Standards Development past awards

2023

Revision: ANSI/ASAE S318.19 OCT2022 Safety for Agricultural Field Equipment

ESH-03/2, Internal Standards Development

ANSI/ASAE S318 one of ASABE's most widely used standards. The document addresses many of the safety hazards common to all farm equipment in the United States and provides manufacturers with a starting point to configure farm machinery. ASABE members worked alongside the Association of Equipment Manufacturers (AEM) discussing the technical challenges to the tractor Power Take-Off (PTO) Operator Presence Control (OPC). The discussions led to proposing the addition of an option that would allow the use of a loud audible alarm in the area of the PTO if the PTO is operating without an operator in the operator's station. Also proposed was allowing the PTO to be run intermittently for an extended period without an operator in the operator's station. At that time in the current version of S318, the alarm had to be overridden each time the PTO was restarted. Following two consensus body ballots, many side-bar discussions and committee suggestions, the revision was approved resulting in time saving operator actions which could be completed in a safe manner.

Revision: ANSI/ASAE/NFBA EP559.2 FEB2023, Design Requirements and Engineering Properties for Mechanically-Laminated Wood (Mechlam) Assemblies

X559 Development Committee under PAFS-20 Structures Group

With respect to the design of mechanically laminated wood assemblies, ANSI/ASAE/NFBA EP559.2 is the law of the land. This is due to the fact that it is included by reference in the International Building Code (IBC) – the model commercial building code that has been adopted by, and is enforced in, all 50 states, the District of Columbia, the U.S. Virgin Islands, Guam and the Northern Marianas Islands. To this end, EP559 is fundamentally important to designers, manufactures and builders of wood frame-buildings, specifically, companies who manufacture laminated columns and girders for post-frame buildings, engineers who design post-frame buildings, and companies that erect post-frame buildings. The purpose for the extensive modifications to EP559 was to expand the use of mechanically-laminated assemblies in engineered applications by providing engineers with the critical design procedures needed to properly size the assemblies for a host of load applications. The revision was led by David Bohnhoff, UW-Madison; and supported by a number of experts in the industry.

Revision: ANSI/ASABE S627.1 OCT2022 Weather-based Landscape Irrigation Control Systems

X627 Development committee under NRES-246 Turf and Landscape Irrigation

This standard was originally initiated by the Irrigation Association to develop a standard for testing of weather-based controllers to meet current needs and looking toward the future when testing protocols are referenced in other standards. This revision to the standard was initiated by Eastern Research Group (ERG) who is the primary contractor for the implementation of the USEPA WaterSense Program. The committee quickly addressed and corrected errors that had been identified in equations within the standard. The committee then took the opportunity to undergo a more significant revision of the standard to ensure terms and abbreviations were used consistently and appropriately. Technical review of the necessary revisions incorporated experts from California Energy Commission, University of Florida, Texas A&M University, Irrigation

Manufacturers (The Irrometer Company, Hydropoint Systems) and several irrigation consultants.

New Standard: ANSI/ASABE S660 SEP2022 Procedure for Evaluating the Distribution Uniformity for Large Granular Broadcast Applicators

MS-23/6/3 Dry material application

The purpose of this Standard is to establish a uniform method of determining and reporting performance data on broadcast spreaders >18.3 m (60') spread width designed to surface apply granular materials. Tests performed according to this Standard make it possible to predict distribution uniformity of a broadcast spreader and to compare spreader distribution patterns for various spreader types: Spinner, Pendulum, Pneumatic. S660 provides a method to evaluate various machines and more accurately measure the spread pattern distribution to a predetermined criteria level or to multiple machines for the end user, industry and academia. Members from industry and academia participated in the review and development of this standard based on what is normally done in the field in North America versus paper reviews from around the world combined to develop different in-field versus in-lab testing procedures.

2022

Revision: ANSI/ASABE EP585.1 MAR2021 Animal Mortality Composting

NRES-27 Ag By-products & Animal Mortality Management Systems

On-site composting of animal mortalities resulting during livestock production is being done more as an alternative to rendering, particularly for large animals. Proper composting of animal mortalities needs to completely dispose of the carcass, safely control odors, pathogens and liquids generated during the process. In order to accomplish that, producers, consultants, government organizations and other actors in the livestock industry requires access to standards with clear terminology, and based on the latest science outcomes. Therefore, members of the ASABE community proposed to review the current standard to improve consistency of the terminology used, and provide updated requirements for controlling pathogen and containment of odors and liquids generated during the process. Livestock producers electing to compost their animal mortalities will use information contained in the updated Standard for safely implementing the process.

