

# INTERNATIONAL STANDARD

**ISO**  
**4250-2**

Second edition  
1991-04-01

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## **Narrow and wide base off-road tyres and rims**

### **Part 2:**

### **Loads and inflation pressures**

*Pneumatiques et jantes à base étroite et à base large pour engins de génie civil —  
Partie 2: Charges et pressions de gonflage*



Reference number  
ISO 4250-2 : 1991 (E)

## Foreword

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

This second edition cancels and replaces the first edition (ISO 4250-2 : 1987), incorporating draft Addendum 1.

ISO 4250 consists of the following parts, under the general title *Narrow and wide base off-road tyres and rims*:

- *Part 1: Tyre designations and dimensions*
- *Part 2: Loads and inflation pressures*
- *Part 3: Rims*

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International Organization for Standardization

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# Narrow and wide base off-road tyres and rims —

## Part 2: Loads and inflation pressures

### 1 Scope

ISO 4250 consists of three parts (see the Foreword) and provides technical details on the designation and dimensions of off-road tyres and rims, as well as load ratings for these types of tyres.

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

NOTE — Terms used are in accordance with ISO 3877-1 : 1978, *Tyres, valves and tubes — List of equivalent terms — Part 1: Tyres*.

### 2 Definitions

#### 2.1 Definitions of masses

**2.1.1 maximum load:** Maximum loads 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 — The maximum GMM includes masses calculated in 2.1.1.1 to 2.1.1.6 inclusive.

**2.1.1.1 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.

**2.1.1.2 optional equipment mass:** Difference in operating mass between the optional item and standard item replaced (such as engine, brakes, tyres, etc.). This includes the operating mass of additional items offered by the manufacturer which are not replacements for standard items (such as cabs, body-liners, side-boards, air conditioners, etc.).

**2.1.1.3 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.).

**2.1.1.4 payload:** Total mass of the material being carried.

**2.1.1.5 tyre ballast:** (If used, this is also included in determination of GMM.)

**2.1.1.6 field modifications:** Operating mass change due to machine alterations made other than by the original manufacturer (such as modifications for additional capacity, reinforcements, etc.).

#### 2.2 Definitions of operating conditions

**2.2.1 maximum speed:** Peak velocity attained by the machine.

**2.2.2 earth-moving haulage cycle:** Cycle where machine self-loads or receives a load from loading equipment, transports it elsewhere and returns unloaded. Transportation usually occurs over unimproved surfaces at medium speeds, up to 65 km/h, and short distances, up to 4 km away.

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

**2.2.3 loader cycle:** Cycle where the machine is used to pick up material and move it a short distance away. Tyre loads fluctuate depending on the conditions involved when the equipment picks up the load. Transportation speeds are low, up to 10 km/h, and distances are short, usually less than 75 m away.

**2.2.4 load carry cycle:** Cycle where the machine, primarily intended for loader service, picks up a load, transports it elsewhere and returns unloaded. Transportation usually occurs over unimproved surfaces at low speeds, up to 25 km/h, and rather short distances, up to 600 m.

NOTE — Machines in this category consist mainly of loaders, log stackers and material-handling equipment. Tyre manufacturers should be consulted for specific conditions.

**2.2.5 dozer (tractor) cycle:** Condition where a machine is used to move materials (usually earth) by pushing, dragging or grading. Tyre loads are relatively constant and speeds are low, up to 10 km/h. Travel distances vary depending on work situations.

**2.2.6 grader cycle:** Condition where a machine is used in construction and road maintenance. Tyre loads are relatively constant during the work cycles. Grader speeds are slower

during working periods with typical transportation speeds reaching about 40 km/h. Travel distances vary depending on work situations.

**2.2.7 creep:** Movement of equipment at a very low speed (commonly not over 120 m in 60 min). 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. Tyre manufacturers should be consulted for specific conditions.

**2.2.8 drive-away:** Movement of a machine from one location to another under non-working conditions. This movement occurs during transportation of a machine from site to site. Tyre manufacturers should be consulted for specific conditions.

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

### 3 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.

### 4 Selection 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 (determined by 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 off-road 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.

## 5 Inflation pressures — General

**5.1** Rim and wheel manufacturers should be consulted to determine if the rim and wheel are of sufficient strength for the intended service conditions (inflation pressure and load).

