BRITISH STANDARD

BS 6913-4:
1997
ISO 6012:1997

Operation and maintenance of earth-moving machinery —

Part 4: Recommendations for service instrumentation

ICS 53.100

National foreword

This British Standard reproduces verbatim ISO 6012:1997 and implements it as the UK national standard. It supersedes BS 6913-4:1990 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee B/513, Construction equipment and plant, and site safety, to Subcommittee B/513/1, Earth-moving machinery (International), which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, page ii, pages 1 to 7 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Sector Board for Building and Civil Engineering, was published under the authority of the Standards Board and comes into effect on
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Amendments issued since publication

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INTERNATIONAL STANDARD

ISO 6012

Fourth edition
1997-03-01

Earth-moving machinery — Service instrumentation

Engin de terrassement — Instruments pour l'entretien

Reference number
ISO 6012:1997(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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

This fourth edition cancels and replaces the third edition (ISO 6012:1989), which has been technically revised.

Descriptors: Earth-moving equipment, checking equipment, instruments, specifications.

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.

NOTE 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.

NOTE 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.

2 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 earth-moving machinery at the work-site

Check	Pressure gauge						Type pressure gauge	Vacuum meter		Thermometer			Pyrometer	Timing electronic tester	Flow meter
	MPa[a]						MPa	MPa[a]		°C			°C		l/s (l/min)
	0,2	0,3	1	5 10	25	40	0,1 to 1	0,01	0,1	− 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					
Fuel pressure		A													
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											
Engine clutch control oil pressure				A											

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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	Vernier caliper	Electrical tester 40 V/500 A/5 000 Ω	Torque Wrenches	Combined template	Outside caliper
min^{-1}		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															
					B											
						B										
											A					
									B							
A																

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Check	Pressure gauge						Type pressure gauge	Vacuum meter		Thermometer			Pyrometer	Timing electronic tester	Flow meter	
	MPa[a]						MPa	MPa[a]		°C			°C		l/s (l/min)	
	0,2	0,3	1	5 10	25	40	0,1 to 1	0,01	0,1	− 40 to 100	50 to 130	50 to 200	900		3,3 (200) 8,3 (500)	
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					
Brake Brake oil control pressure				A	A											
Braking servosystem control air pressure			A													
Vacuum boosted brake system under pressure									A							
Brake disc thickness																
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.)																
Equipment Operation pressure and relief valve setting				A	A	A										
Pressure inside the oil tank			A													
Oil temperature											B					

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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	Vernier caliper	Electrical tester 40 V/500 A/5 000 Ω	Torque Wrenches	Combined template	Outside caliper
	min^{-1}		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				
				B	A				A							B	A

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Check	Pressure gauge						Type pressure gauge	Vacuum meter		Thermometer			Pyrometer	Timing electronic tester	Flow meter	
	MPa[a]						MPa	MPa[a]		°C			°C		l/s (l/min)	
	0,2	0,3	1	5 10	25	40	0,1 to 1	0,01	0,1	– 40 to 100	50 to 130	50 to 200	900		3,3 (200) 8,3 (500)	
Oil flow															B	
Wheels Type pressure[b]							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																

[a] MPa = 10 bar = 7 600 mmHg = 100 mH_20

[b] 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 of 0,3 MPa to 1 MPa as the tyre pressure gauge.

Table 1 — Guide list of diagnostic instruments to check earth-moving machinery at the work-site

	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	Vernier caliper	Electrical tester 40 V/500 A/5 000 Ω	Torque Wrenches	Combined template	Outside caliper
	min^{-1}		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		
								B	A								
											A						
														A			
															A		
				A	A								A				
			A														
		B											A				

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