Revision: ASABE S615.2 – Cotton Module Cover Material Performance

MS-23/7/3 Cotton Engineering

At the time of the January 2019 MS 23/7/3 committee meeting, S615 applied only to cover materials for rectangular cotton modules. With the increased use of cylindrical modules, TAMA Group patents ending, and the increase of plastic contamination in US cotton bales, the committee members determined the proper time had come to develop cylindrical module wrap material specifications. A subcommittee, under the leadership of John Wanjura, was formed to revise the standard.

Technical experts from Cotton Incorporated, USDA-ARS, private industry, and several US Universities worked collaboratively to identify a series of laboratory testing methods for characterizing the physical strength and toughness of the wrap material. Each round of material testing helped the group identify the most pertinent tests and define the laboratory testing protocol and performance thresholds eventually adopted in the standard. This standard, formally endorsed by the National Cotton Ginners Association and the National Cotton Council of America, will be used to make sure all wraps used on U.S. cotton modules meet minimum performance requirements and help the industry continue to reduce the incidence of plastic contamination in US cotton bales.

New Standard: ANSI/ASABE/ASHRAE EP653 OCT2021 Heating, Ventilating, and Air Conditioning (HVAC) for Indoor Plant Environments without Sunlight

X653 Development Committee under PAFS-30 Plant Systems Group

The EP653 Standard was initiated within ASABE's PAFS 30 committee in 2017 to address the need for greater understanding of climate management and HVAC equipment as it applies to controlled environment agriculture. Public posting in ANSI Standards Action brought it to the attention of ASHRAE, who was considering the development of their own standard. In winter 2018, ASHRAE agreed to a joint development plan, with ASABE as the administrator.
The ASHRAE/ASABE collaboration on this project brought to the forefront the expertise of two major standards development organizations. It was a long process of discussion and debate to provide an educational standard and guide for indoors growers.
This standard was written for indoor growers, to help them navigate the HVAC designs and systems proposed by engineering professionals so they can make informed decisions about selecting and operating equipment. EP653 is the first of its kind to describe the HVAC equipment used to manage commercial-scale, controlled environment agriculture facilities that do not use sunlight. The development team dedicates this award to the memory of Dr. Edward D. Harwood, who was one of the initiators and an active participant in its development.

2021

New standard ASABE S573 OCT2018, Procedures for Evaluating Variable-Rate Granular Material Application Accuracy
MS-54, Precision Agriculture
S573 was developed for use by industry and academics to support testing of granular fertilizer applicators equipped with variable rate technology. The standard represents a method that did not exist before to evaluate modern fertilizer applicators. This is the first standard globally that provides standard testing protocol and reporting for variable-rate technology which has become a common technology on modern farm machinery. A unique aspect is that the standard will not only provide rate response information but also inform how product uniformity is maintained during application rate changes.
Key contributors were Dr. John Fulton, Dr. Daniel Humburg and Dr. Scott Shearer along with members of MS-54, Precision Agriculture and MS-23/6/3, Dry Material Application committee members.

Revision ANSI/ASABE S613-3.1 JUN2018 Tractors and self-propelled machinery for agriculture — Air quality systems for cabs — Part 3: Filters for environmental cab HVAC systems
MS-23/2/2 Environment within Ag Vehicle Enclosures
While performing routine testing of various filters, a committee member noticed the acceptance criteria of the existing standard did not provide the desired protection within the vehicle cab enclosure. Members of the committee began long detailed discussions on various filtration test procedures and acceptance criteria to determine a method which would best serve the needs of the end user and produce consistent results. Other sections of the standard were also reviewed, mainly the test conditions for the vapor test, and revised accordingly to prevent the likelihood of further errors. Richard Job was the dedicated Project Lead for this revision. Main contributors were Alan Leupold and John Organiscak

New standard ANSI/ASABE S624 AUG2018, Grain Bin Access Design Safety
PAFS-20 Structures Group, developed by the X624 Standards Development Committee
With recommendations for bin access, anchor attachment points, and safety decals, S624 is intended to provide enhanced protection for those who must enter grain bins and prevent grain entrapment. The standard contains information to help enterers accomplish their task with a higher awareness and understanding of the hazards surrounding them and of the provisions to be taken. Industry was heavily involved in this standards effort. The developing committee consisted of industry representation from most of the North American grain bin manufacturers, members of

PAFS-20 and the Grain Elevator and Processing Society (GEAPS), academic researchers, safety experts, and end users. Daniel Wambeke, with the assistance of Dr Carol Jones, acted as the chair of the group and was the primary author of the X624 standard.

