

Approved By:

Jim Drummond

Physical Testing, Manager



EASTERN REGIONAL OFFICE

100 Industrial Boulevard, Aliquippa, PA 15001 Phone: (724) 378-3900 Fax: (724) 378-3940 Web: www.nondestructivetesting.com Email: ndtgpa@ndtg.net



Full Scale Load Testing

Tested For: East Jordan Iron Works, Inc. 4150 Simon Road Youngstown, OH 44512 Attn: Mr. Brian Durkin

Lab No. 070868 Date Received: 5/17/07 Date Tested: 5/17/07

Date: May 17, 2007

Work Order: G3372

On May 17, 2007, Non-Destructive Testing Group Mechanical Department tested a 1" thick Infra-Riser using a EJIW 1020 Frame and Lid. They were placed over the Infa-Riser rubber adjusting ring. The overall height was zeroed out on a dial indicator. 55,000 pounds of downward load was then applied and held for five (5) minutes. A measurement of .057" was recorded. Then all pressure was unloaded and a measurement of .002" was recorded.

<u>No-Load</u> .000" Loaded 55K .057" Unloaded Permanent - Set .002"

Respectfully Submitted,

Joseph R. Stiger

Department Manager

Testing was performed in accordance with accepted practice as well as the test methods referenced. NDTG has no direct knowledge of the origin, sampling procedure, nor condition of the samples, and makes no claims as to the suitability nor final use of the material. This report applies only to those items tested. This report shall not be reproduced except in full without the written consent of NDTG

Page 1 of 1

Made in the USA

Since 1883, EJ has remained committed to providing Made in USA products to build America's infrastructure. Products by EJ USA, Inc. are manufactured and assembled exclusively in the United States of America. This includes, but is not limited to, manhole frames and covers, curb inlets and frames, utility castings, airport and port authority castings, aluminum access hatches, tree grates, trench grates, drainage grates, WaterMaster® fire hydrants, FlowMaster® RW gate valves, valve boxes and meter boxes.

Contact Information

Local Sales Branch 800 626 4653 us.sales@ejco.com ejco.com

Technical Questions

Craig Coggins Technical Sales Engineer tel 330 717 1528 craig.coggins@ejco.com Tim Powell Technical Specialist tel 580 490 6666 tim.powell@ejco.com

Learn more at ejco.com/infra-riser