# Classification, Nomenclature and Specification Definitions for Trenching Machines –SAE J1382 MAY 82

SAE Standard
Approved May 1982





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**PREPRINT**

# CLASSIFICATION, NOMENCLATURE AND SPECIFICATION DEFINITIONS FOR TRENCHING MACHINES—SAE J1382 MAY82

**SAE Standard**

Report of the Off-Road Machinery Technical Committee, approved May 1982. Rationale statement available.

*1. Purpose*—This SAE Standard defines classification, nomenclature, and dimensional specifications for trenching machines.

*2. Scope*—This standard applies to trenchers as categorized in SAE J1116. Only those terms not covered by SAE J1234 are described herein. The illustrations used are for clarification and are not intended to resemble a particular machine. Only basic working dimensions are given. They may be supplemented by the machine manufacturer. It is intended for this standard to apply to any horsepower trenching machine since many of the features of larger machines are found on smaller trenching machines, as well.

*3. Definitions*

NOTE: Not all of the numerous types of trenching machines are defined herein.

**3.1 Trenching Machine**—An off-road machine used primarily to produce trench in a continuous operation by means of a digging chain, wheel, disk, plow blade, or other functionally similar device.

Trenching machines are primarily used to install some type of underground service, drain tiles, etc.—not as subsoilers or rippers.

**3.2 Trench**—A narrow horizontal excavation. In general, the depth is greater than the width.

**3.3 Chain Line Trencher**—Trenching machine using one or more flexible digging chains having tools (teeth, bits, buckets, etc.) attached for cutting and conveying spoils from the trench (see Figs. 1, 2, and 3).

**3.4 Disk Trencher**—Trenching machine using a rotating disk edged with cutting tools; generally used for cutting rock, hardpan, or road surfaces such as asphalt and concrete. Concrete saws of cutting width less than 25 mm (1 in) are excluded from this definition. (Disk trencher specification definitions and nomenclature to be developed at later date.)

**3.5 Wheel Trencher**—Trenching machine using a rotating wheel typically employing a series of buckets with toothed cutting edges for cutting and conveying spoils from the trench. (Wheel trencher specification definitions and nomenclature to be developed at later date.)

**3.6 Direct Burial Plow**—Trenching machine using drawbar pull to move a ripper-like plow blade through the soil while simultaneously burying underground services (see Figs. 4 and 5).

3.6.1 STATIC PLOW—A direct burial plow using only drawbar pull to move plow blade through soil.

3.6.2 VIBRATORY PLOW—A direct burial plow using periodic blade oscillation to reduce the drawbar pull required to move plow blade through soil.

**3.7 Spoil**—Earth, rock, and the like removed when making excavations.

*4. Machine Classifications*—Trenching machines are type classified dependent upon the method used to couple the trenching elements to the base machine and upon the end point usage design objectives intended by their manufacturer(s).

**4.1 Non-Integral Types**

4.1.1 ATTACHMENT TYPE—Trenching elements designed to be added to a multipurpose base machine (generally from another manufacturer) that itself is not uniquely designed for adaptation as a trenching machine.

4.1.2 REMOVABLE TYPE—Trenching elements for installation on a base machine that itself is designed to accept these elements as well as alternate elements, all generally from same manufacturer.

**4.2 Integral Type**—Trenching elements designed as a part of the base machine frame, where trenching is a primary base machine function. Even though portions of the trenching elements may be removable, the base machine is not designed to have these elements replaced by other tools or elements.

*5. Chain Line Trencher*

**5.1 Nomenclature** (Refer to Figs. 1–3)—Note: Some items shown may not be standard equipment.

**5.2 Dimensional Terms**—Refer to SAE J1234 for general measurement conditions and description of basic dimensions (such as turning radius) not shown in Figs. 1–3. Preferred units of measure are given in SAE J1233 and J916. Specify presence and size of optional equipment that may affect dimensional values, e.g., tire size, digging boom length, digging chain size.

5.2.1 TRENCH SIZE—Specify trench width for maximum recommended digging depth and trench depth for maximum recommended trench width, e.g., 100 × 1500 mm (4 × 60 in) and 450 × 600 mm (17¾ × 24 in). A chart or table may be used to indicate recommended limits in trench size.

5.2.1.1 *Trench Depth* (A)—Distance from Horizontal Ground Plane (HGP) to bottom of trench free of spoil.

5.2.1.2 *Trench Width* (B)—Measured width of trench for a given digging apparatus.

5.2.2 TRENCHING ANGLE—MAX. (C)—Full depth angle of digging boom measured from horizontal to line through head shaft and bottom end idler centerlines.

5.2.3 BOOM TILT ANGLE—Max. angle boom may be inclined laterally from a vertical plane parallel to machine longitudinal centerline. Specify left and right, if different (not illustrated).