New standards ANSI/ASABE S632-1 JUL 2018, Precision Agriculture Irrigation Language: Core Concepts, Processes, and Objects, and ANSI/ASABE S632-3 JUL 2018, Precision Agriculture Irrigation Language: Irrigation System Operations
NRES-244 Irrigation Management
These standards enable a more frictionless experience for users bringing data from their irrigation machinery to their farm management systems. S632 is the first data exchange standard created by ASABE, positioning the organization to be a major player in the promotion and enabling of digital agriculture. This standard presents a basic set of concepts to develop a common data model of irrigation field operations and how they fit in the overall farming operations. It positions the irrigation industry alongside other machinery manufacturers in collaboration and field operations data exchange. This work has been done jointly with AgGateway, an industry consortium for enabling digital agriculture through standards implementation. Key contributors to the project were Diganta Adhikari, Aaron Berger, Dan Berne, Andres Ferreyra, Charles Hillyer and Joe Russo.

New standard ANSI/ASABE S641 MAY2018, Droplet Size Classification of Aerial Application Nozzles
MS-23/6/1 Liquid Application
As most pesticide product labels specify a relative droplet size class that must be applied, a nationally recognized standard method is required to satisfy regulatory and other associated concerns. The existing S572 reference nozzles, designed for ground based spray technologies, could not be evaluated under high airshear conditions associated with aircraft flight speeds. With the publication of this standard, currently available aerial droplet size data and decision support systems will be updated to reflect the approved standard method. Industry was heavily involved in the development of this standard with collaboration with the Agricultural Aviation Association. Andrew Hewitt with the University of Queensland was another key part of the standard development, utilizing a base of research that had been completed in Australia.

New standard ANSI/ASABE S642 SEP2018, Recommended Methods for Measurement and Testing of LED Products for Plant Growth and Development
ES-311 Electromagnetic Radiation Application for Plants
S642 is the second in a series of three standards developed by ES-311 to guide the rapidly expanding area of LED-based plant lighting systems. The standard describes methods for measurement and testing of LED products and is of significant importance to the horticultural industry which includes researchers, growers, and test laboratories, as it helps to standardize specific test methods for testing horticultural luminaires. S642 will also assist industry energy efficiency programs to have a document that they can reference for specific requirements. Current standards do not address the unique nature of LED technology in combination with the unique nature of plant response and sensitivity to electromagnetic radiation. This standard was developed by the ES-311/2 working group and the LED industry, with input from members of the Illumination Engineering Society of North America (IESNA) and the Design Lights Consortium (DLC).

2020

Revision ANSI/ASAE S279.18 OCT2019, Lighting and Marking of Agricultural Equipment on Highways
MS-23/4/3, Lighting& Marking
Accepted by: John Fisher

John Fisher served as the Project Lead for the revision. His time and effort was invaluable in guiding this revision through the numerous ballots and meetings that it took to complete this revision. One of the major changes in this revision was to provide an Illustrated Guide, developed by AEM (Association of Equipment Manufacturers) which shows the requirements for lighting and marking on agricultural equipment across the nation, provides layout information by agricultural machine type, details component placement, spacing, extremity marking, and dimensioning for on each layout, and adds reference notes for special cases for lighting and marking. Equipment requirement changes by the revision are that all towed implements shall have their own SMV emblem and all towed implements shall have their own Speed Identification Symbol.

Revision ASAE S292.6 SEP2019 Uniform Terminology for Agricultural Waste and By-Product Management

NRES-27 Agricultural By-products and Animal Mortality Management Systems

Accepted by: Jactone Ogejo

ASAE S292.6 SEP2019 Uniform Terminology for Agricultural Waste and By-Product Management was a revision project completed by NRES-27 Agricultural By-products and Animal Mortality Management Systems technical committee with Jactone A. Ogejo and Teng-Teeh Lim taking the lead in project development. Committee member input provided the basis for the document update to reflect current practices. This standard provides and describes terminology used in the field of organic waste and by-product management to ensure consistency and uniformity of use across disciplines. The standard also serves as a guideline for developing current, new terminology and definitions using terms and definitions adapted from related fields.

New Standard ANSI/ASABE S638 MAY2019, Pintle Hitch and Ring for Over the Road Towed Implements

MS-23/4/5, Tractor Implement Interface/PTO

Accepted by: Nathan Carlson

Nathan Carlson was the Project Lead, however Tom Tuttle and Kevin Hoehn were both major contributors in developing the initial drafts which helped shape the final version. Other members of the working group included Ed Kreis, Bruce Hawkins, Travis Tsunemori, Dave Raabe, Brian Olson and Chad Stover. S638 was primarily developed to provide an alternate hitching system for use with over the road towed implements, with a mass up to 45,000 kg. An additional benefit of this system is that it is designed to accommodate a larger amount of pitch between the towed and towing machines. The new standard joins ANSI/ ASABE AD6489-3 and ASABE/ISO 21244 in providing essential information related to tractor drawbars and associated implement hitch rings with S638 providing further information for implement to implement hitch connections.

