Machinery Standards for Safe & Strong Farms

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October 8 to10

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Machinery Standards for Safe & Strong Farms

INTERNATIONAL STANDARD **ISO 6489-3**

Second edition
2004-06-01

Agricultural vehicles — Mechanical connections between towed and towing vehicles —

Part 3:
Tractor drawbar

INTERNATIONAL STANDARD **ISO 21244**

First edition
2008-06-01

Agricultural equipment — Mechanical connections between towed and towing vehicles — Implement hitch rings and attachment to tractor drawbars

INTERNATIONAL STANDARD **ISO 12140**

Second edition
2013-07-15

Agricultural machinery — Agricultural trailers and trailed equipment — Drawbar jacks

ANSI/ASAE S338.5 MAY2006 (R2016)
Field Equipment for Agriculture — Safety Chain for Towed Equipment

ASABE

American Society of
Agricultural and Biological Engineers

ANSI/ASABE S625.1 JUL2018
Drawbar Pin Dimensions and Requirements for Towing Machine with Clevis

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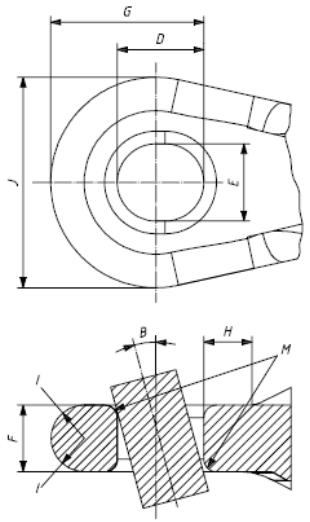
INTERNATIONAL STANDARD

ISO 21244

First edition
2008-06-01

Agricultural equipment — Mechanical connections between towed and towing vehicles — Implement hitch rings and attachment to tractor drawbars



For use only with a drawbar clevis.

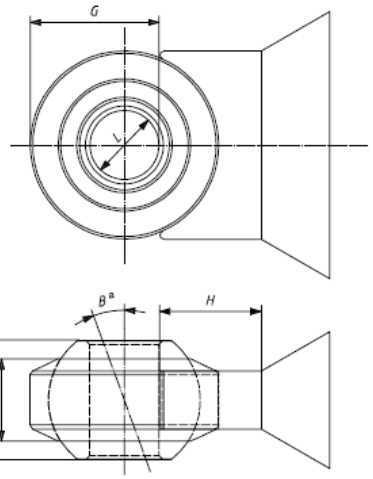
NOTE For angle *B*, see Table 3.

Figure 1 — Hitch ring of implement (see Table 1)

Table 1 — Hitch ring specifications (see Figure 1)

Dimensions in millimetres

Parameter	Drawbar category					
	0	1	2	3	4	5
Slot length, *D*	21–40	33–48	33–60	41–66	55–70	73–85
Slot width (min.), *E*	21	33	33	41	55	73
Thickness (max.), *F*	30	36	38	48	50	60
Distance (max.), *G*	55	85	95	95	110	140
Distance (min.), *H*	35	40	50	50	65	80
Radius, *I*	0,5*F*	0,5*F*	0,5*F*	0,5*F*	0,5*F*	0,5*F*
Width (max.), *J*	95	107	115	140	160	190
Radius, *M*	As required to provide adequate articulation between the tractor and the implement.					
Pin diameter (min.)	In accordance with ISO 6489-3:2004, Table 4.					



For use only with a drawbar clevis.

NOTE For angle *B*, see Table 3. For dimensions *F*, *G* and *H*, see Table 1.

[a] In all directions.

Figure 2 — Ball hitch ring of implement (see Table 2)

Table 2 — Hitch ring specifications (see Figure 2)

Dimensions in millimetres

Parameter	Drawbar category					
	0	1	2	3	4	5
Ball thickness (max.), *K*	45	65	65	85	85	95
Drawpin hole diameter, *L*, $^{+0,8}_{-0,25}$	19	31	31	39	51	71
Pin diameter (min.)	In accordance with ISO 6489-3:2004, Table 4.					

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INTERNATIONAL STANDARD

ISO 6489-3

Second edition
2004-06-01

Agricultural vehicles — Mechanical connections between towed and towing vehicles —

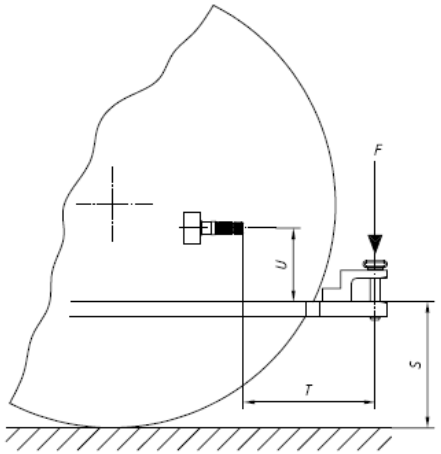
Part 3:
Tractor drawbar

Véhicules agricoles — Liaisons mécaniques entre véhicules remorqueurs et véhicules remorqués —

Partie 3: Barre d'attelage du tracteur

4.4 Drawbar location and position

The drawbar location and position shall conform to Figure 1 and Tables 2 and 3.



Key
F vertical load

NOTE Tables 2 and 3 explain the symbols and give the dimension values.

Figure 1 — Drawbar location and position

Table 2 — Drawbar location — Values of the dimensions S and U

Dimensions in millimetres

Dimension	Drawbar category					
	0	1	2	3	4	5
Height of drawbar [a], S	220 to 420	330 to 500	330 to 500	380 to 560	380 to 560	400 to 600
U [b] min.	200	220	250	260	280	310

[a] The S dimension should be met for normal agricultural applications. On tractors especially designed for high ground clearance, such as working in standing vegetable crops or sugar cane, S may exceed the maximum. On tractors designed for low ground clearance, such as lawn mowing or ground care, which require a low centre of gravity, S may be less than the minimum.

[b] The values given apply to new tractor types designed after the publication of this part of ISO 6489.

4.5 Drawbar dimensions

The drawbar dimensions shall conform to Figure 2 and Table 4.

