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# International Standard



# 6012

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Earth-moving machinery — Service instrumentation

*Engins de terrassement — Instruments pour l'entretien*

Second edition — 1982-06-01

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**Descriptors** : earth-moving machinery, instruments, machine elements, checkout equipment, specifications, inspection, maintenance.

Price based on 7 pages

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

International Standard ISO 6012 was developed by Technical Committee ISO/TC 127, *Earth-moving machinery*. The first edition (ISO 6012-1978) had been approved by the member bodies of the following countries :

Australia	France	South Africa, Rep. of
Austria	Germany, F.R.	Spain
Belgium	Israel	Sweden
Brazil	Italy	United Kingdom
Canada	Japan	USA
Chile	Korea, Rep. of	USSR
Czechoslovakia	Mexico	Yugoslavia
Egypt, Arab Rep. of	Poland	
Finland	Romania	

No member body had expressed disapproval of the document.

This second edition, which cancels and replaces ISO 6012-1978, incorporates draft Amendment 1, which was circulated to the member bodies in March 1981 and has been approved by the member bodies of the following countries :

Australia	France	South Africa, rep. of
Austria	Germany, F.R.	Sweden
Belgium	Italy	United Kingdom
Czechoslovakia	Japan	USA
Egypt, Arab Rep. of	Poland	USSR
Finland	Romania	

The member body of the following country expressed disapproval of the document on technical grounds :

India

# 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 whose utilization 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.

## 2 Field of application

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

The table specifies for each check the corresponding instruments. The letters in the table 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 an alternative.

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

**Table — Guide list of diagnostic instruments to check earth-moving machinery at the work site**

NOTE — A bold line at the top or side of the table indicates the parts that have been amended.

Check	Manometer					MPa or mmHg	Tyre mano- meter	Vacuum meter		Thermometer			Pyro- meter	Timing electronic tester	Flow meter			
	MPa <sup>1)</sup>							MPa	MPa or mH <sub>2</sub> O	MPa or mmHg	°C					°C	l/s (l/min)	
	0,3	1	5 10	25	40						0,2 MPa or 1 520 mmHg	0,3 to 1						0,01 MPa or 1 mH <sub>2</sub> O
<b>Engine</b>																		
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)												A						
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							
<b>Power train</b>																		
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															
Engine clutch control oil pressure			A															
Hydrostatic transmission oil pressure			A	A	A													
Oil flow (applicable to all preceding items)															B			

1) 1 MPa = 10 bar



Table — Guide list of diagnostic instruments to check earth-moving machinery at the work site (continued)

Check	Manometer					Tyre manometer	Vacuum meter		Thermometer			Pyrometer	Timing electronic tester	Flow meter
	MPa <sup>1)</sup>				MPa or mmHg		MPa	MPa or mH <sub>2</sub> O	MPa or mmHg	°C				
	0,3	1	5 10	25	40	0,2 MPa or 1 520 mmHg	0,3 to 1	0,01 MPa or 1 mH <sub>2</sub> O	0,1 MPa or 760 mmHg	- 40 to 100	50 to 130	50 to 200		
Torque converter oil temperature												A		
Oil bath clutch lubeoil temperature											B			
Hydraulic reverser oil temperature											A			
Transmission oil temperature											A			
Bevel gear oil temperature											B			
Hydrostatic transmission oil temperature											A			
<b>Brakes</b>														
Brake control oil pressure			A	A										
Braking servosystem control air pressure		A												
Vacuum boosted brake system underpressure									A					
<b>Steering</b>														
Steering clutches control oil pressure			A											
Steering power assist control oil pressure				A										
Oil flow (applicable to preceding items)														B
<b>Undercarriage</b>														
Wear of track components (links, rollers, idlers, etc.)														
<b>Equipment</b>														
Operation pressure and relief valve setting			A	A	A									
Pressure inside the oil tank		A												
Oil temperature											B			
Oil flow														B
<b>Wheels</b>														
Tyre pressure <sup>2)</sup>							A							
Tyre tread depth														

1) 1 MPa = 10 bar

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



Table — Guide list of diagnostic instruments to check earth-moving machinery at the work site (concluded)

Check	Manometer					Tyre manometer	Vacuum meter		Thermometer			Pyrometer	Timing electronic tester	Flow meter
	MPa <sup>1)</sup>						MPa	MPa or mH <sub>2</sub> O	MPa or mmHg	°C				
	0,3	1	5 10	25	40	0,2 MPa or 1 520 mmHg				0,3 to 1	0,01 MPa or 1 mH <sub>2</sub> O	0,1 MPa or 760 mmHg		-40 to 100
<b>Electrical plant</b>														
Battery electrolyte density														
Battery voltage and various tests														
<b>General</b>														
Bolts and nuts torque														
Various dimensions														
Effort required on the control levers														
Various clearances														

1) 1 MPa = 10 bar

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Engine tachometer	Feeler gauge	Dynamometer	Steel tape	Steel rule	Cylinder compression gauge	Fuel nozzle tester	Tyre tread depth gauge	Depth gauge 180 mm with 1/20 scale slider	Pump and gauge	Battery hydrometer	Hydrometer-thermometer for fluid concentration	Micrometer	Vernier caliper	Electrical tester 40 V/500 A/5 000 Ω	Torque wrenches	Combined template	Outside caliper
min <sup>-1</sup>		N	m	m	MPa	MPa			MPa				mm		N·m		
5 000		300	10	1	1 to 4	25 to 40			0,16				160		140 420 750		
										A							
														A			
			A	A									A		A		
		A															
												B					

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