2019

New standard ASABE S573 OCT2018, Procedures for Evaluating Variable-Rate Granular Material Application Accuracy

MS-54, Precision Agriculture

S573 was developed for use by industry and academics to support testing of granular fertilizer applicators equipped with variable rate technology. The standard represents a method that did not exist before to evaluate modern fertilizer applicators. This is the first standard globally that provides standard testing protocol and reporting for variable-rate technology which has become a common technology on modern farm machinery. A unique aspect is that the standard will not only provide rate response information but also inform how product uniformity is maintained during application rate changes.

Key contributors were Dr. John Fulton, Dr. Daniel Humburg and Dr. Scott Shearer along with members of MS-54, Precision Agriculture and MS-23/6/3, Dry Material Application committee members.

Revision ANSI/ASABE S613-3.1 JUN2018 Tractors and self-propelled machinery for agriculture — Air quality systems for cabs — Part 3: Filters for environmental cab HVAC systems
MS-23/2/2 Environment within Ag Vehicle Enclosures
While performing routine testing of various filters, a committee member noticed the acceptance criteria of the existing standard did not provide the desired protection within the vehicle cab enclosure. Members of the committee began long detailed discussions on various filtration test procedures and acceptance criteria to determine a method which would best serve the needs of the end user and produce consistent results. Other sections of the standard were also reviewed, mainly the test conditions for the vapor test, and revised accordingly to prevent the likelihood of further errors. Richard Job was the dedicated Project Lead for this revision. Main contributors were Alan Leupold and John Organiscak

New standard ANSI/ASABE S624 AUG2018, Grain Bin Access Design Safety
PAFS-20 Structures Group, developed by the X624 Standards Development Committee
With recommendations for bin access, anchor attachment points, and safety decals, S624 is intended to provide enhanced protection for those who must enter grain bins and prevent grain entrapment. The standard contains information to help enterers accomplish their task with a higher awareness and understanding of the hazards surrounding them and of the provisions to be taken. Industry was heavily involved in this standards effort. The developing committee consisted of industry representation from most of the North American grain bin manufacturers, members of PAFS-20 and the Grain Elevator and Processing Society (GEAPS), academic researchers, safety experts, and end users. Daniel Wambeke, with the assistance of Dr Carol Jones, acted as the chair of the group and was the primary author of the X624 standard.

New standards ANSI/ASABE S632-1 JUL 2018, Precision Agriculture Irrigation Language: Core Concepts, Processes, and Objects, and ANSI/ASABE S632-3 JUL 2018, Precision Agriculture Irrigation Language: Irrigation System Operations
NRES-244 Irrigation Management
These standards enable a more frictionless experience for users bringing data from their irrigation machinery to their farm management systems. S632 is the first data exchange standard created by ASABE, positioning the organization to be a major player in the promotion and enabling of digital agriculture. This standard presents a basic set of concepts to develop a common data model of irrigation field operations and how they fit in the overall farming operations. It positions the irrigation industry alongside other machinery manufacturers in collaboration and field operations data exchange. This work has been done jointly with AgGateway, an industry consortium for enabling digital agriculture through standards implementation. Key contributors to the project were Diganta Adhikari, Aaron Berger, Dan Berne, Andres Ferreyra, Charles Hillyer and Joe Russo.

New standard ANSI/ASABE S641 MAY2018, Droplet Size Classification of Aerial Application Nozzles
MS-23/6/1 Liquid Application
As most pesticide product labels specify a relative droplet size class that must be applied, a nationally recognized standard method is required to satisfy regulatory and other associated concerns. The existing S572 reference nozzles, designed for ground based spray technologies, could not be evaluated under high airshear conditions associated with aircraft flight speeds. With the publication of this standard, currently available aerial droplet size data and decision support systems will be updated to reflect the approved standard method. Industry was heavily involved in the development of this standard with collaboration with the Agricultural Aviation Association. Andrew Hewitt with the University of Queensland was another key part of the standard development, utilizing a base of research that had been completed in Australia.

