

INTERNATIONAL
STANDARD

ISO
6012

Third edition
1989-11-01

**Earth-moving machinery — Service
instrumentation**

Engins de terrassement — Instruments pour l'entretien

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Reference number
ISO 6012 : 1989 (E)

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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 6012 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*.

This third edition cancels and replaces the second edition (ISO 6012: 1982), and incorporates draft Addendum 1: 1986.

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Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

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Earth-moving machinery — Service instrumentation

1 Scope

This International Standard sets forth, for guidance, a list of diagnostic instruments to check earth-moving machinery at the work-site.

The main purpose of this International Standard is to ensure that earth-moving machines be designed with proper accessibility and necessary connections in order to make it possible to perform these checks in an easy way, using portable instruments.

NOTES

1 Service instruments use of which involves major machine disassemblies or which are more suitable for use in the workshop are purposely excluded from this list.

2 Diagnostic checks are intended to be carried out by qualified personnel. Relevant specifications and instructions should therefore be included, preferably in the service manual, rather than in the operator's manual.

This International Standard applies to crawler and wheel tractors, crawler and wheel loaders and hydraulic excavators, but

can be easily extended to apply to other basic earth-moving machines such as graders, tractor scrapers and dumpers.

3 Types of checks, instruments and scales

Table 1 specifies the corresponding instruments for each check. The letters in table 1 have the following meanings:

A = definitely required (when the machine uses these basic elements),

B = desirable, but not definitely required.

The instrument specified for each type of check has been selected from among those most commonly used. Other more sophisticated devices or instruments, if any, can be used as alternatives.

The instrument values or ranges presented in table 1 are intended to be indicative only and may change with technological progress.

Table 1 — Guide list of diagnostic instruments to check

Check	Pressure gauge					Tyre pressure gauge	Vacuum meter		Thermometer			Pyro-meter	Timing electronic tester	Flow meter	
	MPa ¹⁾					MPa	MPa or mH ₂ O	MPa or mmHg	°C			°C		l/s (l/min)	
	0,3	1	5 10	25	40	0,2 MPa or 1 520 mmHg	0,1 to 1	0,01 MPa or 1 mH ₂ O	0,1 MPa or 760 mmHg	- 40 to 100	50 to 130	50 to 200		900	3,3 (200) 8,3 (500)
Engine															
Valve clearance															
Diesel timing														B	
Cylinder compression															
Fuel injection pressure															
Engine oil pressure		A													
Intake manifold pressure (supercharged engines)						A									
Exhaust manifold pressure before and after turbine (supercharged engines)						A									
Exhaust manifold temperature before and after turbine (supercharged engines)												B			
Depression after the air cleaner								A							
Cooling fluid temperature										A					
Antifreeze concentration in cooling fluid															
Cooling system sealing															
Engine rotational frequency															
Cold starting cooling fluid temperature										B					
Power train															
Oil bath clutch luboil pressure	B														
Transmission luboil pressure		B													
Hydraulic reverser control oil pressure			A												
Torque converter oil pressure		A													
Power shift clutch control oil pressure			A												

1) 1 MPa = 10 bar

Table 1 – Guide list of diagnostic instruments to check

Check	Pressure gauge					Tyre pressure gauge MPa	Vacuum meter		Thermometer			Pyro- meter °C	Timing electronic tester	Flow meter l/s (l/min)
	MPa ¹⁾				MPa or mmHg		MPa or mH ₂ O	MPa or mmHg	°C					
	0,3	1	5 10	25	40	0,2 MPa or 1 520 mmHg	0,1 to 1	0,01 MPa or 1 mH ₂ O	0,1 MPa or 760 mmHg	- 40 to 100	50 to 130	50 to 200		900
Engine clutch control oil pressure			A											
Hydrostatic transmission oil pressure			A	A	A									
Oil flow (applicable to all preceding items)														B
Torque converter oil temperature												A		
Oil bath clutch luboil temperature											B			
Hydraulic reverser oil temperature											A			
Transmission oil temperature											A			
Bevel gear oil temperature											B			
Hydrostatic transmission oil temperature											A			
Brakes														
Brake oil control pressure			A	A										
Braking servosystem control air pressure		A												
Vacuum boosted brake system under pressure									A					
Steering														
Steering clutches control oil pressure			A											
Steering power assistance control oil pressure					A									
Oil flow (applicable to preceding items)														B
Undercarriage														
Wear of track components (links, rollers, idlers, etc.)														

1) 1 MPa = 10 bar

Table 1 – Guide list of diagnostic instruments to check

Check	Pressure gauge					Tyre pressure gauge	Vacuum meter		Thermometer			Pyro-meter	Timing electronic tester	Flow meter	
	MPa ¹⁾					MPa	MPa or mH ₂ O	MPa or mmHg	°C			°C		l/s (l/min)	
	0,3	1	5 10	25	40	0,2 MPa or 1 520 mmHg	0,1 to 1	0,01 MPa or 1 mH ₂ O	0,1 MPa or 760 mmHg	-40 to 100	50 to 130	50 to 200		900	3,3 (200) 8,3 (500)
Equipment															
Operation pressure and relief valve setting			A	A	A										
Pressure inside the oil tank		A													
Oil temperature											B				
Oil flow															B
Wheels															
Tyre pressure ²⁾							A								
Tyre tread depth															
Electrical plant															
Battery electrolyte density															
Battery voltage and various tests															
General															
Bolts and nuts torque															
Various dimensions															
Effort required on the control levers															
Various clearances															

1) 1 MPa = 10 bar

2) The tyre pressure gauge may have a dual gauge, for example MPa and bar or psi, reflecting the local units. A tyre inflator can have the same range 0,3 MPa to 1 MPa as the tyre pressure gauge.

