INTERNATIONAL STANDARD

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ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Earth-moving machinery — Service tools —

Part 1:
Common maintenance and adjustment tools

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Engins de terrassement — Outils d'entretien et de dépannage —

Partie 1: Outils courants pour l'entretien et les réglages

ISO 4510-1:1987
https://standards.iteh.ai/catalog/standards/sist/ea3d364c-8b4f-4240-8ef0-
79ce87f0ae64/iso-4510-1-1987

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4510-1 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*.

This second edition cancels and replaces the first edition (ISO 4510-1 : 1986), of which it constitutes a minor revision, incorporating changes to table 1 (tools Nos. 1, 3 and 10).

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Earth-moving machinery — Service tools —

Part 1:
Common maintenance and adjustment tools

1 Scope and field of application

This part of ISO 4510 lays down, for guidance, the tool group-
ings commonly used for carrying out on-site, normal
maintenance and routine adjustment work on earth-moving
machinery as defined in ISO 6165.

Manufacturers should choose suitable tools from table 1 for
normal maintenance and routine adjustment work, and specify
in suitable manuals, as described in ISO 6750, the type of tools
to be used for carrying out such maintenance and adjustment
work.

2 References

ISO 263, *ISO inch screw threads — General plan and selection
for screws, bolts and nuts — Diameter range 0.06 to 6 in.*

ISO 6165, *Earth-moving machinery — Basic types —
Vocabulary.*

ISO 6750, *Earth-moving machinery — Operation and
maintenance — Format and content of manuals.*

3 Types and sizes

The metric and inch sizes shown under the heading "Nominal
dimension" in table 1 are not intended to be equivalent, but
represent actual dimensional sizes for tools conforming to the
metric and inch nomenclature. There is not, therefore, an
automatic inch equivalent for every metric size shown.

4 Application of hand tool groups

The annex outlines, in the form of general guidelines, when and
how to apply the hand tool groups given in table 1 intended for
on-site normal maintenance and routine adjustment work on
the machines.

Table 1 — Common maintenance and adjustment tools

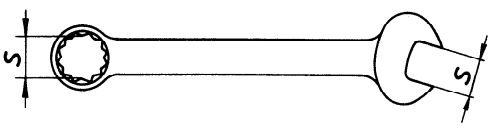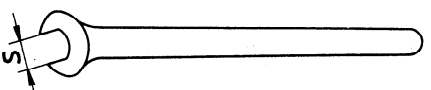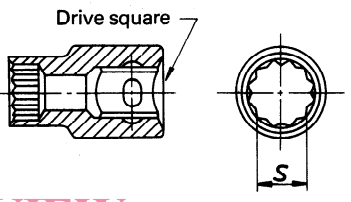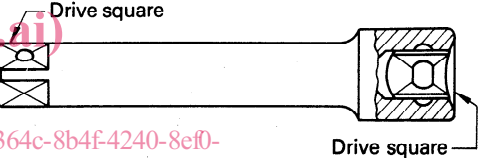Dimensions in millimetres (dimensions in inches in parentheses)
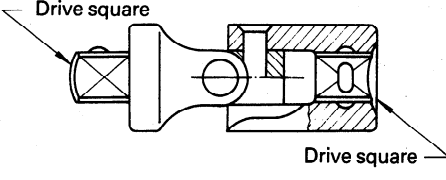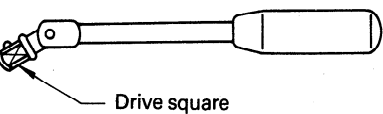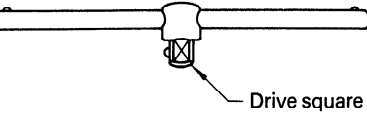
No.	Nomenclature	Nominal dimension	Illustration
1	Combination wrench[1]	$s =$ 8, 10, 12, 13, 14, 16, 17, 18, 19, 21, 22, 24, 27, 30, 32, 34 (5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1 1/8)	
2	Engineer's wrench, single head	$s =$ 36, 41, 46, 50, 55, 60 (1 5/16, 1 1/2, 1 11/16, 1 7/8, 2 1/16, 2 1/4; 2 3/8)	
3	Socket wrench	12,5 (1/2) square drive 20 (3/4) square drive $s =$ 10, 12, 13, 14, 16, 17, 18, 19, 21, 22, 24, 27, 30, 32, 34, 36, 41, 46, 50 (3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1 1/2, 1 11/16, 1 7/8, 2 1/16, 2 1/4)	Drive square
4	Extension bar	12,5 (1/2) square drive 20 (3/4) square drive	Drive square
5	Universal joint square drive	12,5 (1/2) square drive 20 (3/4) square drive	Drive square
6	Nut spinner, flex head	12,5 (1/2) square drive 20 (3/4) square drive	Drive square
7	Tee handle, square drive	12,5 (1/2) square drive 20 (3/4) square drive	Drive square

