

# MONOKO, LLC

1037 Peninsula Avenue

Tarpon Springs, FL 34689-2125

E-mail Address: [MonokoLLC@aol.com](mailto:MonokoLLC@aol.com)

(727) 940-3244

(727) 279-8795 Fax

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**Submittal No.: 24, Steel Grit Certifications and MSDS Sheets**

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**Date: June 3, 2015**

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**Vermont Department of Transportation**

Northeast Regional Construction Office

Attn: Mr. Ron Gray

347 Emerson Falls Road, Suite 5

St. Johnsbury, VT 05819

(Phone) (802) 751-3295; (Cell) (802) 793-3161

(Fax) (802) 751-3297; [Ron.Gray@state.vt.us](mailto:Ron.Gray@state.vt.us)

**Description:** Proposal/Contract Number: Bradford-Newbury IM BPNT (14)

Letting Date: 10/10/14; Award Date: 11/03/14

Project Description: Bridge Painting of Five Bridges

In the Towns of Bradford & Newbury, VT

Contract Amount: \$4,327,785.00; Completion Date: 08/26/16

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**Contractor: MONOKO, LLC**

**Reviewed & Approved By: Keri Monokandilos**

Keri Monokandilos, Manager

**Date: 06/3/2015**

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**Engineer: Peter Hodgson, Resident Engineer**

347 Emerson Falls Road, Suite 5

St. Johnsbury, VT 05819

802-748-2447; 802-793-1878 cell

[pete.hodgson@state.vt.us](mailto:pete.hodgson@state.vt.us)

[Mark.Sargent@state.vt.us](mailto:Mark.Sargent@state.vt.us)

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**Revision:**



Ervin Industries, Inc.

3893 Research Park Drive  
P.O. Box 1168  
Ann Arbor, Michigan 48106-1168  
(734) 769-4600  
(800) 748-0055  
FAX (734) 663-0136

TO WHOM IT MAY CONCERN:

We certify that Ervin AMASTEEL shot meets or exceeds the requirements of SAE J-827 and SAE J-444. AMASTEEL grit meets or exceeds the requirements of SAE J-444 and SAE J-1993. Both also meet the SFSA Specification 20-66.

Sincerely,

A handwritten signature in black ink that reads "Carol Williams". The signature is written in a cursive, flowing style with a large initial 'C'.

Carol Williams  
Sales Administration Manager



# PERRY JOHNSON REGISTRARS, INC.

## *Certificate of Registration*

*Perry Johnson Registrars, Inc., has assessed the Quality Management System of:*

### **Ervin Amasteel**

**915 Tabor Street, Adrian, MI 49221 United States**

*(This is a multisite scheme. See Appendix for site specific details.)*

*(Hereinafter called the Organization) and hereby declares that  
Organization is in conformance with:*

**ISO 9001:2008**

*This Registration is in respect to the following scope:*

**Manufacture of Cast Steel Shot and Grit Abrasives**

*This Registration is granted subject to the system rules governing the Registration referred to above, and the Organization hereby covenants with the Assessment body duty to observe and comply with the said rules.*

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)  
755 West Big Beaver Road, Suite 1340  
Troy, Michigan 48084  
(248) 358-3388



*The use of the UKAS accreditation symbol is in respect to the activities covered by the Accreditation Certificate Number 0105.*

*The validity of this certificate is dependent upon ongoing surveillance and fulfillment of required sampling of sites.*

Effective Date: November 7, 2013  
Expiration Date: November 6, 2016

Certificate No.: C2013-02630  
Page 1 of 2



# PERRY JOHNSON REGISTRARS, INC.

## *Appendix*

*915 Tabor Street,  
Adrian, MI 49221 United States*

*Manufacture of Cast Steel Shot and Grit Abrasives*

*681 East Butler Road,  
Butler, PA 16002 United States*

*Manufacture of Cast Steel Shot and Grit Abrasives*

*Manufacture of Cast Steel Shot and Grit Abrasives*

*Terry Boboige*

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)  
755 West Big Beaver Road, Suite 1340  
Troy, Michigan 48084  
(248) 358-3388

Certificate No.: C2013-02630  
Page 2 of 2

*The validity of this certificate is dependent upon ongoing surveillance and fulfillment of required sampling of sites.*

# ERVIN

# AMASTEEL

"The World's Standard for Quality."