Dimensions in millimetres

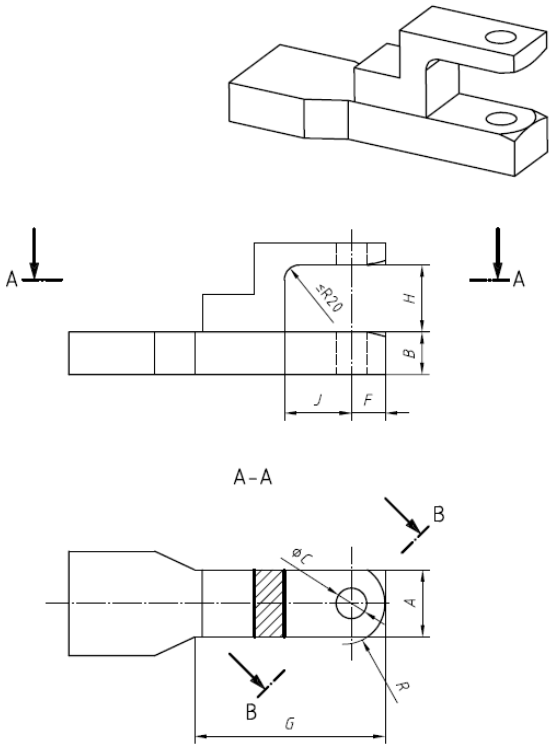


Figure 2 — Tractor drawbar and clevis

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ANSI/ASABE S625.1 JUL2018
Drawbar Pin Dimensions and Requirements for Towing Machine with Clevis

American Society of
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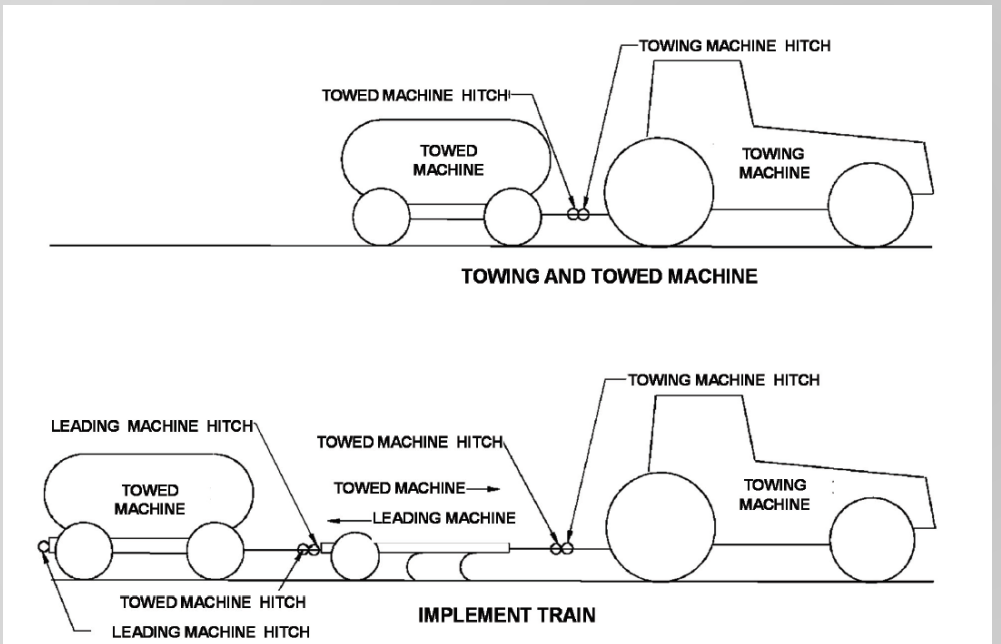

Figure 4 – Towing, towed and leading machines

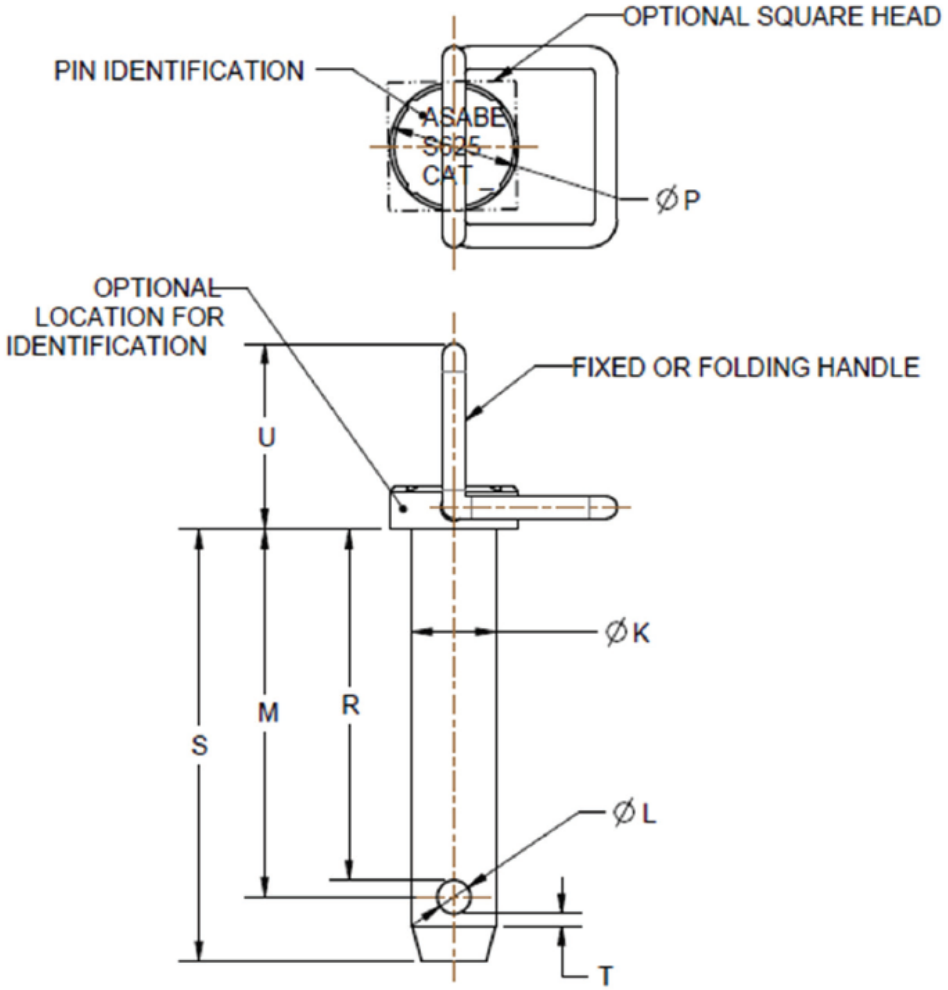

Figure 1 – Drawbar pin

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ANSI/ASAE S338.5 MAY2006 (R2016)
Field Equipment for Agriculture — Safety Chain for Towed Equipment

American Society of
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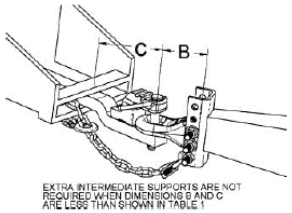

Figure 2 – Example auxiliary attaching system

Table 1 – Safety chain specifications

Intermediate chain sizes to those listed in the table are permissible as long as the chain can pass through nearest smaller opening listed in the table. Minimum ultimate strength as used in this standard refers to the minimum breaking strength of the chain. This is different than the working load limit of the chain as is commonly used for lifting devices.

