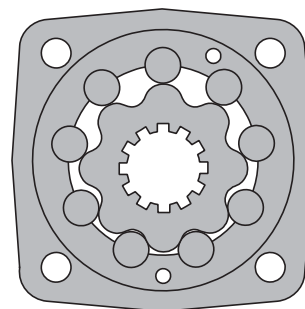


# HYDRAULIC MOTOR-BRAKE MT/B

## APPLICATION

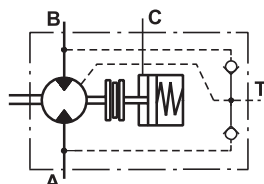
- » Conveyors
- » Metal working machines
- » Agricultural machines
- » Road building machines
- » Mining machinery
- » Food industries
- » Special vehicles
- » Plastic and rubber machinery etc.



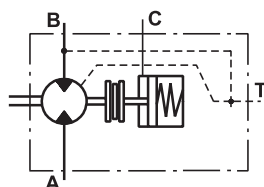
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With check valves



Without check valves "1"



## OPTIONS

- » Model - Disc valve, roll-gerotor;
- » Fully integrated friction disk brake;
- » Side ports;
- » Shafts - straight, splined and tapered;
- » BSPP ports
- » Other special features

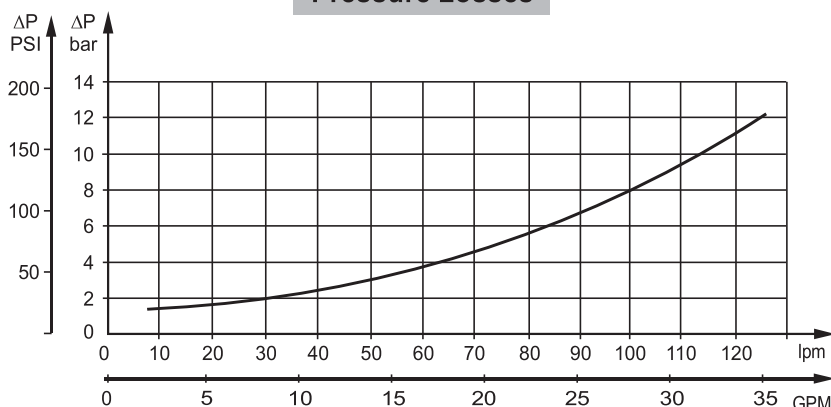
## GENERAL

<b>Max. Displacement,</b> cm <sup>3</sup> /rev [in <sup>3</sup> /rev]	724,3 [44.2]
<b>Max. Speed,</b> [RPM]	780
<b>Max. Torque,</b> daNm [lb-in]	cont.: 130 [11505] int.: 148 [13100]
<b>Max. Output,</b> kW [HP]	40 [54]
<b>Max. Pressure Drop,</b> bar [PSI]	cont.: 200 [2900] int.: 240 [3450]
<b>Max. Oil Flow,</b> lpm [GPM]	150 [40]
<b>Min. Speed,</b> [RPM]	5
<b>Permissible Shaft Loads,</b> daN [lbs]	P <sub>a</sub> =1000 [2248]
<b>Pressure fluid</b>	Mineral based- HLP(DIN 51524) or HM(ISO 6743/4)
<b>Temperature range,</b> °C [°F]	-40÷140 [-40÷284]
<b>Optimal Viscosity range,</b> mm <sup>2</sup> /s [SUS]	20÷75 [98÷347]
<b>Filtration</b>	ISO code 20/16 (Min. recommended fluid filtration of 25 microns)

### Oil flow in drain line

Pressure drop bar [PSI]	Viscosity mm <sup>2</sup> /s [SUS]	Oil flow in drain line lpm [GPM]
140 [2030]	20 [98]	2,5 [.66]
	35 [164]	1,5 [.39]
210 [3045]	20 [98]	5 [1.32]
	35 [164]	3 [.79]