## S.A.E SPECIFICATIONS FOR SHOT AND GRIT SCREENINGS

SAE Size No.	SAE J444 SHOT Tolerances	Screen Opening In-mm	
<b>S780</b>	All Pass No. 7 Screen..... 85% Min on No. 10 Screen..... 97% Min on No. 12 Screen.....	.1110 - 2.80 .0661 - 1.70	
<b>S660</b>	All Pass No. 8 Screen..... 85% Min on No. 12 Screen..... 97% Min on No. 14 Screen.....	.0937 - 2.36 .0555 - 1.40	
<b>S550</b>	All Pass No. 10 Screen..... 85% Min on No. 14 Screen..... 97% Min on No. 16 Screen.....	.0787 - 2.00 .0555 - 1.40 .0469 - 1.18	
<b>S460</b>	All Pass No. 10 Screen..... 5% Max on No. 12 Screen..... 85% Min on No. 16 Screen..... 96% Min on No. 18 Screen.....	.0787 - 2.80 .0661 - 1.70 .0469 - 1.18 .0394 - 1.00	
<b>S390</b>	All Pass No. 12 Screen..... 5% Max on No. 14 Screen..... 85% Min on No. 18 Screen..... 96% Min on No. 20 Screen.....	.0661 - 1.70 .0555 - 1.40 .0394 - 1.00 .0331 - 0.850	
<b>S330</b>	All Pass No. 14 Screen..... 5% Max on No. 16 Screen..... 85% Min on No. 20 Screen..... 96% Min on No. 25 Screen.....	.0555 - 1.40 .0469 - 1.18 .0331 - 0.850 .0278 - 0.710	
<b>S280</b>	All Pass No. 16 Screen..... 5% Max on No. 18 Screen..... 85% Min on No. 25 Screen..... 96% Min on No. 30 Screen.....	.0469 - 1.18 .0394 - 1.00 .0278 - 0.710 .0234 - 0.600	
<b>S230</b>	All Pass No. 18 Screen..... 10% Max on No. 20 Screen..... 85% Min on No. 30 Screen..... 97% Min on No. 35 Screen.....	.0394 - 1.00 .0331 - 0.850 .0234 - 0.600 .0197 - 0.500	
<b>S170</b>	All Pass No. 20 Screen..... 10% Max on No. 25 Screen..... 85% Min on No. 40 Screen..... 97% Min on No. 45 Screen.....	.0331 - 0.850 .0278 - 0.710 .0165 - 0.425 .0139 - 0.355	
<b>S110</b>	All Pass No. 30 Screen..... 10% Max on No. 35 Screen..... 80% Min on No. 50 Screen..... 90% Min on No. 80 Screen.....	.0234 - 0.600 .0197 - 0.500 .0117 - 0.300 .0070 - 0.180	
<b>S70</b>	All Pass No. 40 Screen..... 10% Max on No. 45 Screen..... 80% Min on No. 80 Screen..... 90% Min on No. 120 Screen.....	.0165 - 0.425 .0139 - 0.355 .0070 - 0.180 .0049 - 0.125	