Minimum Ultimate System Strength kN (lbf)	Maximum Chain Link Diameter (see Figure 3) mm (in.)	Minimum Fitting Hole Size (see Figure 3) mm (in.)	Dimensions A, B, C,[1] (see Figures 1 & 2) mm (in.) Maximum Distance from Primary Attaching Point to Chain Attaching Point or Support	Minimum Chain Length[2] (see Figure 3) mm (in.)	Minimum Length ahead of Primary Attaching Point [3] mm (in.)
28 (6,400)	32 (1.3)	32×67 (1.3×2.6)	230 (9.0)	1 500 (59)	900 (35)
44 (10,000)	32 (1.3)	32×67 (1.3×2.6)	230 (9.0)	1 500 (59)	900 (35)
71 (16,000)	32 (1.3)	32×67 (1.3×2.6)	230 (9.0)	1 500 (59)	900 (35)
89 (20,000)	38 (1.5)	45×102 (1.8×4.0)	230 (9.0)	1 500 (59)	900 (35)
133 (30,000)	45 (1.8)	45×102 (1.8×4.0)	230 (9.0)	1 625 (64)	1 025 (40)
178 (40,000)	50 (2.0)	50×102 (2.0×4.0)	280 (11.0)	1 750 (69)	1 150 (45)
267 (60,000)	56 (2.2)	56×127 (2.2×5.0)	280 (11.0)	2 030 (80)	1 400 (55)
311 (70,000)	56 (2.2)	61×136.5 (2.4×5.4)	280 (11.0)	2 286 (90)	1 400 (55)
356 (80,000)	56 (2.2)	61×136.5 (2.4×5.4)	280 (11.0)	2 670 (105)	1 400 (55)

[1] "Maximum Dimension A, B, C" is the maximum distance, ahead of or behind the primary attaching point to the safety chain attaching point (on the towed machine or towing machine) or an intermediate support.
Dimension A is the horizontal distance from the primary attaching point to the center of the intermediate support.
Dimension B is the horizontal distance from the primary attaching point to the towed machine attaching point.
Dimension C is the horizontal distance from the primary attaching point to the towing machine attaching point.

[2] "Minimum Chain Length" applies to safety chains that are not designed specifically for and permanently attached to a particular towed machine (see Figure 2)

[3] Safety chains designed specifically for and permanently attached to a particular towed machine (see Figure 1) may be shorter than the "Minimum Chain Length" specified but shall meet the requirements of "Minimum Length Ahead of Primary Attaching Point." Towed equipment having higher power requirements to operate the equipment in field conditions may need to have a longer safety chain than required by the "Minimum Length Ahead of Primary Attaching Point" because the mass of the towed equipment is lower and not the primary concern when matching towed equipment to towing equipment.

4 Safety Chain Specifications

4.1 The safety chain, its hook, and its end fitting including pins shall conform to the specifications given in Table 1 and illustrated in Figure 3. Other alternative configurations for end fittings and hooks are permissible as long as the chain can be securely retained by the latching mechanism regardless of chain tension. The hook must stay in contact with the same chain link as originally connected.

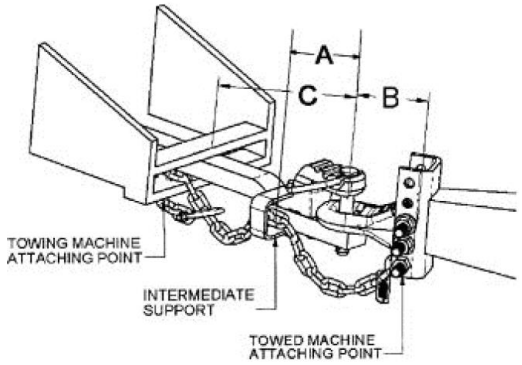

Figure 1 – Example auxiliary attaching system with intermediate support

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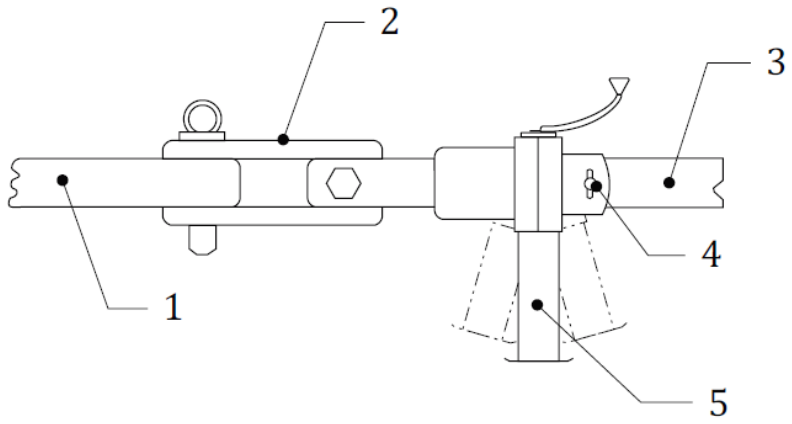
INTERNATIONAL STANDARD **ISO 12140**

Second edition
2013-07-15

Agricultural machinery — Agricultural trailers and trailed equipment — Drawbar jacks

Matériel agricole — Remorques agricoles et matériel traîné — Béquilles d'attelage

If the jack stand system has an adjustable mount, an appropriate instruction sign shall be affixed to the implement near the jack mount indicating the proper adjustment of the jack or jack stand system. See Figure 1 as an example.