### Pressure Losses



## SPECIFICATION DATA

Type	MT/B 160	MT/B 200	MT/B 250	MT/B 315	MT/B 400	MT/B 500	MT/B 630	MT/B 725	
<b>Displacement, cm<sup>3</sup>/rev</b> [in <sup>3</sup> /rev]	161,1 [9.83]	201,4 [12.29]	251,8 [15.36]	326,3 [19.90]	410,9 [25.06]	523,6 [31.95]	631,2 [38.5]	724,3 [44.2]	
<b>Max. Speed, [RPM]</b>	Cont.	625	625	500	380	305	240	197	172
	Int.*	780	750	600	460	365	285	234	209
<b>Max. Torque daNm [lb-in]</b>	Cont.	47 [4160]	59 [5220]	73 [6460]	95 [8410]	108 [9560]	122 [10800]	130 [11505]	127 [11240]
	Int.*	56 [4960]	71 [6285]	88 [7790]	114 [10090]	126 [11150]	137 [12125]	148 [13100]	147 [13010]
<b>Max. Output kW [HP]</b>	Cont.	26,5 [36]	33,5 [45]	33,5 [45]	33,5 [45]	30 [40]	26,5 [36]	24,3 [33]	20,2 [27]
	Int.*	32 [43]	40 [54]	40 [54]	40 [54]	35 [45]	30 [40]	27,5 [37]	26,8 [36]
<b>Max. Pressure Drop bar [PSI]</b>	Cont.	200 [2900]	200 [2900]	200 [2900]	200 [2900]	180 [2600]	160 [2300]	140 [2030]	120 [1740]
	Int.*	240 [3450]	240 [3450]	240 [3450]	240 [3450]	210 [3050]	180 [2600]	160 [2300]	140 [2030]
<b>Max. Oil Flow lpm [GPM]</b>	Cont.	100 [26.5]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]	125 [33]
	Int.*	125 [33]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]	150 [40]
<b>Max. Inlet Pressure bar [PSI]</b>	Cont.	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]	210 [3050]
	Int.*	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]	250 [3600]
<b>Max. Return Pressure with Drain Line, bar [PSI]</b>	Cont.	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]	140 [2030]
	Int.*	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]	175 [2540]
<b>Max. Starting Pressure with Unloaded Shaft, bar [PSI]</b>	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	10 [150]	
<b>Min. Starting Torque daNm [lb-in]</b>	At max. pressure drop Cont.	34 [3010]	43 [3800]	53 [4690]	74 [6550]	84 [7435]	95 [8410]	95 [8410]	95 [8410]
	At max. pressure drop Int.*	41 [3630]	52 [4600]	63 [5580]	89 [7880]	97 [8585]	106 [9380]	110 [9735]	115 [10180]
<b>Min. Speed**, [RPM]</b>	10	9	8	7	6	5	5	5	
<b>Static Torque of Brake, daNm [lb-in]</b>	143 [12657]								
<b>Min. Brake Release Pressure***, bar [PSI]</b>	32-35 [464-507]								
<b>Max. Opening Pressure, bar [PSI]</b>	280 [4060]								
<b>Max. Pressure in Drain Line, bar [PSI]</b>	5 [73]								
<b>Weight, kg [lb]</b>	27,5 [60.6]	28 [61.7]	28,5 [62.8]	29,5 [65]	30,5 [67.2]	31,5 [69.4]	31 [68.3]	32 [70.5]	