SAE Size No.	SAE J444 GRIT Tolerances	Screen Opening In-mm	
<b>G10</b>	All Pass No. 7 Screen..... 80% Min on No. 10 Screen..... 90% Min on No. 12 Screen.....	.1110 - 2.80 .0661 - 1.70	
<b>G12</b>	All Pass No. 8 Screen..... 80% Min on No. 12 Screen..... 90% Min on No. 14 Screen.....	.0937 - 2.36 .0555 - 1.40	
<b>G14</b>	All Pass No. 10 Screen..... 80% Min on No. 14 Screen..... 90% Min on No. 16 Screen.....	.0787 - 2.00 .0555 - 1.40 .0469 - 1.18	
<b>G16</b>	All Pass No. 12 Screen..... 75% Min on No. 16 Screen..... 85% Min on No. 18 Screen.....	.0661 - 1.70 .0469 - 1.18 .0394 - 1.00	
<b>G18</b>	All Pass No. 14 Screen..... 75% Min on No. 18 Screen..... 85% Min on No. 25 Screen.....	.0555 - 1.40 .0394 - 1.00 .0278 - 0.710	
<b>G25</b>	All Pass No. 16 Screen..... 70% Min on No. 25 Screen..... 80% Min on No. 40 Screen.....	.0469 - 1.18 .0278 - 0.710 .0165 - 0.425	
<b>G40</b>	All Pass No. 18 Screen..... 70% Min on No. 40 Screen..... 80% Min on No. 50 Screen.....	.0394 - 1.00 .0165 - 0.425 .0117 - 0.300	
<b>G50</b>	All Pass No. 25 Screen..... 65% Min on No. 50 Screen..... 75% Min on No. 80 Screen.....	.0278 - 0.710 .0117 - 0.300 .0070 - 0.180	
<b>G80</b>	All Pass No. 40 Screen..... 65% Min on No. 80 Screen..... 75% Min on No. 120 Screen.....	.0165 - 0.425 .0070 - 0.180 .0049 - 0.125	
<b>G120</b>	All Pass No. 50 Screen..... 60% Min on No. 120 Screen..... 70% Min on No. 200 Screen.....	.0117 - 0.300 .0049 - 0.125 .0029 - 0.075	

# ERVIN INDUSTRIES

Ervin Industries, Inc. • P.O. Box 1168 • Ann Arbor, MI 48106-1168  
 Toll Free: 800-748-0055 • Telephone: 734-769-4600 • Fax: 734-663-0136  
[www.ervinindustries.com](http://www.ervinindustries.com)

Screen Opening Sizes and Screen Numbers with Max and Min Cumulative Percentages  
 Allowed on Corresponding Screens. ASTM-E-11 and ISO 565 Test Sieves.

# ERVIN AMASTEEL

"The World's Standard for Quality."

The following are paraphrased as condensations of the Society of Automotive Engineers specifications J-827 Cast Steel Shot, J-1993 for Cast Steel Grit, J-444 Cast Steel Shot and Grit Sizes, and include all of the essential features of these specifications. For additional details, request copies of these complete specifications from your Ervin Representative.

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## SOCIETY OF AUTOMOTIVE ENGINEERS J827 Cast Steel Shot and J1993 Cast Steel Grit.

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### Chemical Analysis

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Carbon	.80 - 1.2%
Manganese	
S-70 - S-110	0.35 - 1.2%
S-170	0.50 - 1.2%
S-230 and Larger - All Grit	0.60 - 1.2%
Silicon	0.4% minimum
Sulfur	0.05% maximum
Phosphorous	0.05% maximum

### Microstructure

The Microstructure of cast steel shot and grit shall be uniform Martensite, tempered to a degree consistent with the hardness range, with fine well distributed carbides, if any.

### Hardness

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#### Shot

Ninety percent of random hardness check performed on a representative sample shall fall within the range of 402-558 Knoop hardness number (40-51 HRC)

#### Grit

Ninety percent of random hardness check performed on a representative sample shall fall within the following ranges. S hardness range of 402-558 Knoop hardness number (40-51 HRC), M hardness range of 495-650 Knoop (47-56 HRC), L hardness range 612-754 Knoop (54-61 HRC), and H hardness of 732 Knoop minimum (60 HRC).

The hardness may be determined by any of the various methods applicable to small sections such as Micro Hardness Tester with a Knoop indenter, at loads determined to provide a reliable conversion to Rockwell C.

### Density

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The density of cast steel shall be not less than 7.3 gm/cc Grit and 7 gm/cc for shot.

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### Ervin AMASTEEL Special Hardness

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M hardness - 90% minimum 495-650 KHN (47-56 HRC)
L hardness - 90% minimum 612-754 KHN (54-61 HRC)
H hardness - 90% minimum 732 KHN (60 HRC minimum)

AMASTEEL is also available in other hardness ranges. For these requirements, the hardness of 90% of the representative sample will be within a range of 7 HRC points.

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### General Appearance

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The cast steel shot shall be as nearly spherical as commercially possible and no more than 20% of the shot particles shall have objectionable defects.

### Voids for Shot

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No more than 10% of the cast steel shot particles shall contain voids as determined at 10X magnification. A void must be greater than 10% of the area of the abrasive particle to be considered harmful.