5.2.4 BOOM/TRENCH CLEANER SHOE HEIGHT (D)—Distance from HGP to highest point on the digging boom assembly with boom at maximum lift.

5.2.5 BOOM OFFSET (E)—Distance from centerline of trench to vertical plane through farthest point at each side of machine. Specify left (E1) and right (E2), if different, and multiple boom locations, if applicable.

5.2.6 HEAD SHAFT HEIGHT (F)—Distance between HGP and centerline of head shaft. Specify minimum and maximum height, if adjustable.

5.2.7 OVERHANG BEYOND TIRE/TRACK (H)—Distance between vertical plane through outermost surface of tires or tracks and plane through farthest point on side of machine with standard or optional working tools. Specify left and right, if different.

5.2.8 LENGTH WITH WORKING TOOL—See SAE J1234. Backfill blade, if present, should be centered and at maximum lift position.

5.2.8.1 (*L2*)—Measure with boom resting on HGP.

5.2.8.2 (*L2'*)—Measure at maximum boom lift position.

5.2.9 SPOIL DISCHARGE REACH FROM CENTERLINE OF TRENCH (N)—Distance from centerline of trench to vertical plane through farthest conveying element of spoil conveying system. Include any side shift capability, if applicable. Specify left and right, if different.

5.2.10 SPOIL DISCHARGE REACH BEYOND TIRE/TRACK (P)—Measured as paragraph 5.2.9 from vertical plane through outermost surface of tire or tracks (including side shift, if applicable).

5.2.11 CONVEYOR WIDTH (Q)—Width of conveying medium, i.e., apron belt, bucket, chain, etc.

5.2.12 CONVEYOR DISCHARGE HEIGHT (R)—Distance from HGP to highest point on conveying medium at outer roller (including side shift, if applicable).

5.2.13 HANDLEBAR HEIGHT (T)—Vertical distance from HGP to top of hand grip. Specify range, if adjustable.

5.2.14 HANDLEBAR WIDTH (U)—Overall width of handlebar.

5.2.15 TRAIL WHEEL LOCATION (V)—Distance between centerline of trench to nearest surface of trail wheel.

**5.3 General**

5.3.1 BACKFILL BLADE—Nomenclature and specification definitions are given in SAE J729 and SAE J173, respectively. Since the primary function of a backfill blade is to grade loose spoil into a trench, reference to the above standards in no way implies similar performance characteristics between dozers and backfill blades.

5.3.2 FEED TUBES—Feed tubes are sometimes available on chain line trenchers for direct burial applications. Refer to paragraph 6.2.1.1 for description.

*6. Direct Burial Plow*

**6.1 Nomenclature (Refer to Figs. 4–6)**—Note: Some items shown may not be standard equipment.

**6.2 Dimensional Terms**—Refer to SAE J1234 for general measurement conditions and description of basic dimensions (such as turning radius) not shown in Figs. 4–6. Preferred units of measure are given in SAE J1233 and J916. Specify presence and size of optional equipment that may affect dimensional values, e.g., tire size, blade size.

6.2.1 BLADE SIZE—List available sizes. If desired, trench size (see paragraph 5.2.1) may be specified for direct burial plows in addition to blade size.

6.2.1.1 *Feed Blade*—NOTE: The terms defined in this paragraph apply also to feed tubes mounted on other types of trenching machines.

