SURFACE VEHICLE STANDARD

J1790™	NOV2021

Issued 1998-06
Revised 2016-12
Stabilized 2021-11

Superseding J1790 DEC2016

Self-Propelled Sweepers and Scrubbers Steering Requirements Single-Circuit Hydraulic Servo-Assisted Systems

RATIONALE

The technical report covers technology, products, or processes for which technical expertise no longer resides in the committee. We believe the standard still applies to a certain segment of the market, but those manufacturers are no longer participating on the committee. Further we believe the technical report covers technology, products, or processes which are mature and not likely to change in the foreseeable future.

STABILIZED NOTICE

This document has been declared “Stabilized” by the SAE MTC2, Sweeper, Cleaner, and Machinery Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/J1790_202111/

1. SCOPE

The SAE Standard applies to self-propelled, driver-operated sweepers and scrubbers as defined in SAE J2130-1 and SAE J2130-2.

1.1 Purpose

The purpose of this document is to establish the minimum requirements for a steering mechanism that is of a single-circuit hydraulic servo-assisted system without any mechanical linkage to the road wheels, as typically depicted in Figure 1.

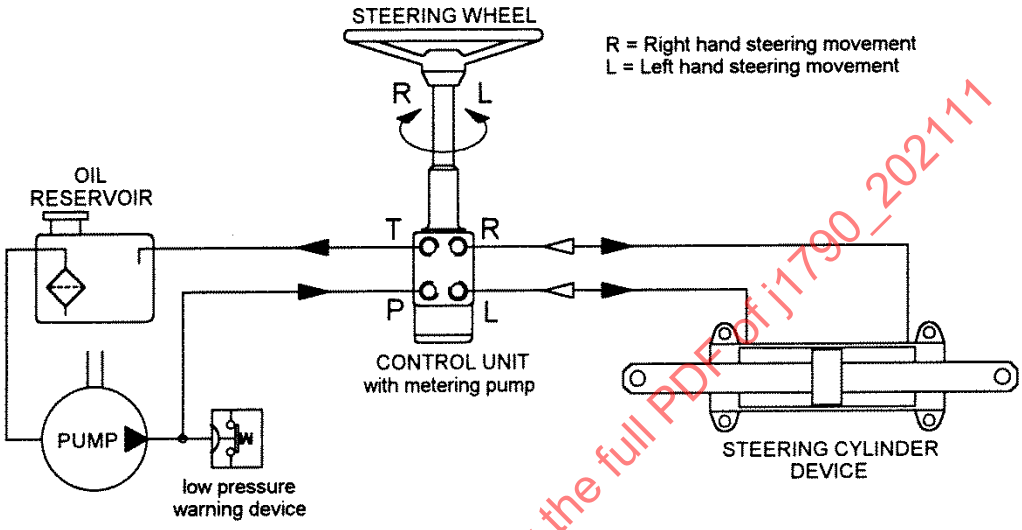

Figure 1 - General layout of system

2. REFERENCES

2.1 Applicable Document

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J2130-1 Identification of Self-Propelled Sweepers and Cleaning Equipment Part 1 - Machines with a Gross Vehicle Mass Greater than 5000 kg

SAE J2130-2 Identification of Self-Propelled Sweepers and Cleaning Equipment Part 2 - Machines with a Gross Vehicle Mass Up to 5000 kg

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publication

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J1511/ISO 5010:1994 Steering for Off-Road Rubber-Tired Machines

2.2.2 ISO Publications

Copies of these documents are available online at http://webstore.ansi.org/

ISO 789-11:1996 Agricultural tractors - Test procedures - Part 11: Steering capability of wheeled tractors

ISO 5010:1992 Earth-moving machinery - Rubber-tired machines - Steering requirements

ISO 10998:1995 Agricultural wheeled tractors - Steering requirements

3. DEFINITIONS

3.1 STEERING MECHANISM

All equipment needed to steer the machine.

3.2 HYDRAULIC SERVO-ASSISTED SYSTEM

A system that meters a pressurized flow of fluid from an energy source (e.g., pump) to a steering device (e.g., cylinder) that is linked to the steered road wheels. The metered fluid output is also proportional to the movement of a steering control (e.g., wheel). Additionally, the system can pump fluid to the steering device by manual effort in the event of failure of the fluid power energy source.

3.3 STEERING WHEEL

Type of steering control that is generally round and alters the direction of movement by rotary motion.

3.4 STEERED ROAD WHEELS

3.4.1 Wheels, the alignment of which can be altered in relation to the machine in order to obtain a change in the direction of movement of the machine.

3.4.2 All wheels of an articulated machine.

3.5 FLUID POWER ENERGY SOURCE

A hydraulic pump means to power the steering system. The pump may be arranged to serve only the steering system (dedicated) or arranged to serve not only the steering system but other hydraulic duties as well (shared).

3.6 SINGLE CIRCUIT

A hydraulic circuit where there is only one fluid power energy source and one pressure conduit from it to the metering control unit as depicted in Figure 1.

3.7 STEERING DEVICE

A fluid power cylinder or actuator that is mechanically linked to the steered road wheels in order to alter the direction of movement.

3.8 TURNING RADIUS

Radius of the circular path described by the center of tire contact with the surface of the test site of the wheel describing the largest circle.

3.9 NON REACTIVE

A system where there is no feedback from the steering function.

3.10 REACTIVE

A system where feed-back from the steering function may be felt in the steering wheel.

4. SPECIAL REQUIREMENTS

4.1 The steering wheel shall be easy to use and grip. It shall be designed in such a way as to permit gradual deflection. The direction of movement of the top of the steering wheel shall correspond to the desired change in the direction of the machine.

4.2 Steering wheel play or lash within the steering control unit shall not exceed 8 degrees from the neutral position to a position where perceptible road wheel movement is observed.

4.3 With the fluid power energy source inert, rotary motion of the steering wheel under the influence of manual effort shall alter the direction of machine movement by supplying a metered supply of pressurized fluid to the steering device.

4.4 One or more pressure limitation devices shall protect the whole or parts of the fluid power circuit against excess pressure. At all times, protection shall be afforded to individual components and conduits.

4.5 The burst pressure ratings of fluid conduits shall be four (4) times the maximum operating pressure permitted by the pressure limitation devices. The fluid conduits shall be protected and arranged in such a way that risks from damage by impact or interference are reduced to a minimum.

4.6 The fluid power energy source shall be active whenever the machine's prime mover power source is active.