Table 1 — Common maintenance and adjustment tools (*continued*)

Dimensions in millimetres (dimensions in inches in parentheses)

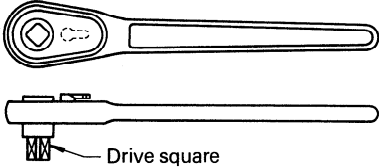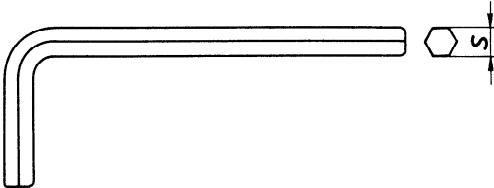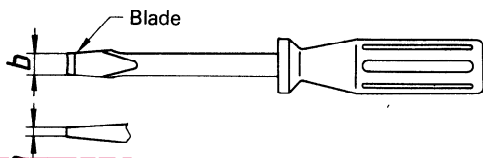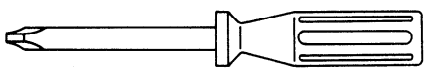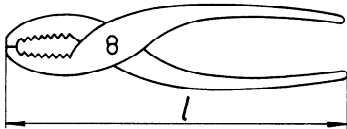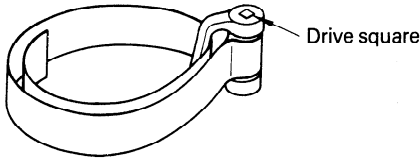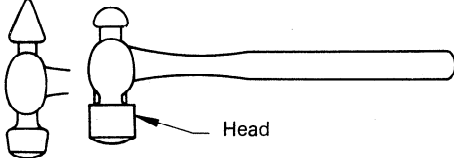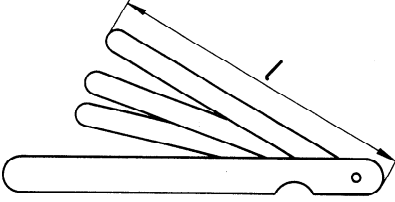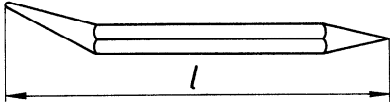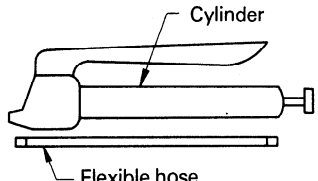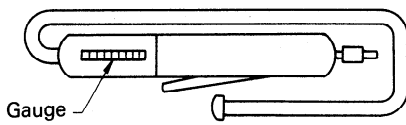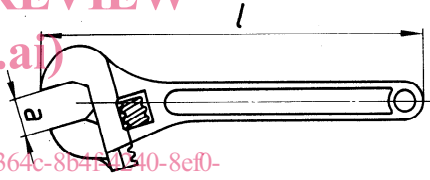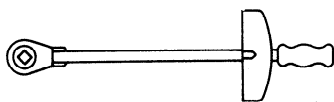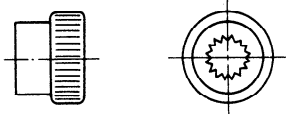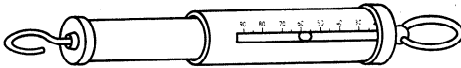| No.	Nomenclature	Nominal dimension	Illustration
8	Ratchet handle, reversible	12,5 (1/2) square drive 20 (3/4) square drive	 — Drive square
9	Key, hexagon socket screw	$s =$ 3, 4, 5, 6, 8, 10, 12, 14, 17 (3/16, 7/32, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 1/2, 9/16, 5/8)	
10	Screwdriver for slotted head screws	Blade type 3 $a \times b =$ 0,8 × 5,5 1,2 × 8 1,4 × 12 (1/32 × 7/32) (3/64 × 5/16) (1/6 × 7/16)	 — Blade
11	Screwdriver for recessed head screws	For screws M3, M4 and M5 (UNo.5, UNo.6, UNo.8 and UNo.10)[2]	
12	Slip joint pliers	$l =$ 150 (6)	
13	Strap wrench	12,5 (1/2) square drive	 — Drive square
14	Hammer	Mass of head = 0,7 kg (1 1/2 lb)	 — Head
15	Feeler gauge	$l =$ 75 (3)	

Table 1 — Common maintenance and adjustment tools (*concluded*)

Dimensions in millimetres (dimensions in inches in parentheses)

No.	Nomenclature	Nominal dimension	Illustration
16	Pinch bar	$l =$ 400, 750 (16, 30)	
17	Grease gun with flexible hose	Capacity of cylinder $\geqslant$ 300 ml (10 fl oz) or 300 g (2/3 lb)	
18	Inflator gauge, pneumatic tyre[3]	Capacity of cylinder = 1 MPa (140 lbf/in²)	
19	Adjustable wrench, open end[4]	$a \times l =$ 0 to 29 × 250 (0 to 1 1/8 × 10)	
20	Torque wrench	12,5 (1/2) square drive 20 (3/4) square drive	
21	Battery post cleaner		
22	Belt tension gauge		

1) The combination wrench may be replaced by an engineer's wrench, double head, open end, or by a box wrench, double head with the given dimensions for *s*.