New standard ANSI/ASABE S642 SEP2018, Recommended Methods for Measurement and Testing of LED Products for Plant Growth and Development
ES-311 Electromagnetic Radiation Application for Plants
S642 is the second in a series of three standards developed by ES-311 to guide the rapidly expanding area of LED-based plant lighting systems. The standard describes methods for measurement and testing of LED products and is of significant importance to the horticultural industry which includes researchers, growers, and test laboratories, as it helps to standardize specific test methods for testing horticultural luminaires. S642 will also assist industry energy efficiency programs to have a document that they can reference for specific requirements. Current standards do not address the unique nature of LED technology in combination with the unique nature of plant response and sensitivity to electromagnetic radiation. This standard was developed by the ES-311/2 working group and the LED industry, with input from members of the Illumination Engineering Society of North America (IESNA) and the Design Lights Consortium (DLC).

2018

Revision ANSI/ASAE S318.18 JUN2017, Safety of Agricultural Field Equipment
ESH-03/2, Internal Standard Development
Generally accepted as the North American overall product safety standard intended primarily for use by design engineers and product safety validation work and originally published in 1964, the standard was revised based on the evolution of technology for design and use of agricultural equipment. The driving force and inspiration for upgrading content has some reflection of the structure of the EU Machinery Directive - not as a statutory document, but as a discipline to an overall approach to integrating product safety measures into agricultural machinery design. The standard is a result of a collaborative effort by colleagues, normally considered competitors, in the agricultural machinery industry led by Karl Klotzbach as project lead with Chris Bursiek, Mike DeSpain, Howard Douglas, Todd Howatt, Dan Moss, Randy Renze, Eric Smith, and Mike Weber.

New standard ANSI/ASABE S613-4 AUG2017, Tractors and self-propelled machinery for agriculture—Air quality systems for cabs—Part 4: Performance test of a cab
MS-23/2/1, Environment Within Ag Vehicle Enclosures
S613-4 is the final part of the series, but it is also the final result of work that began in the mid-1990's. The original standard on this topic, ANSI/ASAE S525, was withdrawn, and beginning in 2007, a management system approach was pursued in S613. This standard provides a means to ensure protection of the operator working in contaminated environments associated with agricultural crop production. It supports development of a cab that is capable of meeting the operator protection needs in an application, as well as other factors to be considered in successful use and maintenance of the system. It is applicable in protection against both particulate and vapor contaminates. Major contributors were Richard Job who was the project lead, also Eugene Arenholz, Jason Dohrman, Al Leupold, Jeff Moredock, John Organiscak, Melinda Pell, Michael Schmitz, and Eric Smith.

New standard ASABE EP621 JUN2017, Guidelines for Calibrating, Validating, and Evaluating Hydrologic and Water Quality Models
X621, Standard Development Committee and NRES-21, Hydrology Group
Although information to support application of Hydrologic and Water Quality models abounds, model practitioners commonly use inconsistent methods to conduct, document, and report model calibration, validation, and evaluation. When applied, this engineering practice should facilitate sound model development and meaningful results. During the development of the content, the

committee collaborated with industry leaders within and outside of ASABE. Industry leaders contributed to the draft by providing early feedback about the scope and format that would be most useful to the industry, as authors of two related special issue papers, and by serving on the advisory committee to review, comment on, and approve the final draft. This development effort was led by Claire Baffaut and Daren Harmel with the support of many experts from industry academia and research organizations.

New standard ANSI/ASABE S640 JUL2017, Quantities and Units of Electromagnetic Radiation for Plants (Photosynthetic Organisms)
ES-311, Electromagnetic Radiation Application for Plants
Prior to the development of this standard, the industry did not have consistent and clear definitions for metrics used in horticultural lighting. In July 2014 industry and academia began Round Table discussions to develop a strong standardized consensus for metrics, testing and performance. This standard is the result and provides consistent and clear definitions that will guide the wide-range of practice for producers, users, regulators, and those interested in horticultural lighting. The project leader, Jianzhong Jiao, had broad support from participation of industry and academia with representatives of IES Testing Procedures Committee, Design Light Consortium, and CIE (International Commission on Illumination).

Revision ANSI/ASABE AD6489-3:2004 JUL2017, Agricultural vehicles — Mechanical connections between towed and towing vehicles — Part 3: Tractor drawbar.
MS-23/4/5, Tractor/Implement Interface and MS-23/4, Tractors
Tractor drawbars are commonly used in North America. The dimensions in this standard must relate with PTO drive shafts, drawbar pins and implement hitch rings. ISO 6489-3 was originally based on ASAE S482, a historic standard. This project focused on permanently capturing important North American design details. These include adding pictorials to further clarify the drawbar clearance for tracked tractors and addressing uploading on hitches. Nolan House was instrumental in developing the highly debated draft language and creating the tracks pictorial. Ed Kreis and Tom Tuttle assisted with additional draft input.