Key

1 drawbar
2 clevis
3 tongue
4 positioning nut
5 jack

Figure 1 — Jack stand system — Example

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http://pami.ca/pdfs/safety/sih_guide_Final.pdf

ANSI/ASABE S620 MAR2017
Safety for Anhydrous Ammonia Application Equipment

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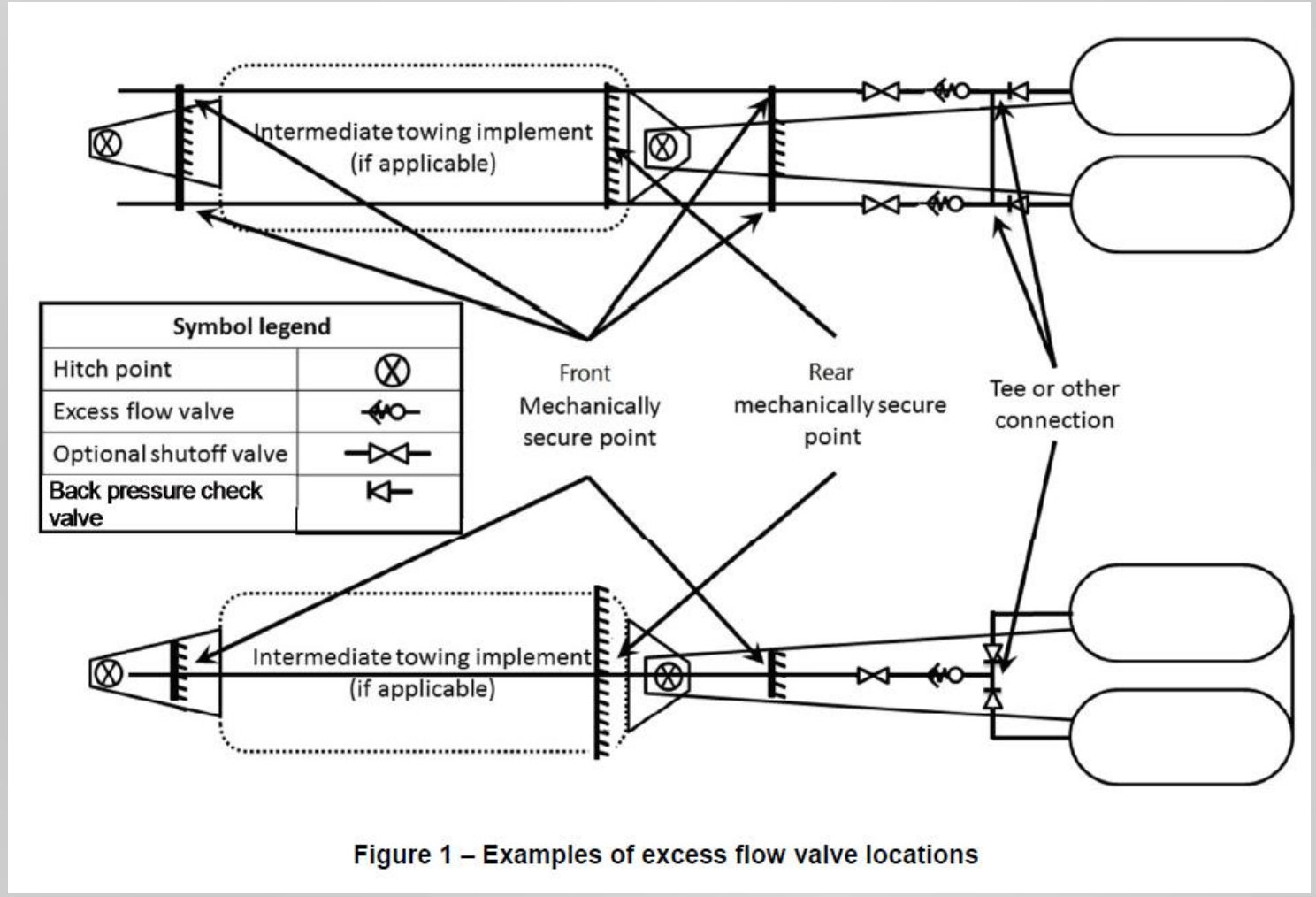

Figure 1 – Examples of excess flow valve locations

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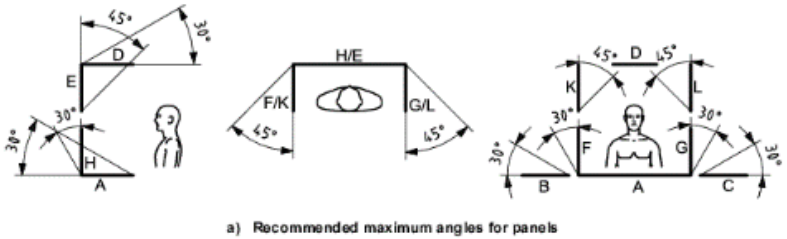
INTERNATIONAL STANDARD **ISO 15077**

First edition
2008-01-15

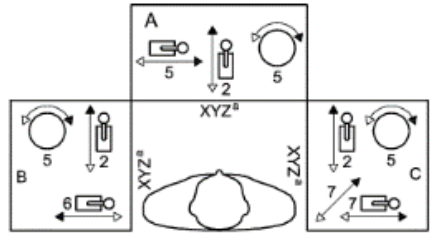
Tractors and self-propelled machinery for agriculture — Operator controls — Actuating forces, displacement, location and method of operation

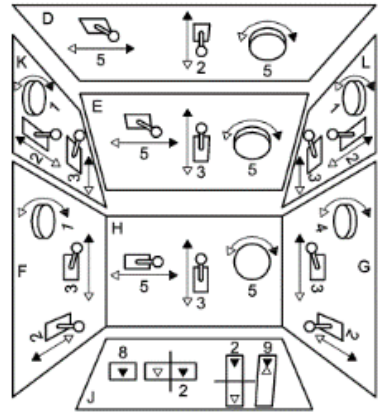
Tracteurs et machines agricoles automotrices — Commandes de l'opérateur — Forces de manœuvre, déplacements, emplacements et

ISO 15077:2008(E)



a) Recommended maximum angles for panels





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INTERNATIONAL STANDARD **ISO 11684**

First edition
1995-01-15

Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles

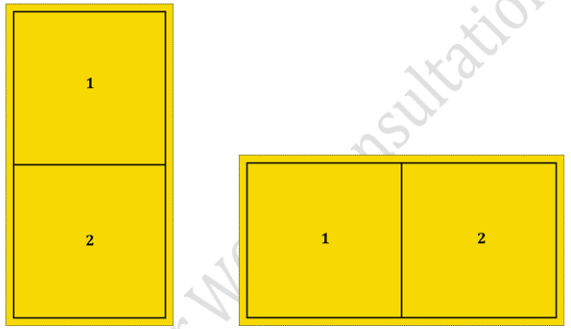
Tracteurs et matériels agricoles et forestiers, matériels à moteur pour jardins et pelouses— Signaux de sécurité et de danger — Principes généraux

5.2 Safety signs without text

5.2.1 Two-panel (no text) safety sign

The hazard description panel contains either a hazard description pictorial enclosed by the safety alert triangle or the safety alert triangle with exclamation mark alone. The message panel contains information that describes the hazard avoidance (as a pictorial or as multiple pictorials), explains the consequences of exposure to the hazard, and instructs how to avoid the hazard.