2) UNo.5 indicates unified screws No. 5. (See ISO 263.)

3) Inflator gauge is used for rubber-tyred machines and may have a dual gauge, for example in MPa and bar (1 bar = 10^5 Pa = 10^5 N/m²) or psi, reflecting the local units.

4) Tools with a specific fixed end should normally be used and an adjustable wrench should only be used when such a specific tool is not available.

NOTE — For tools for drain plugs with square holes, use 12,5 mm or 20 mm square drive handle.

Bibliography

ISO 1085, *Combination of double-ended wrench gaps.*

ISO 1174, *Assembly tools for bolts and screws — Driving squares for power socket wrenches and hand socket wrenches.*

ISO 1703, *Assembly tools for screws and nuts — Nomenclature.*

ISO 2380, *Screwdriver blades for slotted head screws.*

ISO 2725, *Assembly tools for screws and nuts — Power and hand operated square drive sockets — Metric series.*

ISO 2936, *Assembly tools for screws and nuts — Hexagon socket screw keys — Metric series.*

ISO 3315, *Assembly tools for screws and nuts — Driving parts for hand-operated square drive socket wrenches — Torque testing.*

ISO 3316, *Assembly tools for screws and nuts — Attachments for hand-operated square drive socket wrenches — Torque testing.*

ISO 3318, *Assembly tools for screws and nuts — Open-end double-head engineers' wrenches, double-head box wrenches and combination wrenches — Maximum widths of heads.*

Annex

General guidelines on hand tool application when carrying out on-site, normal maintenance and routine adjustment work

Earth-moving machinery shall be oiled, greased, checked and adjusted before, during and after operation, respectively, in order to maintain it in good condition.

Table 2 gives general guidance as to the basic tool to be used to service items on the machine.

Table 2 — General guidelines on hand tool application

No.	Division	Item to be served	Manually 1) (D)	Combination wrench 2) (E)	Engineers' wrench single head 2) (F)	Socket wrenches and handles 2) (G)	Key, hexagon socket screw (H)	Screwdriver (I)	Slip joint pliers (J)	Strap wrench (K)	Hammer (L)	Feeler gauge (M)	Pinch bar (N)	Grease gun (O)	Inflator gauge (P)	Adjustable wrench 3) (Q)	Socket and torque wrench 3) (R)	Battery post cleaner (S)	Belt tension gauge (T)
(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)
1	Engine	1) Engine oil	o																
		2) Pump (water and fuel)	o	o		o								o			o		
		3) Filter element	o	o		o				o									
		4) Bolt and nut (rotating to exhaust and intake manifold, turbo-charger, air cleaner)																	
		5) Valve clearance						o				o							
2	Gauges and meters	1) Engine tachometer		o					o										
		2) Speedometer		o					o										
		3) Ammeter		o															
		4) Temperature gauge		o															
		5) Pressure gauge		o															
3	Air intake, cooling, fuel system	1) Fuel system	o	o															
		2) Radiator	o	o		o											o		
		3) Cylinder head and cylinder block				o													
		4) Air cleaner	o						o								o		
		5) Filter element (main and auxiliary)		o		o													
		6) Fuel injection nozzle		o		o													
		7) Fan belt		o		o								o					o
4	Electrical system	1) Battery	o	o		o		o	o									o	
		2) Lighting system		o		o		o	o										
		3) Starting system		o		o								o					
		4) Generator		o		o													
		5) Regulator				o		o				o							
5	Power train (include work attachment control)	1) Clutch	o	o		o					o		o				o		
		2) Transmission	o			o											o		
		3) Steering	o	o		o											o		
		4) Final drive				o	o						o				o		
		5) Universal joint				o					o		o	o			o		
		6) Hydraulic units	o	o		o			o										
6	Controls	1) Engine control		o										o					
		2) Steering control		o										o					
		3) Brake		o										o					
7	Under-carriage	1) Carrier roller				o					o			o			o		
		2) Track roller				o					o			o			o		
		3) Idler				o					o			o			o		
		4) Track shoe				o					o						o		
		5) Main spring			o	o					o								
		6) Track tension adjustment a) Adjust rod type				o													
		b) Grease type				o								o					
		7) Tyre				o									o		o		

1) "Manually" means maintenance and adjustment by hand without using tools.

2) Combination wrenches and socket wrenches are also used for retightening bolts and nuts of machines.

3) The adjustable wrench is used only when a combination wrench, engineers' wrench, or socket wrench is not available.