6.2.1.1.1 Cover Depth (A)—Distance from Horizontal Ground Plane

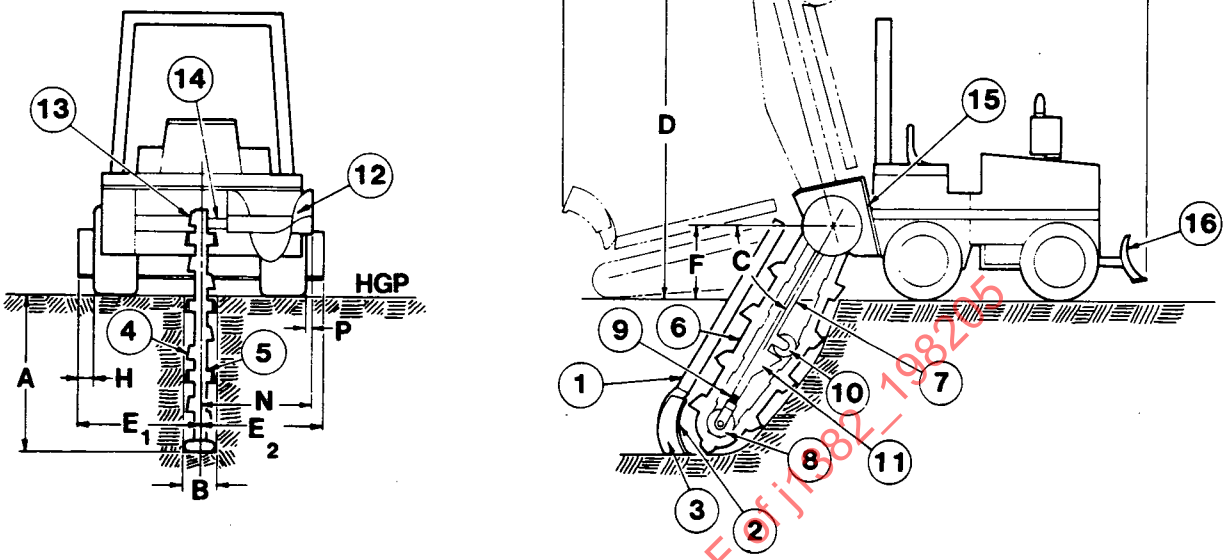


FIG. 1

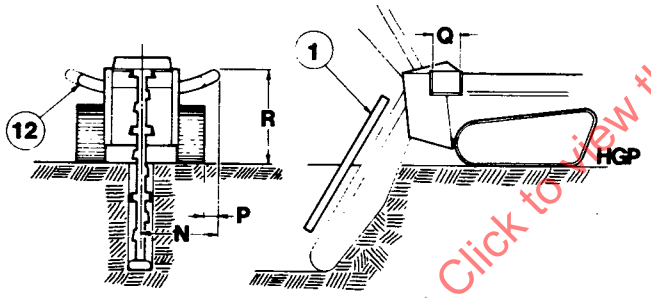


FIG. 2

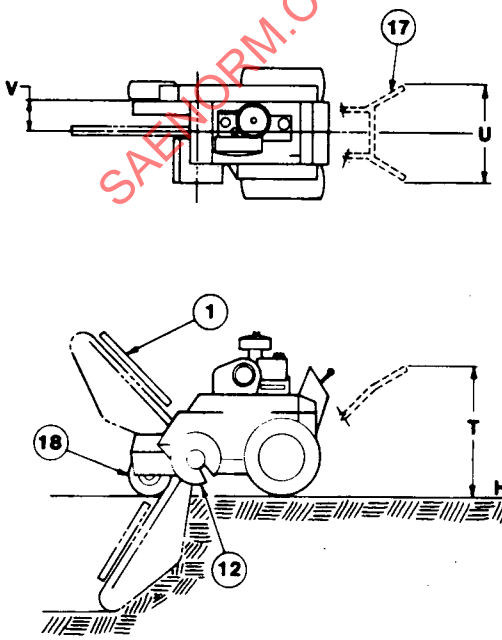


FIG. 3

1. TRENCH CLEANER BAR OR DIGGING CHAIN GUARD
2. TRENCH CLEANER FACING
3. TRENCH CLEANER SHOE
4. DIGGING TOOL
   — Cup tooth
   — Chisel tooth
   — Bit
   — Bucket
   — Other
5. TOOL ADAPTER BRACKET
6. DIGGING CHAIN
   — Single
   — Multiple
7. DIGGING BOOM
8. BOOM END IDLER
9. CHAIN TENSION ADJUSTER
10. IDLER
11. ROCK GUARD
12. SPOIL CONVEYING SYSTEM
    — Head shaft driven auger
    — Idler driven auger(s)
    — Conveyor
    — Other
13. DIGGING CHAIN DRIVE SPROCKET
14. HEAD SHAFT
15. ATTACHMENT FRAME OR BASE MACHINE FRAME
16. BACKFILL BLADE
17. HANDLEBAR
18. TRAIL WHEEL