See Figure 1.



a) Vertical configuration **b) Horizontal configuration**

Key
1 hazard description panel
2 message panel

Figure 1 — Two-panel (no text) safety sign

Draft for WG 1 consultation

INTERNATIONAL STANDARD **ISO 3600**

Fourth edition
2015-07-15

Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and format

Tracteurs, matériels agricoles et forestiers, matériel à moteur pour jardins et pelouses — Manuels d'utilisation — Contenu et présentation

ISO/TC 23/SC 14 N

Date: 2019-08-15

ISO/CD 11684:2019(E)

ISO/TC 23/SC 14/WG 1

Secretariat: ANSI

Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles

Tracteurs, matériels agricoles et forestry, matériales à moteur pour jardins et pelouses — Signaux de sécurité et de danger — Principes généraux

WG 1 consultation

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INTERNATIONAL STANDARD **ISO 4254-16**

First edition
2018-12

Agricultural machinery — Safety —

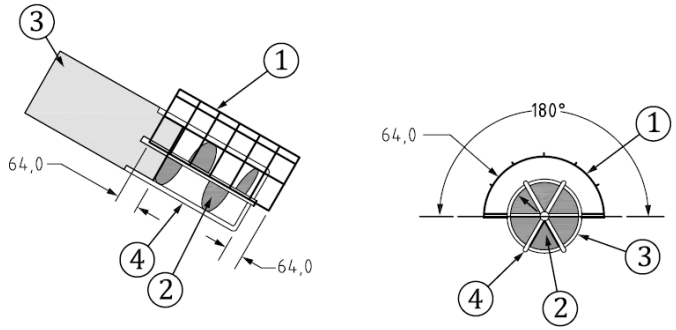
Part 16:
Portable agricultural grain augers

Matériel agricole — Sécurité —

Partie 16: Tarières à grain agricoles portatives

ISO 4254-16:2018(E)

Dimension in millimetres



Key

1 intake guard
2 flighting
3 flighting tube
4 bearing support rod

Figure 1 — Intake guarding

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ISO/TC 23/SC 6/WG 24 **N 63**

ISO/TC 23/SC 6/WG 24
Closed transfer systems

Email of convenor: rhg@wisdomsystems.co.uk
Convenorship: BSI (United Kingdom)

sc 6 n xxxx ISO CD 21191 CTS-CD-Post-Turin-CLEAN

Document type: Other draft

Date of document: 2018-02-12

Expected action: ACT

ISO/CD 21191:2016(X)

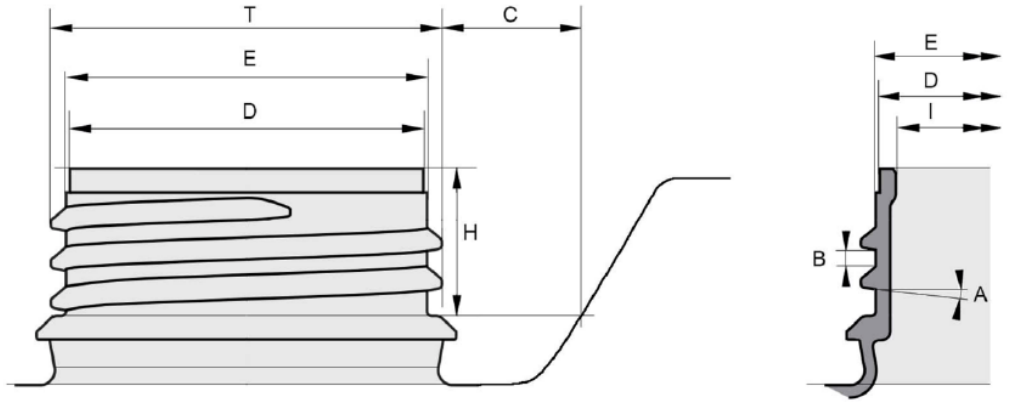
Annex F (Normative)

Product Container closure to CTS Interface dimensions and tolerances

F.1 Industry Agreed Dimensions for a 63mm Container Neck to CTS Interface

These dimensions have been proposed and agreed by the PPP manufacturers and application equipment manufacturers as the dimensions that are acceptable to define a 63mm container closure to CTS interface. These dimensions are provided to give guidance to CTS manufacturers who intend to use the 63mm container neck as the interface for their equipment. These dimensions shall also provide guidance to any packaging manufacturers who would like to ensure an appropriate connection between their products and a CTS meeting the requirements of this standard.

The interface connection of a CTS shall be constructed to make a leak tight and secure connection to the following diagram and table:



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ISO/TC 23/SC 6/WG 25 **N 67**

ISO/TC 23/SC 6/WG 25
Unmanned Aerial Vehicle Spraying Systems

Email of convenor: jyr@snu.ac.kr
Convenorship: KATS (Korea, Republic of)

ISO PWI 23117 Clean Version with annex 20190301 (INC N 43 & N 44 PROPOSALS)

Document type: Working draft

Date of document: 2019-03-08

Expected action: ACT

(a) helicopter (b) multi-rotor (c) fixed-wing

Figure 1 Examples of Unmanned Agricultural Aircraft Systems

3.2

Unmanned Aerial Spraying System

Unmanned aerial spraying system (UASS)[2] includes all hardware and software necessary for unmanned aerial spraying. Hardware includes nozzle body, boom, spray tube, tube connector, electronic valves, pumps, spray tank, remote spray controller[3] and sensors for spraying if supplied etc. Software includes computer programs for controlling pump and electronic valves installed on the sprayer based on signal from the ground based remote pilot or pre-set spraying map or real-time sensor signals installed in the UAAS etc. Figure 2 show an example of UASS. Some UASS have not an explicit boom as shown in Figure 2 by installing flexible spray tube inside of UAAS structure such as the rotor arm. Also the remote spray controller could be replaced by a proper remote control device such as a mobile phone.