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

**5.3** In agreement with tyre manufacturers, inflation pressures may be varied to compensate for extremes of atmospheric temperatures or special operating conditions.

**5.4** For all tables the inflation pressures are given for guidance only; in actual practice they may vary according to the operating conditions, in agreement with the tyre manufacturers.

## 6 Load/inflation tables

Load/inflation relations for diagonal ply rating tyres are given in tables 1 to 6: those for symbol-marked radial tyres are given in tables 7 to 9.

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

Tyre size designation	Ply rating	Load <sup>1)</sup> kg	Inflation kPa
12.00 — 20/21	14	5 000	600
	16	5 450	700
12.00 — 24/25	8	4 000	325
	14	5 600	575
	16	6 150	675
	18	6 500	750
13.00 — 24/25	20	6 900	825
	8	4 375	300
	12	5 600	450
	18	7 100	675
14.00 — 24/25	20	7 500	750
	22	8 000	825
	8	4 875	275
	10	5 600	350
14.00 — 24/25	12	6 300	425
	16	7 300	550
	20	8 500	700
	24	9 500	850
14.00 — 24/25	28	10 000	925
	12	7 100	325
	16	8 250	425
	20	9 750	550
16.00 — 24/25	24	10 600	650
	28	11 500	750
	32	12 500	875
	36	13 600	975
18.00 — 24/25	12	8 250	275
	16	10 000	375
	20	11 500	475
	24	12 500	550
18.00 — 24/25	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 — 24/25	16	11 800	325
	20	13 200	400
	24	15 000	500
	28	16 500	575
21.00 — 35	28	19 500	575
	32	21 200	650
	36	23 000	750
	40	24 300	825
21.00 — 35	44	25 000	900

Tyre size designation	Ply rating	Load <sup>1)</sup> kg	Inflation kPa
21.00 — 49	28	23 600	575
	32	25 000	650
	36	27 250	750
	40	29 000	825
21.00 — 49	44	30 750	900
	24	18 000	425
24.00 — 25	30	20 000	525
	24	19 000	425
24.00 — 29	30	21 800	525
	36	26 500	650
24.00 — 35	42	29 000	750
	48	31 500	850
	54	34 500	975
	36	30 000	650
24.00 — 43	42	32 500	750
	48	34 500	850
	36	32 500	650
24.00 — 49	42	34 500	750
	48	37 500	850
	24	22 400	350
27.00 — 33	30	25 750	450
	36	29 000	550
	36	36 500	575
27.00 — 49	42	40 000	675
	48	43 750	775
	40	45 000	575
30.00 — 51	46	48 750	650
	52	53 000	750
	42	51 500	550
33.00 — 51	50	56 000	650
	58	61 500	750
	42	58 000	500
36.00 — 51	50	65 000	600
	58	71 000	675
	52	80 000	550
40.00 — 57	60	87 500	650
	68	92 500	725

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

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 <sup>1)</sup> kg	Inflation kPa
12.00 — 20/21	14	2 800	425
	16	3 000	475
12.00 — 24/25	8	2 180	225
	14	3 000	375
	16	3 250	450
	18	3 550	500
	20	3 750	550
13.00 — 24/25	8	2 360	200
	12	3 000	300
	18	3 875	450
	20	4 000	500
14.00 — 24/25	8	2 575	175
	10	3 000	225
	12	3 350	275
	16	4 000	375
	20	4 625	475
	24	5 150	575
16.00 — 24/25	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 — 24/25	12	4 750	200
	16	5 600	275
	20	6 500	350
	24	7 300	425
	28	8 000	500
	32	8 750	575
	40	9 750	700
18.00 — 33	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 — 24/25	16	6 900	250
	20	7 750	300
	24	8 750	375
	28	9 500	425
21.00 — 35	28	11 200	425
	32	12 150	500
	36	12 850	550
	40	14 000	625
	44	14 500	675
21.00 — 49	28	13 600	425
	32	15 000	500
	36	15 500	550
	40	17 000	625
	44	17 500	675

