

2.1.1 SAE Publication

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

SAE J1116 Categories of Off-Road Self-Propelled Work Machines

2.2 Related Publications

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

2.2.1 SAE Publications

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

SAE J371 Drain, Fill, and Level Plugs for Off-Road Self-Propelled Work Machines

SAE J476a Dry Seal Pipe Threads

2.2.2 ANSI Publication

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ANSI B 1.20.1 NPT Threads

3. INSTALLATION

3.1 For flow rates less than 570 liters per minute, the fuel receiver mounting connection may be 2 in NPTF, flanged or other suitable connection having a 50 mm minimum inside diameter. Where the connection is made directly to the tank, it should be located as near the bottom of the tank as practical to provide submerged filling to limit foam formation. Where mounting the fuel receiver near the bottom of the tank is impractical, a 50 mm minimum inside diameter internal extension line to the bottom of the tank may be used. The receiver should be a dry break style coupling to reduce any fuel spillage during and after refueling.

Liquid crossover lines between multiple tanks should be minimum 50 mm inside diameter. Extension fill lines between the tank and a remote fuel receiver shall have a 50 mm minimum inside diameter and enter the bottom of the tank so as to provide submerged filling. Remote fill lines should be run with a minimum number of bends, and all bends having the largest bend radius possible to reduce pressure drop and not limit system performance. Total pressure build up at the fuel receiver from fuel head plus friction loss should not exceed 30 kPa at 9 L/s.

3.2 The automatic shut-off vent connection may be 2 in NPTF, flanged or other suitable connection with the centerline vertical within 5 degrees. Where multiple tanks are used, each tank should be provided with a separate vent connection or a minimum 25 mm inside diameter air crossover line may be used between tanks. Care should be taken as not allow the crossover line to kink, therefore restricting airflow from tank to tank. If an emergency overflow line is connected to the vent outlet, a minimum 25 mm must be used. Attention should be taken to insure the emergency overflow line does not become kinked. The fuel tank must be properly vented to certify that the fast fill system does not shut-off prematurely due to excess internal fuel tank pressure.

- 3.3 The inlet shut-off valve mounting connection used in low pressure systems may be 2 in NPTF, flanged or other suitable connection. The inlet valve must be mounted between the fuel tank and the fuel receiver. Where the connection is made directly to the tank, it should be located as near the bottom of the tank as practical to provide submerged filling to limit foam formation. Where mounting the fuel receiver near the bottom of the tank is impractical, a 100 mm minimum inside diameter internal extension line to the bottom of the tank may be used. If the shut-off valve is mounted remotely, a housing may be used to contain the inlet shut-off assembly. The housing should have a minimum inside diameter of 125 mm, and may have multiple outlets as required to fill multiple fuel tanks simultaneously. The inlet shut-off valve assembly may also be mounted inside the fuel tank attached to the end of a inlet line mounted to the tank wall with a minimum 50 mm inside diameter. The internal option may be used where space is not available for external mounting or a vent and shut-off valve combination is incorporated into a single mounting plate.
- 3.4 The signal line used in low pressure systems is connected between the automatic shut-off vent and the inlet shut-off valve. This line should be a minimum inside diameter of 6.4 mm constructed of stainless steel braided hose with a liner compatible with diesel fuel. The length should be kept to a minimum, and kinking or bending of the line should be avoided. All connections of the signal line to the vent and inlet valve must be tight to insure proper shut-off of fuel during fast fill operations.

4. POSITION

- 4.1 The fuel receiver should be accessible from ground level. Its location shall allow unrestricted access by an operator with a fueling hose and nozzle. If remotely mounted, the receiver should be supported with brackets or other means to withstand the weight of the refueling nozzle and hose filled with fuel. For low pressure systems the fuel receiver may be directly mounted to the inlet shut-off valve assembly in a remote canister or direct fuel tank mounting.
- 4.2 The automatic vent connection shall open into the tank vapor space and be located at the highest point on the top of the fuel tank. The vent exhaust port should be directed away from any hot surfaces, personnel, or any surface which may block the free flow of displaced air from the fuel tank during venting. The vent should be located away from any internal spray caused from the receiver and/or inlet shut-off valve assembly. A guard to divert the incoming fuel spray from the fuel receiver or inlet shut-off valve may be required to keep any fuel from spraying out of the vent assembly during refueling operations. Avoid mounting the diverter too close to the vent blocking air flow, the diverter should be mounted a minimum of 10 mm away from portions of the vent within the tank. For pressurized systems, any other positive venting connections shall be closed off when using the fast fill system. In low pressure systems, a separate vacuum vent may be required, which may be incorporated in the gravity fill fuel cap or by other means. In low pressure systems, the vent and automatic shut-off assembly incorporated in most vents may be separated if necessary to obtain proper fuel level shut-off height, or limited space around the fuel tank prohibits the automatic shut-off vent to mount as a single unit. If multiple tanks are vented through an air crossover hose option, the vent must be installed to the highest tank from ground level.
- 4.3 The inlet shut-off valve assembly used in low pressure systems should be mounted as close to the fuel tank as possible if contained in a housing and remotely mounted. Locate the inlet shut-off valve away from the automatic shut-off vent assembly to eliminate incoming internal fuel from spraying out of the vent during high flow rate refueling. A diverter may be required to force the fuel flow away from the shut off vent if the location of vent and inlet valve must be located near each other, or the tank's geometry causes fuel to spray out of vent on fast fill refueling operation. If a diverter is required, the inside surface of the guard should be a minimum of 10 mm away from any inlet shut-off valve surfaces. Care should be taken as to avoid blocking more than 50% of the flow area of the inlet shut-off valve, as this will cause decreased performance of the fast fill system.
- 4.4 The signal line used in low pressure systems should be mounted through the inside of the fuel tank connecting the inlet shut-off valve to the vent. Internal routing of the signal line will eliminate any factors which may cause damage from a external routing exposed to the environment, If the signal line is run external to the fuel tank due to internal tank features such as large baffles or other interference, the line must be secured to the vehicle's tank and/or structure using tie down clips or by other means. Bulkhead fittings may be used to run the signal lines external of the fuel tank so that connections may be made to the internal ports on the vent and inlet shut-off valve. If the signal line is run external to the fuel tank it should be mounted away from any moving parts, and located closest the internal portion of the vehicle's structure to avoid possible damage from any moving debris created during the vehicle's normal operation.