2017
ANSI/ASABE S629, Framework to Evaluate the Sustainability of Agricultural Production Systems
ASE-16, Engineering for Sustainability
Led by Dr. Marty Matlock and Dr. Ed Barnes since its inception in 2011, the project was a very collaborative process and involved direct input from agricultural producer groups (cotton, soybeans, corn), Field to Market, a formal representative from the American Society of Agronomy (Doug Karlen) and several different divisions within ASABE, including Machinery Systems, Natural Resources & Environmental Systems, and Applied Science & Engineering. A significant engineering contribution toward a sustainable tomorrow, this standard establishes a framework for developing programs to chart progress towards sustainable agricultural production by defining and benchmarking key performance indicators and implementing strategies for continuous improvement, and reporting improvements over time. Therefore, the farmer has more freedom to choose production systems that will reach the desired performance measures to address resource concerns specific to their farm.

ANSI/ASABE S592.1, Best Management Practices for Boom Spraying MS-23/6/1, Liquid Application Systems

Serious discussion/activities of upgrading Best Management Practices (BMPs) for Boom Spraying started in June 2015. Participation in this project led by Alvin (Al) Womac, was broad, and represented not only full-line agricultural equipment manufacturers (Deere, CNH, Agco, etc.), but also the nozzle manufacturers, the agrochemical industry, university and independent researchers, and manufacturers of specialty sprayers.
The standard is a one-stop source for step-by-step, updated boom spraying practices. In this revision, the need for a much more comprehensive document was identified by stakeholders. The new ASABE boom sprayer BMPs can guide applicator training, pesticide labels, regulatory efforts, and serve as an overall repository of responsible application techniques. The language of the standard was comprehensive but not prescriptive, such that it could adapt and remain relevant with respect to evolving technology and the nearly endless combination of field conditions in which it might be applied.

ANSI/ASABE S620, Safety for Anhydrous Ammonia Application Equipment, MS-23/6/5, Anhydrous Ammonia Application Equipment, developed by X620 Development committee
The development of this standard involved strong ASABE and FEMA member input and participation. The committee consisted of equipment and component manufacturers, state DNR regulatory and inspection personnel, university extension engineers, crop farmers, industry product safety experts, fertilizer distributors and applicators, Ag retailers and other industry experts. Additional experts provided guidance from ASABE technical committees MS 23/4/5, MS 23/3, MS 23/4/3 and MS 23/19.
Prior to the availability of this document there was not a standardized approach to the safety aspects of anhydrous ammonia application equipment design, construction and use. With the availability of this standard each organization can now focus and collaborate on a consistent approach that augments the safe use of the equipment as well as the design for safety process.
Key contributors to the development of this standard were Co-Chairs: Jim Hellbusch and Randy Renze; Working Group Leaders: Mark Hanna, Pat Hodges, Ed Kaiser, Ed Kreis, John Lang, Dave Raabe, Judd Stretcher, and Tom Tuttle.

ANSI/ASABE S626, Landscape Irrigation System Uniformity and Application Rate Testing, NRES-246 Turf and Landscape Irrigation, developed by X626 Development committee
This standard was proposed by the Irrigation Association in response to changes and shifts in the landscape irrigation market. In addition to describing a procedure for setting out catch devices in an irrigation test area, the standard also establishes procedures for measuring the effects of sprinkler irrigation by use of a portable soil moisture sensor to describe soil moisture uniformity and guidelines for auditing landscape drip irrigation systems.
S626 provides a needed reference that describes a methodology or procedure that is practical, repeatable and defensible for evaluating irrigation performance which could provide useful tools for programs such as US EPA WaterSense program, or California's Model Water Efficient Landscape Ordinance.
Key contributors to the development of this standard were Mike Huck, Jeff Kremecki, Brent Mecham, Tige Procyshyn, Daniel Ransom, Tom Reynolds, Andy Slack, Andy Strother, Sam Thayer, Tracy Tucker, and Brian Vinchesi.

ASABE/ISO 3767-1:2016, Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols; ASABE/ISO 3767-2:2016, Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 2: Symbols for agricultural tractors and machinery, MS-23/14 Machine Symbols, Displays and Manuals
Consistent universal symbols are a necessity for ensuring equipment designed today will meet the criteria for use in North America and worldwide. These identical ISO standard adoptions replaced the earlier 1998 versions of the ISO documents which were initially adopted by ASABE in 2006.

