



Parkade Center, Suite 250  
601 Business Loop 70 West  
Columbia, Missouri 65203

January 27, 1998

MISSOURI BULLETIN - MO-180-8-4

Subject: Missouri Livestock Watering Systems Handbook

Purpose: To transmit handbook, and materials data

Expiration: When superseded.

Attached is Missouri Livestock Watering Systems Handbooks Book 1 of 2 and Book 2 of 2. Book 2 of 2 is material sources and product data. These books replace the Montana Stockwater Pipeline Manual sent out by Missouri Bulletin MO-210-6-5. Many thanks go to Montana for developing the original material. The Montana Pipeline Manual was re-written for use in Missouri.

The Midwest Plan Service Bulletin MWPS-14 shall be removed from the Montana Stockwater Pipeline Manual and placed in the Reference Section of Book 1 of 2. Appendix B Computer Programs will be developed at a later date.

Special thanks go to the Manufactures and Suppliers listed in Appendix C for supplying product literature.

Additional copies are available from the Planning and Engineering Staff at 573-876-0910. If you have questions, please contact Neil Pellmann or Richard Koenig.

  
ROGER A. HANSEN ACTING  
State Conservationist

Dist: All Field Offices  
All Area Offices  
All Area Engineers  
All Resource Conservationist  
All Project Engineers (w/o attach)  
Field Tech Staff (1 Copy)  
Planning and Engineering Staff (2 copies)  
Irrigation and Water Quality Project Office, Dexter  
Mark Twain Quality Project Office, Macon  
Larry Dawson, Regional Engineer, NRCS, Madison, WI  
Jim Suit, State Conservation Engineer, NRCS, Bozeman, Montana  
Midwest State Conservation Engineers

Subject: ENG - Missouri Livestock Watering Systems  
Handbook, Notice No. 1

Date: March 4, 1998

To: Holders of MLWS Handbook:

File code: 210-13

All Field Offices  
All Area Offices  
All Project Engineers (w/o attach)  
Field Technical Staff (1 copy)  
Planning and Engineering Staff (2 copies)  
Irrigation and Water Quality Project Office, Dexter  
Mark Twain Quality Project Office, Macon, MO  
Larry Dawson, Regional Engineer, NRCS, Madison, WI  
Jim Suit, State Conservation Engineer, NRCS, Bozeman, MT  
Larry Caldwell, State Conservation Engineer, NRCS, Stillwater, OK  
Scott Mueller, Agriculture Engineer, NRCS, 138 S. Iowa Street, Dodgeville, WI 53533  
David Webber, NRCS, 1213 North 14th Street, Murphysville, IL 62966  
Mark Kennedy, State Grassland Conservationist, NRCS, Houston RC&D  
Curt Walker, Resource Conservationist, NRCS, Platte City F/O  
Don Pfof, Agriculture Engineer, University of Missouri, Columbia, MO  
Midwest State Conservation Engineers

For your information attached is some additional information on the UTINA Pasture Pump. This should be filed in the front part of the Hydraulic Ram, Solar Pump, etc. section of Appendix C, Book 2 of 2 of the Missouri Livestock Watering Systems Handbook.



