INTERNATIONAL STANDARD

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Fourth edition
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Earth-mover tyres and rims —

Part 2: Loads and inflation pressures

Pneumatiques et jantes pour engins de terrassement —

Partie 2: Charges et pressions de gonflage

Reference number
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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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ISO 4250-2 was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*, Subcommittee SC 6, *Off-the-road tyres and rims*.

This fourth edition cancels and replaces the third edition (ISO 4250-2:1995), which has been technically revised. It also incorporates the Amendment ISO 4250-2:1995/Amd.1:1997.

ISO 4250 consists of the following parts, under the general title *Earth-mover tyres and rims*:

— *Part 1: Tyre designation and dimensions*

— *Part 2: Loads and inflation pressures*

— *Part 3: Rims*

Earth-mover tyres and rims —

Part 2:
Loads and inflation pressures

1 Scope

ISO 4250 consists of three parts (see the Foreword) laying down the technical designation and dimensions of tyres and rims for earth-movers; it also gives load tables for these tyres.

This part of ISO 4250 gives working definitions of masses and load cycles, and specifies tyre loads and reference inflation pressures for narrow and wide base tyres primarily intended for earth-mover machines.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4223-1, *Definitions of some terms used in the tyre industry — Part 1: Pneumatic tyres*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4223-1 and the following apply.

NOTE For a list of equivalent terms, see ISO 3877-1 [1].

3.1 Definitions of masses

3.1.1
maximum load
maximum load of individual tyres determined by manufacturer's rated gross machine mass (GMM) distribution assigned to each axle, divided by the number of tyres for that axle

NOTE 1 The maximum GMM includes masses calculated in 3.1.1.1 to 3.1.1.5 inclusive.

NOTE 2 If tyre ballast is used, this is also included in the determination of GMM.

3.1.1.1
operating mass
net weight (deprecated)
actual mass of the base machine with equipment specified by the manufacturer, operator (75 kg), full fuel tank, and full lubricating, hydraulic and cooling systems

3.1.1.2
optional equipment mass
difference in operating mass between the optional item and standard item replaced (such as engine, brakes, tyres, etc.)

NOTE This includes the operating mass of additional items offered by the manufacturer which are not replacements for standard items (such as cabs, body-liners, sideboards, air-conditioners, etc.)

3.1.1.3
mass of special modifications
difference in the operating mass of the machine due to modifications not previously covered in optional equipment mass (such as additional reinforcements, etc.)

3.1.1.4
payload
total mass of the material being carried

3.1.1.5
field modification
operating mass change due to machine alterations made other than by the original manufacturer (such as modifications for additional capacity, reinforcements, etc.)

3.2 Definitions of operating conditions

3.2.1
maximum speed
peak velocity attained by the machine

3.2.2
earth-moving haulage cycle
cycle where machine self-loads or receives a load from loading equipment, transports it elsewhere and returns unloaded

NOTE 1 Transportation usually occurs over unimproved surfaces at medium speeds, up to 65 km/h, and short distances, up to 4 km one way.

NOTE 2 Machines in this category are mainly haulage trucks (dumpers) and tractor-scrapers.

3.2.3
loader cycle
cycle where the machine is used to pick up material and move it a short distance away

NOTE 1 Tyre loads fluctuate depending on the conditions involved when the equipment picks up the load.

NOTE 2 Transportation speeds are low, up to 10 km/h, and distances are short, usually less than 75 m one way.

3.2.4
load-carry cycle
cycle where the machine, primarily intended for loader service, picks up a load, transports it elsewhere and returns unloaded.

NOTE 1 Transportation usually occurs over unimproved surfaces at low speeds, up to 25 km/h, and short distances, up to 600 m.

NOTE 2 Machines in this category consist mainly of loaders, logstackers and material-handling equipment.

NOTE 3 Tyre manufacturers should be consulted for specific conditions.

3.2.5
dozer (tractor) cycle
condition where a machine is used to move materials (usually earth) by pushing, dragging or grading

NOTE 1 Tyre loads are relatively constant and speeds are low, up to 10 km/h.

NOTE 2 Travel distances vary depending on work situations.

3.2.6
grader cycle
condition where a machine is used in construction and road maintenance

NOTE 1 Tyre loads are relatively constant during the work cycles.

NOTE 2 Grader speeds are slower during working periods, with typical transportation speeds reaching about 40 km/h.

NOTE 3 Travel distances vary depending on the work situations.

3.2.7
creep
movement of equipment at a very low speed (commonly not over 120 m in 60 min)

NOTE 1 During creep motion, loads on the tyres are usually very high and consideration needs to be given to the type of surface over which the equipment is travelling.

NOTE 2 Tyre manufacturers should be consulted for specific conditions.

3.2.8
drive-away
movement of a machine from one location to another under non-working conditions

NOTE 1 This movement occurs during transportation of a machine from site to site.

NOTE 2 Tyre manufacturers should be consulted for specific conditions.

NOTE 3 Load/speed/distance tables in this part of ISO 4250 do not apply to drive-away conditions.

3.3 Definition of vehicle type

3.3.1
industrial vehicle
vehicle including counterbalanced lift trucks, container handlers, straddle carriers, aircraft tow tractors, mobile crushers, logstackers

4 Special conditions

For longer hauls and/or speeds in excess of those indicated in the tables, the tyre manufacturers should be consulted for instructions regarding permissible loads and the required inflation pressures.

5 Selection of tyres for new machine design

Selection of size and strength index of the tyre used on each axle shall be based on the highest individual wheel load as determined by Gross Machine Mass (GMM) distribution, including load transfer and the machine application.