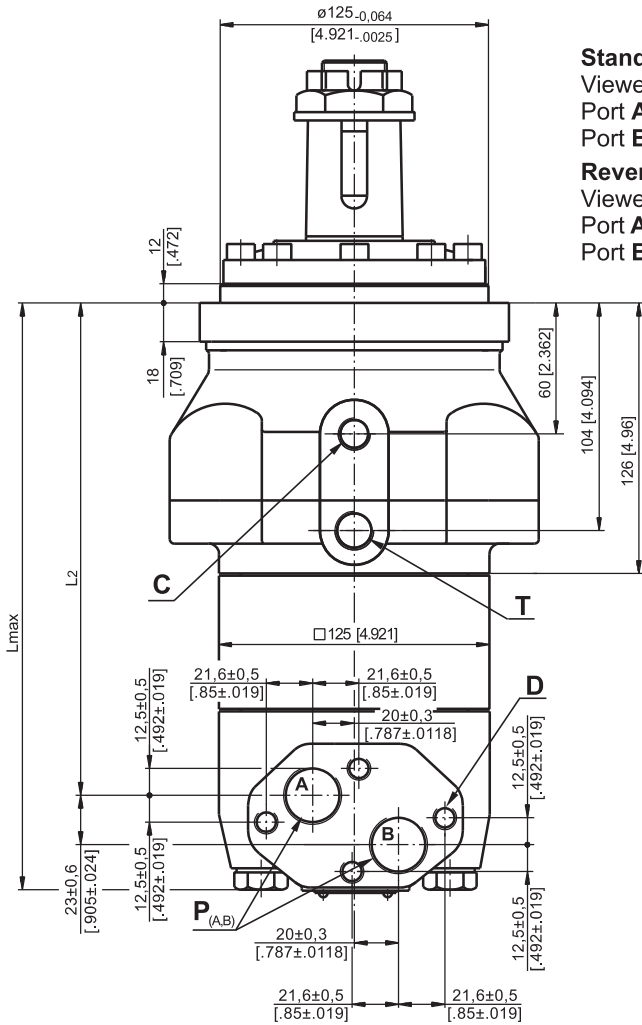
\* Intermittent operation: the permissible values may occur for max. 10% of every minute.

\*\* For speeds lower than given, consult factory or your regional manager.

\*\*\* Motor-brakes must always have a drain line. The brake release pressure is the difference between the pressure in the brake release line and the pressure in the drain line.

1. Intermittent speed and intermittent pressure must not occur simultaneously.
2. Recommended filtration is per ISO cleanliness code 20/16. A nominal filtration of 25 micron or better.
3. Recommend using a premium quality, anti-wear type mineral based hydraulic oil HLP(DIN51524) or HM (ISO 6743/4).  
If using synthetic fluids consult the factory for alternative seal materials.
4. Recommended minimum oil viscosity 13 mm<sup>2</sup>/s [70 SUS] at 50°C [122°F].
5. Recommended maximum system operating temperature is 82°C [180°F].
6. To assure optimum motor life fill with fluid prior to loading and run at moderate load and speed for 10-15 minutes.