NEIL F. PELLMANN, P.E.  
Acting State Conservation Engineer

Subject: **ENG – Missouri Livestock Watering Systems  
Handbook, Notice No. 2**

Date: **March 24, 2000**

To:  **Holders of MLWS Handbook**

File: **210-13**

**All Field Offices**

**All Area Office**

**All Project Engineers (w/o attach)**

**Field Technical Services Staff (1 copy)**

**Planning and Engineering Staff (2 copies)**

**Irrigation and Water Quality Project Office, Dexter, MO**

**Mark Twain Water Quality Project Office, Macon, MO**

**Larry Dawson, Agricultural Engineer, NRCS, Madison, WI**

**Jim Suit, SCE, NRCS, Bozeman, MT**

**Larry Caldwell, SCE, NRCS, Stillwater, OK**

**Scott Mueller, Agricultural Engineer, NRCS 138 S. Iowa Street, Dodgeville, WI 53533**

**David Webber, NRCS, 1213 North 14<sup>th</sup> Street, Murphyville, IL 62966**

**Mark Kennedy, SGC, NRCS, Houston RC&D**

**Don Pfost, AE, University of Missouri, Columbia, MO**

**Midwest State Conservation Engineers**

**Raleigh Redman, RC(P), Warrensburg T/O**

**Bob Heidledge, Claremore T/O, 1750 N. Sioux St., Ste 0, Claremore, OK 74017**

**Delmar Hall, Bloomington F/O, 1931 Liberty Dr., Bloomington, IN 47403**

**Pam Cornelius, Lebanon FO**

**Howard Moechning, 37484 90<sup>th</sup> Ave., Cannon Falls, MN 55009**

**Mike Russell, CET, Warrensburg FO**

**April Wilson, RC(Grassland), Ava FO**

Attached is an additional booklet to be added to the Missouri Livestock Watering Systems Handbook. The booklet "Watering Systems for Grazing Livestock" was produced by the Great Lakes Basin Grazing Network and Michigan State University Extension. It is very well organized with good information and color photographs on watering system options. This will be a very useful reference.

File this booklet in the Appendix E References section, Book 1 of the Missouri Livestock Watering Systems Handbook.



**ACTING**

**KEITH ADMIRE**  
State Conservation Engineer

Subject: ENG – Missouri Livestock Watering Systems  
Handbook, Notice No. 3

Date: April 4, 2000

To: Ivan Thiele, AgE, St. Joseph FO  
Otto Alber, CE/EE, Mark Twain WQO  
Reese Coulter, CE, New London FO  
Darrel Campbell, AE, Jefferson City FO  
Jeffrey Gibson, CE, Warrensburg FO  
John Feistner, AgE, Springfield AO  
Mark Nussbaum, CE (FO), Jackson AO  
John Hester, CE, Dexter Irrigation and Water Quality Project Office  
Theresa Woods, AgE, Houston FO  
Field Technical Services Staff (1 copy)  
Planning and Engineering Staff (2 copies)  
Mark Kennedy, SGC, NRCS, Houston RC&D  
Don Pfost, AE, University of Missouri, Columbia, MO  
Maurice Davis, SRC, Moberly FO  
Curt Walker, DC, Maysville FO  
Dennis Shirk, GS, Linn FO

File: 210-13

Attached are:

1. Two Missouri Engineering forms to assist in designing pipelines for livestock watering systems.
2. Instructions and examples for use of a spreadsheet for designing pipelines.

The spreadsheet will be E-mailed to you soon.

Wisconsin developed this spreadsheet and procedure. We have deleted the Wisconsin references from the data but still give Wisconsin credit. This procedure uses Manning's equation. It appears to give similar but slightly more conservative answers than Hazen-Williams used in the Missouri Livestock Watering Systems Handbook. It is very important to use correct inside diameter of pipe. We feel this procedure gives reasonable answers, however, you will probably want to check a few by the old procedure. Copies of the attachments have only been given to Area Engineers and persons directly involved in designing livestock watering systems. If other offices need a copy of the attachments, please make requests through your area engineer.

If you have any problems with this procedure, please keep us informed. We feel this procedure will be beneficial, but you are not required to use it. If this procedure shows "no flow," you need to revise your design.

File this information in Appendix B Computer Programs section, Book 1 of the Missouri Livestock Watering Systems Handbook.