Machinery Standards for Safe & Strong Farms

ISO/TC 23/SC 3 N

Date: 2019-04-15

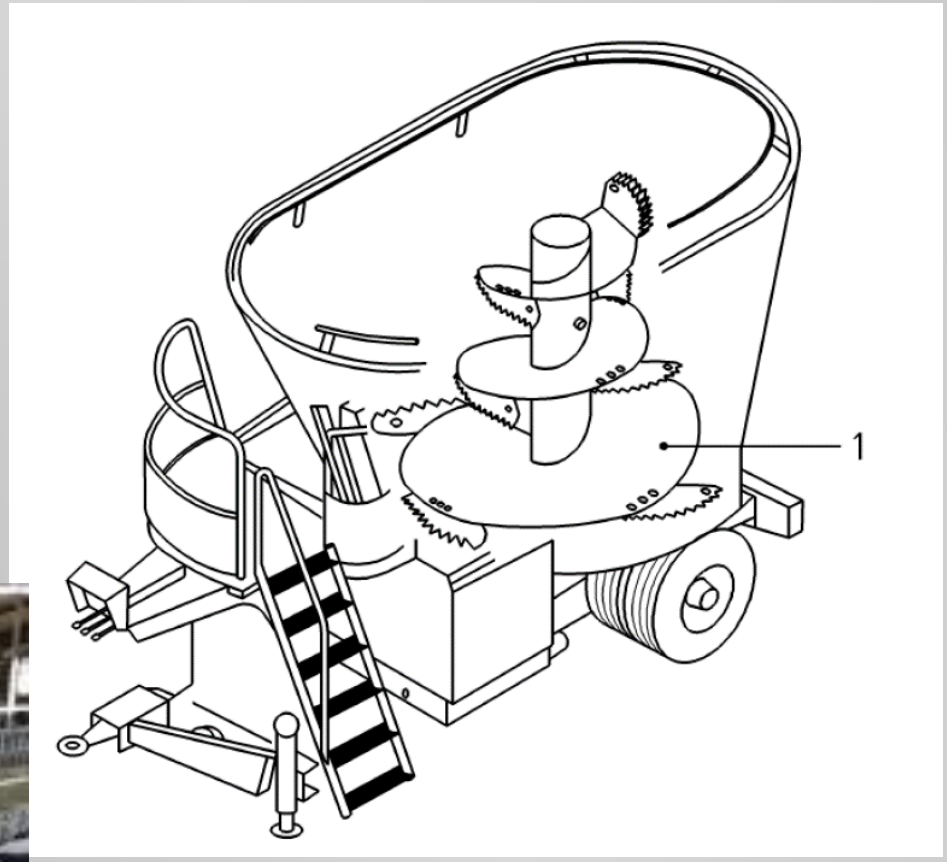
ISO/WD 4254-19:2019(E)

ISO/TC 23/SC 3/WG

Secretariat: DIN

Agricultural machinery — Safety — Part 19: Feed mixing machines

Élément introductif — Élément central — Partie 19: Titre de la partie



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ISO/TC 23/SC N

Date: 2018-05-09

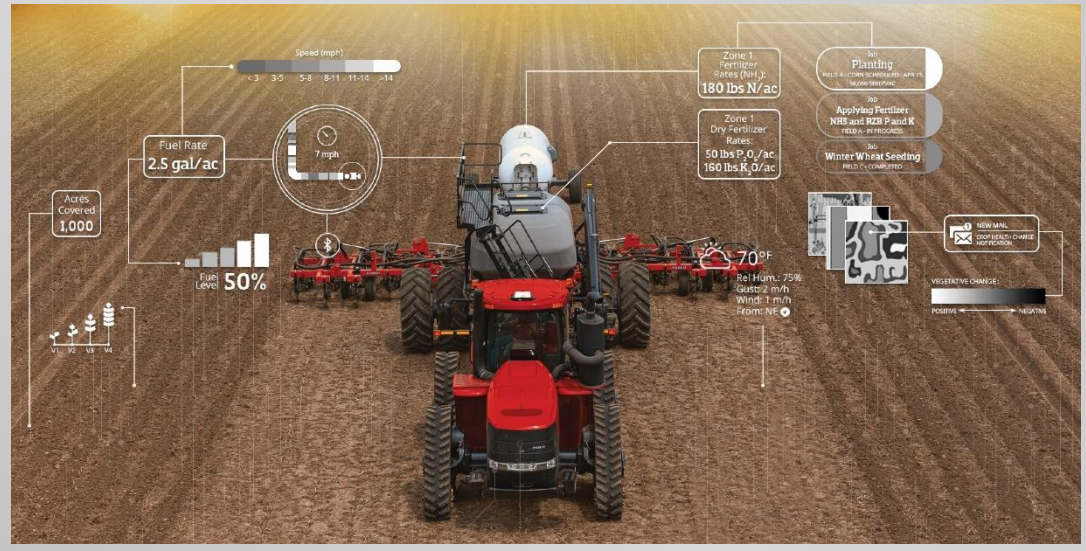
ISO/CD 22172-1:2018(E)

ISO/TC 23/SC /WG 5

Secretariat: AFNOR

Tractors and agricultural machinery — Standardized access to repair and maintenance information (RMI) — Part 1: General information and functional, technical and user interface requirements