Tyre size designation	Ply rating	Load <sup>1)</sup> kg	Inflation kPa
24.00 — 25	24	10 300	325
	30	11 800	400
24.00 — 29	24	11 200	325
	30	12 500	400
24.00 — 35	36	15 500	475
	42	16 500	550
	48	18 500	650
	54	19 500	725
24.00 — 43	36	17 000	475
	42	19 000	575
	48	20 600	650
24.00 — 49	36	18 500	475
	42	20 000	550
	48	21 800	650
27.00 — 33	24	13 200	275
	30	15 500	350
	36	16 500	400
27.00 — 49	36	21 200	425
	42	23 000	500
	48	25 000	575
30.00 — 33	28	16 000	275
	34	18 500	350
	40	21 200	425
30.00 — 51	40	25 750	425
	46	29 000	500
	52	30 000	550
33.00 — 51	42	30 000	425
	50	33 500	500
	58	35 500	575
36.00 — 51	42	34 500	375
	50	37 500	450
	58	41 250	525
40.00 — 57	52	46 250	425
	60	50 000	475
	68	54 500	550

1) Load adjustment for maximum speed 65 km/h :  
load × 0,85  
Load adjustment for maximum speed 15 km/h :  
load × 1,12

Values so calculated to be rounded off to the nearest :  
25 kg for loads up to 4 999 kg;  
50 kg for loads from 5 000 kg to 9 999 kg;  
100 kg for loads equal to or above 10 000 kg.

**Table 3 — Diagonal ply rating marked wide base tyres for earth-moving slow speed service, reference speed 10 km/h (loaded conditions)**

Tyre size designation	Ply rating	Load <sup>1)</sup> kg	Inflation kPa
15.5 — 25	8	4 250	250
	10	4 875	325
	12	5 600	400
17.5 — 25	8	4 750	225
	12	6 150	350
	16	7 300	475
	20	8 250	575
20.5 — 25	12	6 700	250
	16	8 250	350
	20	9 500	450
	24	10 300	525
23.5 — 25	12	8 000	225
	16	9 500	300
	20	10 900	375
	24	12 500	475
26.5 — 25	28	13 600	550
	16	11 500	275
	20	13 200	350
	24	14 000	400
26.5 — 29	28	15 500	475
	32	17 000	550
	18	12 850	300
	22	14 500	375
29.5 — 25	26	16 000	450
	30	17 500	525
	16	12 850	250
	22	15 000	325
29.5 — 29	28	17 500	425
	16	14 000	250
	22	16 000	325
	28	19 000	425
29.5 — 35	34	21 200	525
	40	23 600	625
	22	17 500	325
	28	20 600	425
	34	23 000	525

Tyre size designation	Ply rating	Load <sup>1)</sup> kg	Inflation kPa
33.25 — 29	26	20 600	350
	32	23 600	450
	38	25 750	525
33.25 — 35	26	22 400	350
	32	25 750	450
	38	28 000	550
33.5 — 33	26	22 400	350
	32	25 750	425
	38	29 000	525
33.5 — 39	26	24 300	350
	32	27 250	425
	38	30 750	525
37.25 — 35	30	28 000	375
	36	30 750	450
	42	33 500	525
37.5 — 33	30	28 000	375
	36	31 500	450
	42	34 500	525
37.5 — 39	28	29 000	350
	36	33 500	450
	44	37 500	550
37.5 — 51	28	33 500	350
	36	38 750	450
	44	42 500	525
40.5/75 — 39	30	31 500	325
	38	37 500	425
	46	42 500	525

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

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

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Table 4 — Diagonal ply rating marked wide base tyres for earth-moving service for relatively short hauls, reference speed 50 km/h

Tyre size designation	Ply rating	Load <sup>1)</sup> kg	Inflation kPa
15.5 — 25	8	2 575	175
	10	3 000	225
	12	3 250	250
17.5 — 25	8	2 800	150
	12	3 650	225
	16	4 250	300
	20	5 000	400
20.5 — 25	12	4 500	200
	16	5 450	275
	20	6 000	325
	24	6 700	400
23.5 — 25	28	7 500	475
	12	5 300	175
	16	6 150	225
	20	7 300	300
26.5 — 25	24	8 000	350
	28	8 750	400
	16	7 300	200
	20	8 250	250
26.5 — 29	24	9 250	300
	28	10 000	350
	32	11 200	425
	18	8 250	225
29.5 — 25	22	9 250	275
	26	10 300	325
	30	11 200	375
	16	8 000	175
29.5 — 29	22	10 000	250
	28	11 500	325
	16	8 500	175
	22	10 600	250
29.5 — 35	28	12 150	325
	34	14 000	400
	40	15 000	475
	22	11 500	250
33.25 — 29	28	13 600	325
	34	15 000	400
	26	13 600	275
33.25 — 35	32	15 000	325
	38	17 000	400
	26	14 500	275
33.5 — 33	32	16 500	325
	38	18 500	400
	26	15 000	275
33.5 — 39	32	18 000	325
	38	20 000	400
	26	16 000	275
37.25 — 35	30	17 500	275
	36	19 500	325
	42	21 800	400
37.5 — 33	30	18 000	275
	36	20 000	325
	42	22 400	400
37.5 — 39	28	18 500	250
	36	21 200	325
	44	24 300	400
	52	26 500	475
37.5 — 51	28	20 600	250
	36	24 300	325
	44	27 250	400
40.5/75 — 39	30	20 600	250
	38	24 300	325
	46	27 250	400