KEITH E. ADMIRE, P.E.  
State Conservation Engineer

cc: (without attachments)

All Field Offices

All Area Offices

All Project Engineers

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Mike Russell, CET, Warrensburg F/O

April Wilson, RC(Grassland), Ava F/O

Subject: ENG – Missouri Livestock Watering Systems  
Handbook, Notice No. 4

Date: January 10, 2001

To: Ivan Thiele, AgE, St. Joseph FO  
Otto Alber, CE/EE, Mark Twain WQO  
Reese Coulter, CE, New London FO  
Darrel Campbell, AE, Jefferson City FO  
Jeffrey Gibson, CE, Warrensburg FO  
John Feistner, AgE, Springfield AO  
Mark Nussbaum, CE (FO), Jackson AO  
John Hester, CE, Dexter Irrigation and Water Quality Project Office  
Theresa Woods, AgE, Houston FO  
Field Technical Services Staff (1 copy)  
Engineering Staff (2 copies)  
Mark Kennedy, SGC, NRCS, Houston RC&D  
Bob Broz, Extension Assistant Professor, University of Missouri, Columbia, MO  
Maurice Davis, State Range Conservationist, Moberly FO  
Curt Walker, DC, Maysville FO  
Dennis Shirk, GS, Linn FO

File: 210-13

There has been a request from the field for approval to use small diameter polyvinyl chloride (PVC) sewer pipe conforming to ASTM D 2729 for spring development. We have researched this pipe and approve the use if the following conditions are met:

1. This is not a very strong pipe and should be used with caution. A check with the landowner is needed to ensure they do not want to use a stronger pipe.
2. Use diameter sizes 3-inch through 6-inch. Maximum cover is 4.0 feet or less for soil backfill. Minimum cover is 18 inches, as long as equipment does not cross over it. Freezing should be considered when selecting minimum depth.
3. Maximum cover can be increased to 7 feet when a minimum of 6 inches of sand or gravel backfill is used all around pipe.
4. Do not use for pressure flow. (Gravity systems only.)
5. Install carefully to obtain reasonably good backfill around pipe.
6. Pipe may be perforated or solid depending on intended use.
7. Pipe should not be exposed to sunlight unless it is painted to protect from ultraviolet rays.

File this information in Missouri Addendums section, Book 1 of the Missouri Livestock Watering Systems Handbook.



KEITH E. ADMIRE, P.E.  
State Conservation Engineer

cc: All Field Offices  
All Area Offices  
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Mike Russell, CET, Warrensburg F/O  
April Wilson, RC(Grassland), Ava F/O  
Teri Edeal, RC, 721 E Pacific, Suite #2, Lexington, NE

Subject: **ENG – Missouri Livestock Watering Systems Handbook, Notice No. 5**

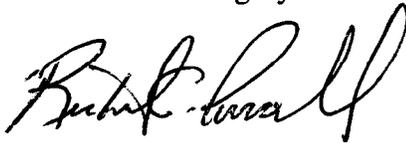
Date: **January 21, 2003**

To: **Ivan Thiele, AgE, St. Joseph FO**  
**Otto Alber, CE/EE, Mark Twain WQO**  
**Reese Coulter, CE, New London FO**  
**Darrel Campbell, AE, Jefferson City FO**  
**Jeffrey Gibson, CE, Warrensburg FO**  
**John Feistner, AgE, Springfield AO**  
**Mark Nussbaum, CE (FO), Jackson AO**  
**John Hester, CE, Dexter Irrigation and Water Quality Project Office**  
**Theresa Woods, AgE, Houston FO**  
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**Bob Broz, Extension Assistant Professor, University of Missouri, Columbia, MO**  
**Curt Walker, DC, Maysville FO**  
**Dennis Shirk, GS, Linn FO**

File: **210-13**

Attached is revised Sheet 2-6 for Book 1 of the Missouri Livestock Watering Systems Handbook. Sheet 2-5 is included because it is printed on the front of Sheet 2-6.

Please remove the old sheet and replace with the new one. If additional copies of the Missouri Livestock Watering Systems Handbook are needed, please contact Sandie Stuby at (573) 876-0910.



**RICHARD C. PURCELL, PE**  
State Conservation Engineer

cc: All Field Offices  
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