Maximum load per tyre shall not be greater than specified in the applicable tables.

The performance of machines fitted with earth-mover tyres depends on the operating conditions, and more particularly on the specific ground pressure which is governed by the inflation pressure. It is therefore advisable to select tyre size on the basis of low inflation pressure.

6 Inflation pressures – General

6.1 Tyres covered by this part of ISO 4250 shall not exceed a cold inflation pressure of 1 000 kPa. Rim and wheel manufacturers shall be consulted to determine if the rim and wheel are of sufficient strength for the intended service conditions.

6.2 Inflation pressures shown in the load/inflation tables are reference pressures and do not include any pressure build-up due to vehicle operation.

6.3 In agreement with tyre manufacturers, inflation pressures may be adjusted to compensate for extremes of atmospheric temperature or special operating conditions.

7 Load/inflation tables

Load/inflation relations for diagonal ply rating tyres are given in Tables 1 to 8; those for symbol-marked radial tyres are given in Tables 9 to 16.

8 Load capacities for earth-mover tyres on industrial vehicles

Load capacities for earth-mover tyres on industrial vehicles are given in Table 17.

Table 1 — Diagonal ply rating marked narrow base tyres for earth-moving slow speed service, reference speed of 10 km/h (loaded conditions)

Tyre size designation	Ply rating	Load[a, b] kg	Inflation pressure[b] kPa
12.00 — 20	14	5 000	600
	16	5 450	700
12.00 — 24 and 12.00 — 25	8	4 000	325
	14	5 600	575
	16	6 150	675
	18	6 500	750
	20	6 900	825
13.00 — 24 and 13.00 — 25	8	4 375	300
	12	5 600	450
	18	7 100	675
	20	7 500	750
	22	8 000	825
14.00 — 24 and 14.00 — 25	8	4 875	275
	10	5 600	350
	12	6 300	425
	16	7 300	550
	20	8 500	700
	24	9 500	850
	28	10 000	925
16.00 — 24 and 16.00 — 25	12	7 100	325
	16	8 250	425
	20	9 750	550
	24	10 600	650
	28	11 500	750
	32	12 500	875
	36	13 600	975
18.00 — 24 and 18.00 — 25	12	8 250	275
	16	10 000	375
	20	11 500	475
	24	12 500	550
	28	13 600	650
	32	15 000	750
	36	16 000	850
	40	17 000	950
18.00 — 33	28	16 000	650
	32	17 500	750
	36	18 500	850
18.00 — 49	24	18 500	550
	28	20 000	650
	32	21 800	750
21.00 — 24 and 21.00 — 25	16	11 800	325
	20	13 200	400
	24	15 000	500
	28	16 500	575

Table 1 (*continued*)

Tyre size designation	Ply rating	Load[a, b] kg	Inflation pressure[b] kPa
21.00 — 35	28	19 500	575
	32	21 200	650
	36	23 000	750
	40	24 300	825
21.00 — 49	28	23 600	575
	32	25 000	650
	36	27 250	750
	40	29 000	825
24.00 — 25	24	18 000	425
	30	20 000	525
24.00 — 29	24	19 000	425
	30	21 800	525
24.00 — 35	36	26 500	650
	42	29 000	750
	48	31 500	850
24.00 — 43	36	30 000	650
	42	32 500	750
	48	34 500	850
24.00 — 49	36	32 500	650
	42	34 500	750
	48	37 500	850
27.00 — 33	24	22 400	350
	30	25 750	450
	36	29 000	550
27.00 — 49	36	36 500	575
	42	40 000	675
	48	43 750	775
30.00 — 51	40	45 000	575
	46	48 750	650
	52	53 000	750
33.00 — 51	42	51 500	550
	50	56 000	650
	58	61 500	750
36.00 — 51	42	58 000	500
	50	65 000	600
	58	71 000	675
40.00 — 57	52	80 000	550
	60	87 500	650
	68	92 500	725

[a] For stationary service conditions, the loads in this table may be increased up to 60 % with no increase in inflation pressure.

[b] For special equipment with a high centre of gravity, consult the tyre manufacturer.

Table 2 — Diagonal ply rating marked narrow base tyres for earth-moving service for relatively short hauls, reference speed 50 km/h

Tyre size designation	Ply rating	Load[a] kg	Inflation pressure kPa
12.00 — 20 and 12.00 — 21	14	2 800	425
	16	3 000	475
12.00 — 24 and 12.00 — 25	8	2 180	225
	14	3 000	375
	16	3 250	450
	18	3 550	500
	20	3 750	550
13.00 — 24 and 13.00 — 25	8	2 360	200
	12	3 000	300
	18	3 875	450
	20	4 000	500
	22	4 250	550
14.00 — 24 and 14.00 — 25	8	2 575	175
	10	3 000	225
	12	3 350	275
	16	4 000	375
	20	4 625	475
	24	5 150	575
	28	5 600	650
16.00 — 24 and 16.00 — 25	12	3 875	225
	16	4 875	325
	20	5 450	400
	24	6 000	475
	28	6 700	575
	32	7 300	650
	36	7 750	725
18.00 — 24 and 18.00 — 25	12	4 750	200
	16	5 600	275
	20	6 500	350
	24	7 300	425
	28	8 000	500
	32	8 750	575
	36	9 250	625
	40	9 750	700
18.00 — 33	24	8 500	425
	28	9 250	500
	32	10 000	575
	36	10 600	625
18.00 — 49	24	10 600	425
	28	11 800	500
	32	12 850	575
21.00 — 24 and 21.00 — 25	16	6 900	250
	20	7 750	300
	24	8 750	375
	28	9 500	425