### Shrinkage

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No more than 10% of cast steel shot particles shall contain shrinkage as determined at 10X magnification. Shrinkage is an internal cavity with irregular dendritic surface, whose area is larger than 40% of the particle area.

### Cracks

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No more than 15% of cast steel shot and 40% of the cast steel grit particles shall have cracks as determined at 10X magnification. A crack is a linear discontinuity whose length is greater than 3 times its width and radial in direction.

### Particle Shape of Shot

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When examined at 10X magnification, no more than 5% of the shot particles will have a length that is in excess of twice the cross section.

### Mechanical Tests

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Several designs of shot testing machines are available commercially for application to routine procedures. See SAE J445 for methods of checking uniformity of shipments of shot or grit to determine relative fatigue life and energy transfer of different types of shot or grit.

Ervin AMASTEEL Shot and Grit products meet or exceed all of the requirements of SAE specifications. The Ervin AMASTEEL Division is also capable of producing material to meet special customer specifications or requirements.

# MATERIAL SAFETY DATA SHEET



<b>ERVIN INDUSTRIES, INC.</b> 3893 RESEARCH PARK DRIVE ANN ARBOR, MI 48108-2217		<b>TELEPHONE: (734) 769-4600</b> <b>FAX: (734) 663-0136</b>	
Revision Date: 12/5/2012	Replaces Date: 12/9/2009	Revision Level: T	
PREPARED BY: Mark Hash		Ervin Industries	

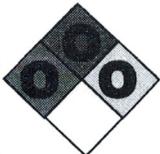
<b>SECTION I</b>		<b>PRODUCT IDENTIFICATION</b>	
<b>Product Name</b>		<b>Chemical Family</b>	
<b>AMASTEEL SHOT</b>	<b>AMABRASIVE</b>	<b>FERROUS</b>	
<b>AMASTEEL GRIT</b>	<b>(SHOT / GRIT MIX)</b>		

<b>SECTION II</b>		<b>COMPOSITION / INGREDIENTS</b>			
<b>Chemical Name</b>	<b>CAS Registry No</b>	<b>% Weight</b>	<b>ACGIH - TLV (mg/m<sup>3</sup>)</b>	<b>OSHA - PEL (mg/m<sup>3</sup>)</b>	
<b>Iron - Fe</b> Oxide fume as Fe	7439-89-6	>96	5	10	
<b>Carbon - C</b>	7440-44-0	<1.2	none estab.	none estab.	
<b>Manganese - Mn</b> Elemental, Inorganic Compounds as Mn Fume as Mn	7439-96-5	<1.3	0.2 none estab.	5 (ceiling) 5 (ceiling)	
<b>Silicon - Si</b> as total dust Respirable fraction	7440-21-3	<1.2	10 none estab.	15 5	
<b>Chromium - Cr</b> Elemental, Inorganic Compounds as Cr metal Cr II compounds - as Cr Cr III compounds - as Cr Cr VI compounds - water soluble Cr VI compounds - insoluble Chromic Acid and Chromates as CrO <sub>3</sub>	7440-47-3	<0.25	0.5 none estab. 0.5 0.05 0.01 none estab.	1 0.5 0.5 5 ug 5 ug 0.1 (ceiling)	
Cr VI (hexavalent chromium) in product as shipped		<b>Not detected</b>	0.05 & 0.01	5 ug /2.5 action	
<b>Copper - Cu</b> Fume Dust & mists	7440-50-8	<0.25	0.2 1	0.1 1	
<b>Nickel - Ni</b> Elemental metal Insoluble as Ni Soluble compounds as Ni	7440-02-0	<0.20	1.5 0.1 0.2	1 1	

<b>SECTION III</b>		<b>PHYSICAL DATA</b>	
<p>Cast steel shot and grit are non-hazardous as received. Fine metallic dust is generated as the abrasive breaks down from impact and wear during normal use. Since the ferrous content is &gt;96%, dust or fumes will consist mainly of iron or iron oxide. In addition, the fine steel dust created can be a mild explosion hazard (see section V).</p>			
Boiling Point - 2850-3150 Degrees C		Melting Point - 1371-1483 Degrees C	
Specific Gravity (at 60 Degrees F) >7.6		Vapor Pressure - Not Applicable	
% Volatile by Volume - Not Applicable		pH - Not Applicable	
Appearance and Odor - Spherical - no odor		Percent Solid by Weight - 100%	

<b>SECTION IV</b>		<b>REACTIVITY DATA</b>	
Stability - Stable	Hazardous decomposition products - None	Hazardous Polymerization - will not occur	
Shot will break down into progressively smaller particles and dust during normal use.			