The adoptions of the 2016 versions as national standards added over 300 symbols to Part 1 and over 200 to Part 2.
Richard Gast was a key contributor in the development of the 2016 versions of the ISO documents and Bruce Hawkins led the US adoptions. Many of the new symbols incorporate technological modernization changes and allow for a more precise monitoring of agricultural equipment.
These Symbols are applicable to multiple types of agricultural tractors and machinery, forestry machinery, and powered lawn and garden equipment and displays agricultural equipment standards Part 1 covers harvesting machinery and equipment, harvesters (combine, cotton, forage, sugar cane), windrower, sprayers, and balers. Part 2 includes system symbols for the engine, transmission, hydraulic, brake, fuel, lighting, climate, seat, tires, steering, and window and visibility.

2016

ANSI/ASAE S422.1 DEC2015, Mapping Symbols and Nomenclature for Erosion and Sediment Control Plans for Land Disturbing Activities
NRES-224, Sediment and Associated Pollutants

S422, first developed and published in 1995, was revised to update to current practices. Prior to revision, the standard was missing some mapping abbreviations and symbols, and did not include some newer control practices now in common usage. This document contains a list of descriptive elements for use in developing erosion- and sediment-control plans. It is used as a resource of applicable mapping symbols and nomenclature of current erosion and sediment control practices for state erosion and sediment control agencies, consultants, and related associations.
Major contributors in the revision of this standard were Dr. Gene Yagow, Senior Research Scientist at Virginia Tech, Dr. Tamie Veith, Agricultural Engineer with the USDA, Dr. Jason Vogel, Associate Professor and Stormwater Specialist from Oklahoma State University, Thomas Schneider, Stormwater Compliance of Stormcon, LLC, and Chris Marr of Erosion Solutions Inc.

ASAE S526.4 SEP2015, Soil and Water Terminology
NRES-07, Nomenclature

ASAE S526 consists of preferred terms and definitions that are intended for use in all ASABE standards, technical journals, magazines, text books, and extension publications pertaining to soil and water engineering. The revision of standard, initiated in response to the required ANSI five-year periodic review of the standard, included clarifications, revisions, additions, and deletions of entries to accommodate advances in the soil and water scientific fields. The 900 plus terms/definitions were also added to the AgGateway Glossary, which is an online resource serving the agricultural community.
Major contributors in the revision of this standard were Drs. Fouad Jaber, Associate Professor and Extension Specialist at Texas A & M University, Carmen Agouridis, Associate Professor at the University of Kentucky and Ruth Book, State Conservation Engineer at the USDA-NRCS.

ANSI/ASABE EP585 DEC2015, Animal Mortality Composting
NRES-27, Ag Byproducts & Animal Mortality Systems

With recent disease challenges in the livestock and poultry industries, composting of mortalities has been promoted in many regions of the U.S. This method reduces potential water quality risks and disease transfer that can occur during offsite disposal. Regulations and standards for design and operation of livestock composting systems varies among states and regions but the basic guidelines are universal. This new ASABE standard was developed to provide the basic planning, design, management and troubleshooting guidelines for the biosecure, environmentally acceptable, and economically sustainable disposal of livestock mortalities and carcass components via composting.
Major contributors to the development of this standard were Drs. Amy Schmidt, Assistant Professor at the University of Nebraska, Saqib Mukhtar, Professor at the University of

Florida, and Teng Teeh Lim, Associate Professor at the University of Missouri.

ANSI/ASABE S625 MAR2015, Drawbar Pin Dimensions and Requirements for Towed Equipment
MS-23/4/5, Tractor Implement Interface/PTO
The increasing number of roadway implement transports and expanding size of agricultural equipment emphasized the need to recommend acceptable drawbar hitching practices related to pin size and performance.
Improved guidelines were needed to establish dimensions and minimum strength requirements for agricultural drawbar pins. This new ASABE standard, was strongly encouraged by members of the Farm Equipment Manufacturers Association (FEMA), accomplished that goal and also defines loading conditions for drawbar pin retention systems.
Major contributors in the development of this standard were Ed Kreis, Staff Engineer at John Deere Product Engineering Center and Tom Tuttle, retired Project Engineer at CNH.

ASABE/ISO 12188-2:2012, Positioning & guidance systems in ag-Part 2: Testing satellite-based auto-guidance systems
MS-54, Precision Agriculture
MS-23/19, Ag Electronics
This ASABE standard is an adoption of International Standard ISO 12188-2, which was initially proposed as ASABE standard project X605. After the X605 draft was completed a decision was made to move the project directly to the international level as a proposed international standard. Once the ISO document was approved for international use it was adopted by ASABE as a national standard. The standard provides a fundamental framework and associated terminology to be used for testing of automated guidance systems. The intention of this standard is to be a basis on which other standards can be developed for addressing specific types of guidance scenarios.
Major contributors to the development and adoption were Drs. Timothy Stombaugh, Professor at the University of Kentucky and Viacheslav Adamchuk, Associate Professor at McGill University and Adjunct Associate Professor at the University of Nebraska-Lincoln.