Tyre size designation	Ply rating	Load <sup>1)</sup> kg	Inflation kPa
33.25 — 35	26	14 500	275
	32	16 000	325
	38	18 000	400
33.5 — 33	26	15 000	275
	32	16 500	325
	38	18 500	400
33.5 — 39	26	16 000	275
	32	18 000	325
	38	20 000	400
37.25 — 35	30	17 500	275
	36	19 500	325
	42	21 800	400
37.5 — 33	30	18 000	275
	36	20 000	325
	42	22 400	400
37.5 — 39	28	18 500	250
	36	21 200	325
	44	24 300	400
	52	26 500	475
37.5 — 51	28	20 600	250
	36	24 300	325
	44	27 250	400
40.5/75 — 39	30	20 600	250
	38	24 300	325
	46	27 250	400

1) Load adjustment for maximum speed 65 km/h :  
load × 0,83  
Load adjustment for maximum speed 15 km/h :  
load × 1,12  
Values so calculated to be rounded off to the nearest :  
25 kg for loads up to 4 999 kg;  
50 kg for loads from 5 000 kg to 9 999 kg;  
100 kg for loads equal to or above 10 000 kg.

Table 5 — Diagonal ply rating marked 65 series tyres for earth-moving service

Tyre size designation	Ply rating	Earth-moving service for relatively short hauls, reference speed 50 km/h		Earth-moving slow speed service, reference speed 10 km/h (loaded conditions)	
		Load kg	Inflation kPa	Load kg	Inflation kPa
25/65 — 25	12	4 375	175	7 300	250
	16	5 150	225	8 500	325
	20	5 800	275	9 750	400
30/65 — 25	16	6 700	200	10 900	275
	20	7 500	250	12 500	350
30/65 — 29	16	7 100	200	11 500	275
	20	8 250	250	13 200	350
	24	9 000	300	15 000	425
35/65 — 33	24	11 500	250	19 000	350
	30	12 850	300	21 200	425
	36	14 500	375	23 600	525
40/65 — 39	30	—	—	27 250	375
	36	—	—	30 000	450
45/65 — 45	38	—	—	40 000	450
50/65 — 51	46	—	—	51 500	450

Table 6 — Diagonal ply rating marked narrow base, wide base and 65 series tyres in grader service, reference speed 40 km/h

Tyre size designation <sup>1)</sup>	Ply rating	Load kg	Inflation kPa	Tyre size designation <sup>1)</sup>	Ply rating	Load kg	Inflation kPa
10.00 — 24 TG	8	1 700	250	17.5 — 25	8	2 120	125
12.00 — 24 TG	6	1 600	150		12	2 900	200
	8	1 900	225		14	3 000	225
	12	2 430	325		16	3 350	275
13.00 — 24 TG	8	2 060	200		20	3 650	325
	10	2 360	250	20.5 — 25	12	3 550	175
	12	2 725	300		16	4 000	225
	14	3 000	350		20	4 500	275
14.00 — 24 TG	8	2 500	175	23.5 — 25	12	4 000	150
	10	2 800	225		16	4 750	200
	12	3 075	275		20	5 450	250
	14	3 450	325	25/65 — 25	12	3 350	125
	16	3 650	375		16	4 125	175
16.00 — 24 TG	12	3 650	225	1) "TG" is a designation to be used to identify tyres mounted on SDC rims.			
	14	4 000	275				
	16	4 500	325				
18.00 — 25	12	4 125	200				
	16	5 000	275				
15.5 — 25	8	1 950	150				
	10	2 180	175				
	12	2 650	225				