## MATERIAL SAFETY DATA SHEET

SECTION V FIRE AND EXPLOSION HAZARD DATA	
Flash Point - Not Applicable	Auto Ignition Temperature (solid iron exposed to Oxygen) -930 degree C
Flammability Limits - Not Applicable	Cast steel shot will not burn or explode
A mild fire or explosion hazard situation may be created from fine metal dust. Fire Extinguishing method for dust created due to use - use Class D extinguishing agents or dry sand to exclude air. Do not use water or other liquids, or foam.	
 NFPA Hazard Rating: 0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme Health (blue) = 0 Flammability (red) = 0 Reactivity (yellow) = 0 Special (colorless)	

SECTION VI HEALTH HAZARD DATA	
<b>Emergency and First Aid Procedure</b> - If inhaled, move out of area into fresh air. Flush eyes with running water, have any remaining particles removed from eyes by a qualified medical person; call 911 for immediate medical assistance.	
The end user should have an industrial hygiene evaluation to determine the proper personal protective equipment for each application or blasting operation. Threshold Limit Values - Permissible Exposure Limits - see Section II	
Primary Routes of entry - inhalation of dust or dust particles in eyes. Target Organs - Lung for chromium and lung & nasal for Nickel. Metallic Nickel is reasonably anticipated to be a human carcinogen.	
Over exposure to dust and fumes may cause mouth, eye, and nose irritation. Prolonged overexposure to manganese dust or fume affects the central nervous system. Prolonged overexposure to iron oxide fume can cause siderosis, or "iron pigmentation" of the lung. It can be seen on a chest x-ray but causes little or no disability.	
Fumes generated by welding or flame cutting a surface containing new or used abrasive or the dust created by use of the abrasive may convert a small portion of chromium to hexavalent chromium. IARC reports welding fumes are possibly carcinogenic to humans.	

SECTION VII PERSONAL PROTECTION INFORMATION	
Ventilation - General ventilation and local exhaust should be provided to keep the dust levels below the limits shown in Section II.	
Respiratory protection - If an industrial hygiene evaluation shows dust exceeds OSHA PEL's indicated in Section II, a NIOSH approved respirator with appropriate filters should be worn as determined by the end user.	
Eye protection - Approved safety glasses w/side shields should always be worn. Other protective equipment determined by the end user.	

SECTION VIII SPILL / LEAK PROCEDURES AND WASTE DETERMINATION	
Shot spilled or leaked onto floors can create hazardous walking conditions. When cleaning up quantities of dust; if exceeding OSHA permissible exposure limits, an approved respirator with appropriate filters should be used.	
Dust from blasting or peening operations always contain contaminants. The dust must be tested to determine if it is hazardous or non-hazardous waste. After such determination, the dust must be disposed of according to appropriate local, State or Federal regulations.	

SECTION IX SPECIAL PRECAUTIONS	
Precautions to be taken in handling and storing - Keep dry to reduce rusting. <b>Observe maximum floor loading limitations.</b>	

SECTION X TRANSPORTATION		
DOT Classification - Not a regulated material	Proper Shipping Name - N/A	DOT ID # - Not regulated

SECTION XI REGULATORY	
a) CERCLA Hazardous Substance	___ yes ___ <input checked="" type="checkbox"/> no
b) SARA, Title III, Extremely Hazardous Substance	___ yes ___ <input checked="" type="checkbox"/> no
c) Toxic Chemical Release Report	___ <input checked="" type="checkbox"/> yes ___ no
Nickel & Manganese are subject to requirements of Section 313 of the Community Right-to-know Act of 1986 & 40CFR Part 372.	

The information presented here has been compiled from sources considered to be reliable and accurate to the best of our knowledge and belief, but is not guaranteed to be so.