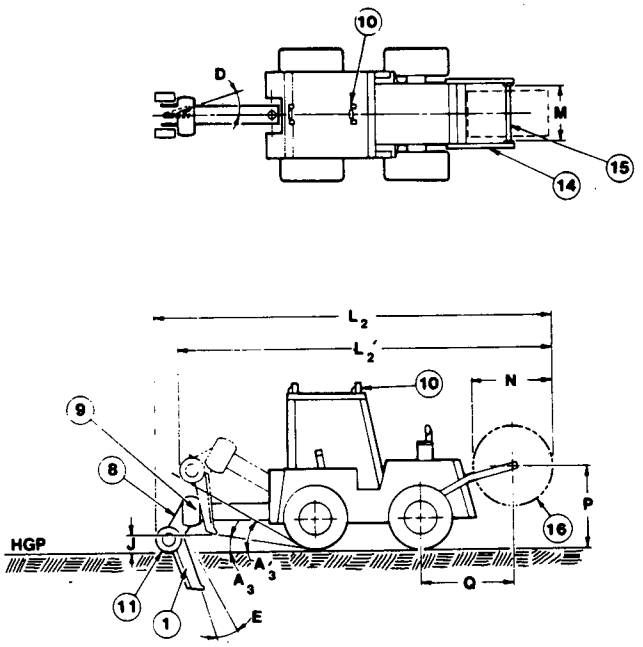


FIG. 4

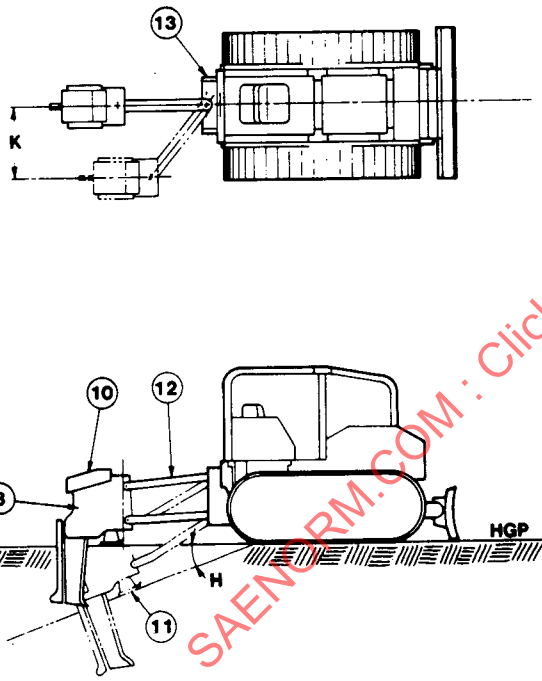


FIG. 5

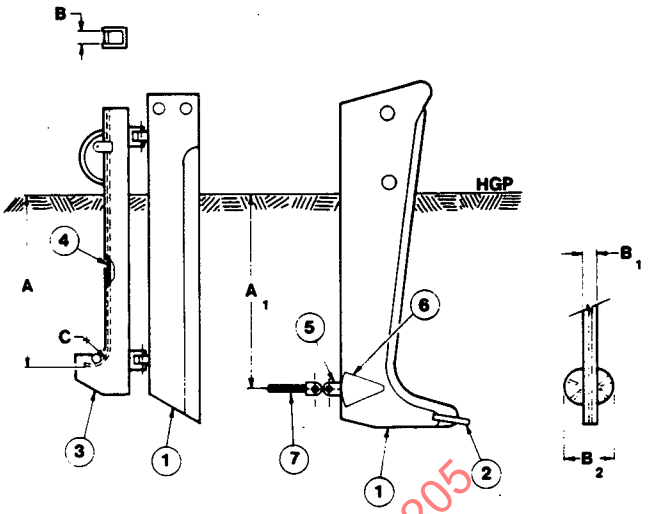


FIG. 6

1. PLOW BLADE
   — Feed blade
   — Pull blade
   — Other
2. TOE
3. FEED TUBE
   — Fixed
   — Hinged
   — Floating
   — Independent
   — Single or multiple
   — Other
4. FEED TUBE GUIDE
5. PULLING EYE
6. BULLET
7. PULLING DEVICE
8. PLOW FRAME
9. VIBRATOR (VIBRATORY PLOW ONLY)
10. MATERIAL GUIDE
11. SKID SHOE OR DEPTH WHEEL
12. PLOW ARM(S)
13. ATTACHMENT FRAME OR BASE MACHINE FRAME
14. REEL CARRIER
15. SPINDLE
16. REEL



(HGP) to horizontal line tangent to top inside surface of feed tube at exit end with blade at full depth. Include optional mounting positions, if applicable.

6.2.1.1.2 Width (B)—Distance between vertical planes tangent to internal portions of feed tube at the narrowest cross section.

6.2.1.1.3 Bend Radius (C)—Radius of curvature of feed tube guide measured to surface internal to feed tube.

6.2.1.2 *Pull Blade*—Specify following:

6.2.1.2.1 Depth (A1)—Distance from HGP to horizontal line through pulling eye with blade at full depth. Include optional mounting positions, if applicable.

6.2.1.2.2 Width (B1)—Measured width of blade shank portion.

6.2.1.2.3 Bullet Width (B2)—Distance between vertical planes tangent to widest portion of bullet.

6.2.2 Blade Steer Angle (D)—Maximum angle plow blade may be pivoted, as measured in a horizontal plane, from vertical plane through plow arm centerline(s) containing mid-position of blade. Specify left and right, if different.

6.2.3 Blade Angle Adjustment (E)—Adjustable range in angle of leading edge of plow blade measured in the plane of the blade path, if applicable.

6.2.4 Blade Tilt Angle—Maximum angle plow blade may be inclined laterally from a vertical plane containing central position of the blade with plow arm(s) oriented parallel to machine longitudinal centerline. This adjustment may occur anywhere between the blade and the machine ground contact. Specify left and right, if different (not illustrated).

6.2.5 Angle of Depression (H)—Angle between HGP and a plane through ground contact point of machine tires or track sprockets nearest