ASABE/ISO 23205:2014 FEB2016, Agricultural tractors — Instructional seat
MS-23/4, Tractors
A good example of accomplishing harmonization between national and international standardization can be seen in the ASABE adoption of ISO 23205:2014. The previous 2006 version of the ISO document was adopted by ASABE with technical deviations in 2010. These same technical deviations were proposed and accepted in the later version of the ISO standard, ISO 23205:2014, and adopted identically by ASABE, replacing the previous version. Incorporation of the US deviations into the revised international 2014 version eliminated the need for a national adoption with deviations, a goal that facilitates manufacturing, safety advancements and product marketing worldwide.
Major contributors in the development and adoption of this standard were Eric Smith, Manager, Product Standards at John Deere Product Engineering Center and Doug Durant, retired Manager Product Standards at John Deere Product Engineering Center.

2015
MS-23/4, Tractors and MS-23/4/5, Tractor Implement Interface/PTO
ANSI/ASABE AD5673-1:2005*, Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 1: General manufacturing and safety requirements*
The adoption of ISO 5673-1 began in 2011 with the intent to replace ASABE S604. However, the subject matter experts soon realized that unique requirements for the U.S. market were not addressed in the ISO document. The scope of the project was focused on

the technical details for the PTO yoke locking device requirements. Developing the details concerning the locking device deviation was the heart of the basis for the Standards Development Award. While the result looks very simple, reaching consensus among several subject matter experts is not easy. This project demonstrates how the open and transparent ASABE and ANSI standards development process can be used to bring different viewpoints together.

MS-23/7/2, Forage and Biomass Engineering
ASABE S532 APR2014, *Net Wrap for Round Balers*
There are currently many manufacturers of round baler net wrap who had lacked any standardized dimensional requirements towards compatibility with baler wrapper systems. This standard establishes standardized knitted net wrap nomenclature and provides dimensional and packaging requirements which will insure dimensional compatibility with all baler wrapper systems and promote safe handling of net rolls.

NRES-245, Microirrigation
ASAE S435.1 JAN2015, *Polyethylene Pipe Used for Microirrigation Laterals*
The revision of standard ASAE S435.1, Polyethylene Pipe Used for Microirrigation Laterals, represents a complete rewrite of the previous standard to reflect current best practices. The revision contains requirements and methods for testing of polyethylene materials and of pipe or tubing made from those materials for microirrigation. This revision is significant because it outlines minimum requirements for microirrigation tubing, enabling the industry to have a solid starting point when evaluating and specifying microirrigation tubing for commercial use.

2014
Daniel E. Ciolkosz, Will D. Corman, John R. Fisher, Mehari Z. Tekeste

2013
David R. Bohnhoff, Earle C. Morton, Stephen W. Searcy/Shay L. Simpson, Eric B. Smith, Shahab Sokhansanj

2012
Oladiran O. Fasina, Brian L. Herbst, Matthew J. Robert, Daniel L. Scruton, Clément Vigneault

2011
David R. Bohnhoff, Jan C. Jofriet, Harvey B. Manbeck, E.A. McKenzie, Jr., Thomas B. Tuttle

2010
Robert D. Grisso, Edwin R. Kreis, Daniel E. Meyer, Randal K. Taylor, David L. Valcore

2009
Roger M. Hoy, Richard W. Job, Anthony H. Kajewski, Carson J. Ward, Ross A. Witt

2008
Brian Herbst, Philip McLoud, Kasiviswanathan Muthukumarappan, Gene Yagow

2007
Douglas Durant, Oladiran Fasina, Nancy Fitz, Ron MacDonald, Steven J. Thomson

2006
Carl J. Bern, Anthony J. Kajewski, Michael D. Senneff, Richard (Rick) K. Koelsch, Wendy J. Powers

2005
Tony Kajewski, Ronald MacDonald, Earle Morton, Mark Siemens

2004
Herb M. Farley, Robert B. Skromme, Reed James Turner, Thomas B. Tuttle, Steven R. Walder, Kasiviswanathan Muthukumarappan

2003
Barry S. Bauman

2002
Arend-Jan Both

2001
Rodney L. Huffman

2000

Alvin R. Womac, James D. Rickman, Donald L. Stettler

1999
Barrie L. Smith, Gary N. West, Thomas L. Spofford, Dennis J. Murphy, and Mark A. Purschwitz