Élément introductif — Élément central — Partie 1: Titre de la partie



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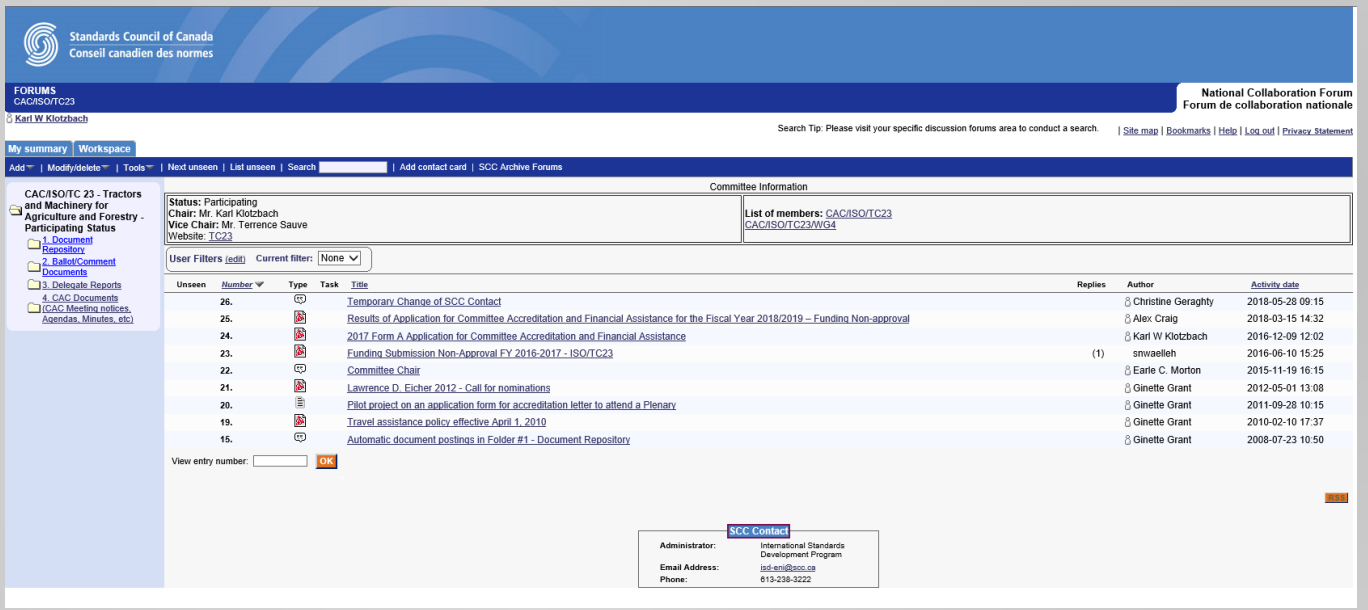
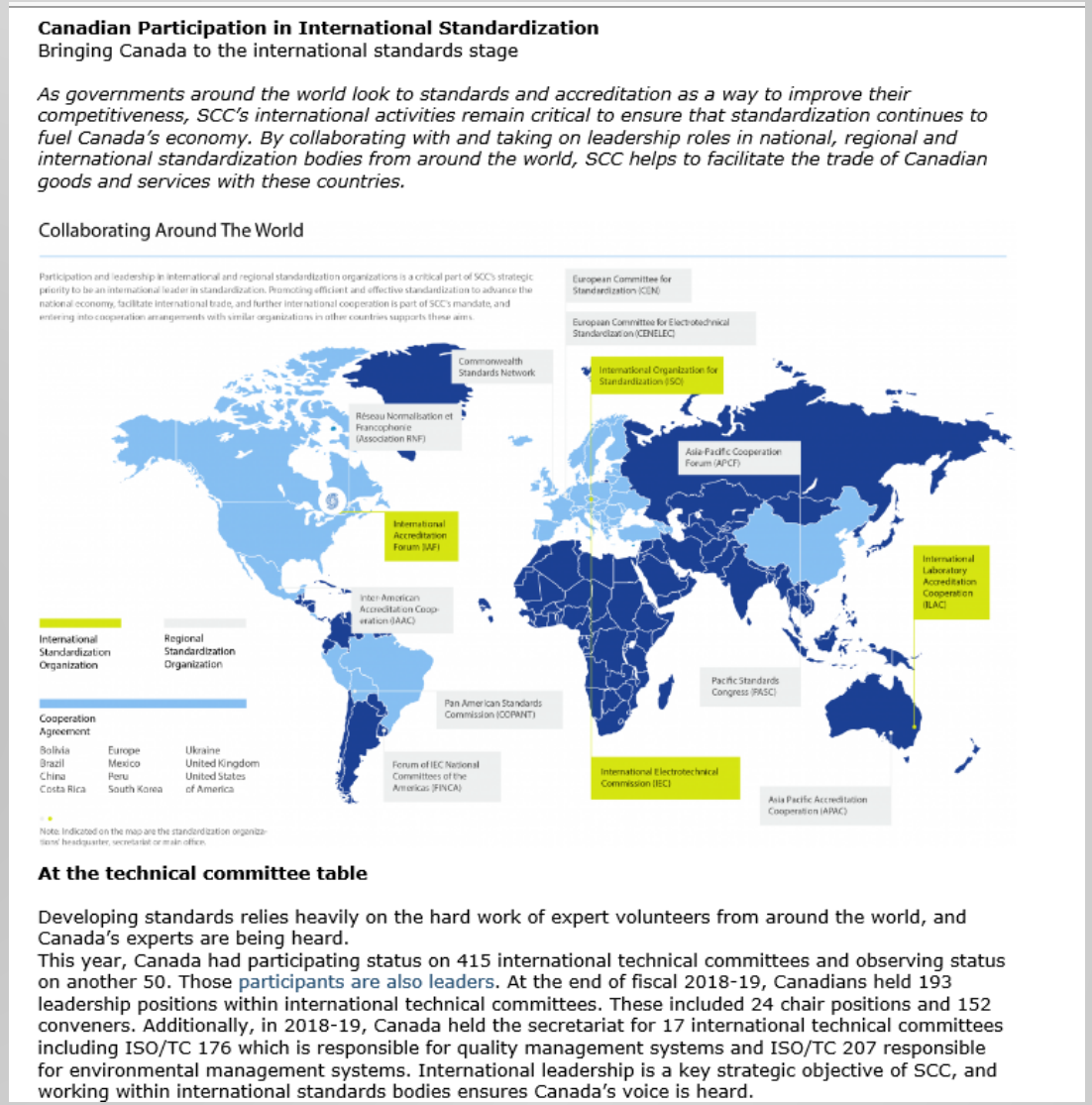
Standards Council of Canada
Conseil canadien des normes





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Machinery Standards for Safe & Strong Farms

ANSI/ASAE S318.18 JUN2017
Safety for Agricultural Field Equipment

American Society of Agricultural and Biological Engineers

ANSI/ASAE S354.7 SEP2018
Safety for Farmstead Equipment

American Society of Agricultural and Biological Engineers

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Scott Cedarquist – ASABE Director, Standards and Technical

- Manage ASABE Standards Program and coordinate ASABE technical committee and technical community structure
  - ASABE administers 14 ISO US Mirror Committees
- Member of ASHCA, ISASH, NTSC Steering Committee, & various ANSI committees and forums.

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Organizations that develop and implement agricultural equipment and safety standards