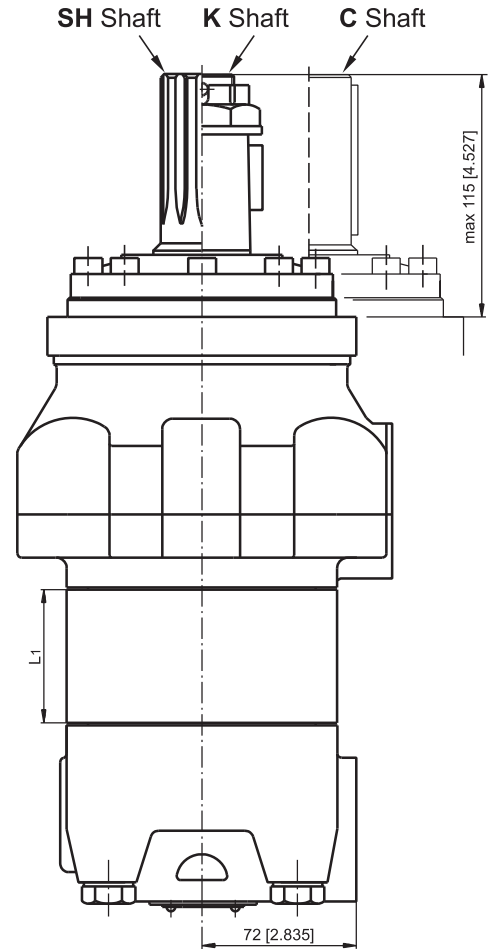
**DIMENSIONS AND MOUNTING DATA**



**Standard Rotation**  
Viewed from Shaft End  
Port A Pressurized - CW  
Port B Pressurized - CCW

**Reverse Rotation**  
Viewed from Shaft End  
Port A Pressurized - CCW  
Port B Pressurized - CW

Shaft Dim.  
See Page 30

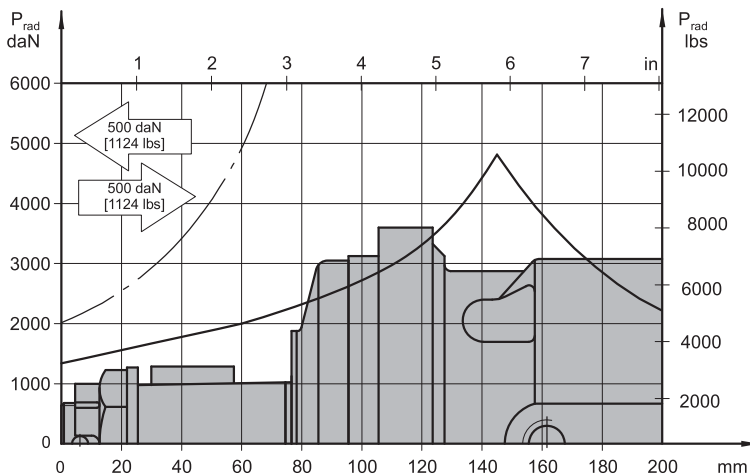


mm [in]

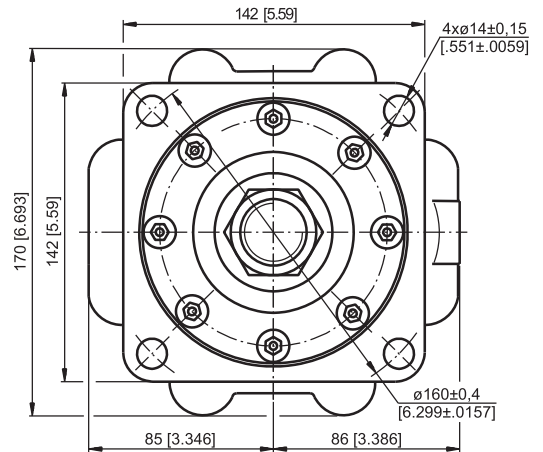
- P<sub>(A,B)</sub>** - 2xG3/4, 17 mm [.669] depth
- C** - Brake release port, G1/4, 12 mm [.472 in] depth
- T** - Drainage tap, G3/8, 13 mm [.512] depth
- D** - 4xM10, 10 mm [.394] depth

**PERMISSIBLE SHAFT LOADS**

The curve applies to a B10 bearing life of 3000 hours at 200 RPM.  
Max. permissible radial shaft load with a safety factor of 3:1.



Warning: Drain line should always be used.



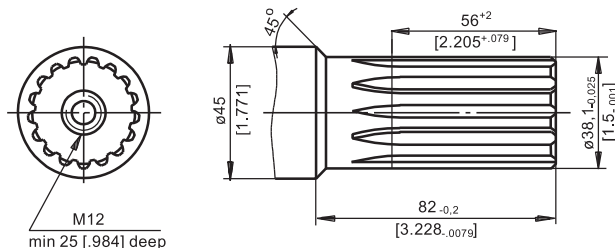
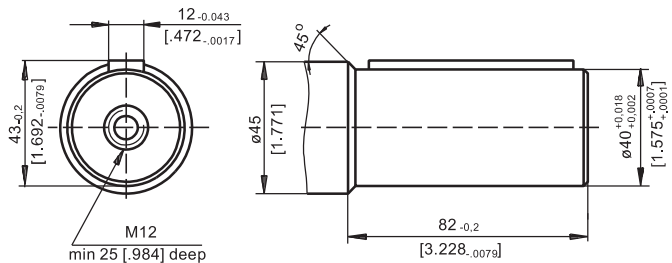
Type	*L1, mm [in]	L2, mm [in]	Lmax, mm [in]
MT/B 160	17 [.67]	178 [7.01]	228 [8.98]
MT/B 200	22 [.87]	183 [7.21]	233 [9.17]
MT/B 250	28,3 [1.11]	189,3 [7.45]	239 [9.41]
MT/B 315	37,5 [1.48]	198,5 [7.81]	248 [9.76]
MT/B 400	48 [1.89]	209 [8.23]	259 [10.2]
MT/B 500	62 [2.44]	223 [8.78]	273 [10.8]
MT/B 630	58 [2.28]	219 [8.62]	269 [10.6]
MT/B 725	67 [2.64]	228 [8.98]	278 [10.9]