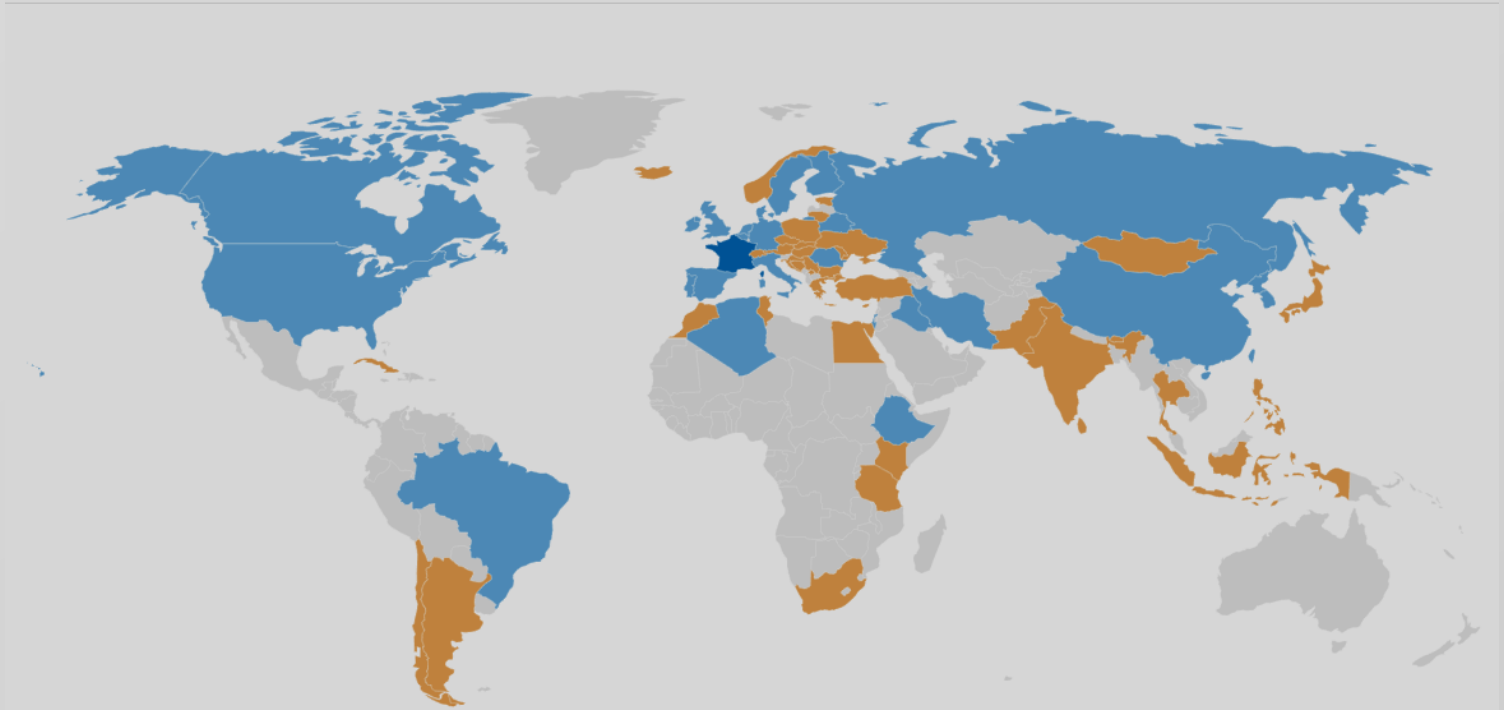
- **Canada**
  - Standards Council of Canada (SCC)
    - Agricultural Machinery Technical Committee (AMTC)
- **United States**
  - American National Standards Institute (ANSI)
    - American Society of Agricultural and Biological Engineers (ASABE)
- **International**
  - International Organization for Standardization (ISO)
    - Various governing bodies

How are ISO standards developed?

- National standards organizations from 164 nations
- One country, one vote, ~23,000 published standards
- Countries may choose what technical committees to participate in
- Canada is involved in 341 technical committees
- The United States is involved in 587 technical committees
- France is involved in 735 technical committees

How are ISO standards developed? (cont.)

ISO/TC 23 Participation Example

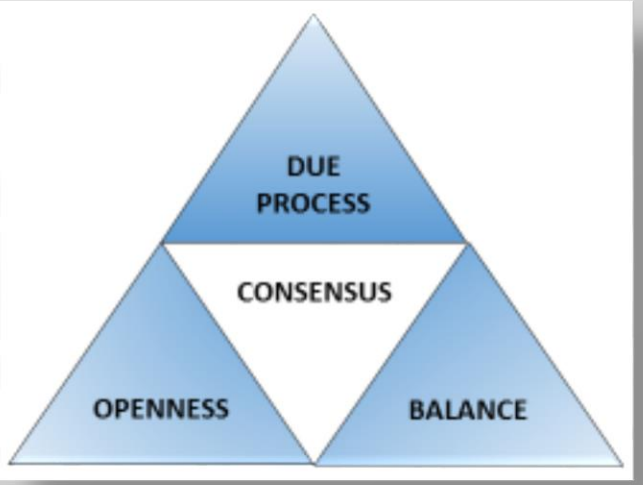


How do safety experts participate in the world of standards?

- Become a member:
  - AMTC
  - The ASABE committee in an area of interest
  - The Canadian mirror committee for ISO/TC 23 or subcommittee

- SCC, ANSI, and ISO procedures all require seeking balanced committees from all impacted sectors

- The best standards have input from different background, experiences, and levels within the industry.



Agricultural safety is more than machinery

- S624, Grain Bin Access Design Safety
- EP342, Safety Devices for Chemigation
- S354, Safety for Farmstead Equipment
- EP470, Manure Storage Safety
- S607, Ventilating Manure Storages to Reduce Entry Risk
- ISO 20966, Automatic Milking Installations
- ISO 5710, Equipment for Internal Farm Work and Husbandry

Future standards development within the industry

- Autonomous field equipment
- Electrification of field equipment
- Safety for feed machinery – Stationary / PTO Driven
- Unmanned Arial Vehicles (UAVs)
  - Safety inspections
    - Grain elevators, storage bins, silos, and etc.
  - Quality control
  - Wildlife management
  - Spraying

Standards and Regulations

- Standards create the basis for strong legislation at the state, provincial, national, and international levels
  - Includes building code specifications

Terrence Sauvé - Farmstead Optimization and Safety Engineering Specialist (bilingual)

- Complaint resolution for farm machinery performance and repair issues (Ontario Central/East)
- Safety standard development and support
  - Chair of CSA Ag Machinery Tech. Com.
  - Participating member at ISO TC 23
  - Member of some ASABE standards

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Farm Machinery Standards in Law - Adoption

- Canadian developed and adopted farm machinery standards are followed by farm machinery manufacturers on a voluntary basis

- Legislators and regulators may use direct adoption, or some content of farm machinery safety standards to protect farm operators

- Application could be targeted actions: importing, manufacturing, selling, or servicing agricultural machinery in Canada

Farm Machinery Standards in Law - Advantages

Using consensus-based industry, user, and regulator developed standards increases the likelihood of adopting a standard

- Significantly increase the speed of adoption in law
- Minimizes international trade restrictions and disputes
- Streamlines export/import opportunities for local Canadian farm machinery manufacturing
- Minimizes upkeep and review of legislation following product improvements
- Significantly increases the chance of obtaining social license

Farm Machinery Standards in Law – Ontario (1)

Ontario's *Farm Implements Act*, R.R.O 1990 c. F4 legislates sale of new and used farm implements at dealers:

- Implements sold at dealers must meet the following standards:
  - Instructional seats and restraining devices (I.E. seat belts, harnesses, etc.)
  - Roll Over Protection Structures (ROPS) for test methods and materials used, labels, etc..
  - Liquid manure spreaders entry point restrictions

Farm Machinery Standards in Law – Ontario (2)

Ontario's *Farm Implements Act*, R.R.O 1990 c. F4 legislates sale of new and used farm implements at dealers:

- Dealers must provide:
  - Safety decals and protective shielding recommended by the manufacturer
  - A copy of the operator manual and safety related instructions
  - Transfer to purchaser any and all safety awareness information for liquid manure spreaders

Thank you for your time!
If you have any questions, please feel free to ask.

Sault Ste. Marie International Bridge