\* The width of the gerotor is  
3,5 mm [.138 in] greater than L<sub>1</sub>.

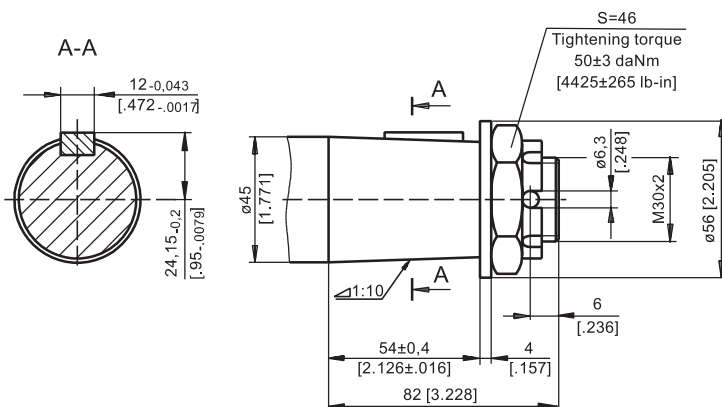
**SHAFT EXTENSIONS**

**C** - $\varnothing$ 40 straight, Parallel key A12x8x70 DIN 6885  
Max. Torque 123 daNm [10886 lb-in]

**SH** - $\varnothing$ 1½" splined 17T, DP 12/24 ANSI B92.1-1976  
Max. Torque 123 daNm [10886 lb-in]



**K** -tapered 1:10, Parallel key B12x8x28 DIN 6885  
Max. Torque 210 daNm [18587 lb-in]



**ORDER CODE**

	1	2	3	4	5
<b>MT/B</b>					

**Pos.1 - Displacement code**

<b>160</b>	- 161,1 cm <sup>3</sup> /rev [ 9.83 in <sup>3</sup> /rev]
<b>200</b>	- 201,4 cm <sup>3</sup> /rev [12.29 in <sup>3</sup> /rev]
<b>250</b>	- 251,8 cm <sup>3</sup> /rev [15.36 in <sup>3</sup> /rev]
<b>315</b>	- 326,3 cm <sup>3</sup> /rev [19.90 in <sup>3</sup> /rev]
<b>400</b>	- 410,9 cm <sup>3</sup> /rev [25.06 in <sup>3</sup> /rev]
<b>500</b>	- 523,6 cm <sup>3</sup> /rev [31.95 in <sup>3</sup> /rev]
<b>630</b>	- 631,2 cm <sup>3</sup> /rev [38.50 in <sup>3</sup> /rev]
<b>725</b>	- 724,3 cm <sup>3</sup> /rev [44.20 in <sup>3</sup> /rev]

**Pos.2 - Shaft Extensions\*\***

<b>C</b>	- $\varnothing$ 40 straight, Parallel key A12x8x70 DIN6885
<b>SH</b>	- $\varnothing$ 1½" splined 17 DP12/24 ANS B922.1-76
<b>K</b>	- $\varnothing$ 45 tapered 1:10, Parallel key B12x8x28 DIN 6885

**Pos.3 - Check Valves**

omit	- with check valves
<b>1</b>	- without check valves

**Pos.4 - Special Features (see page 68)**

**Pos.5 - Design Series**

omit - Factory specified

**NOTES:**

\* The permissible output torque for shafts must not be exceeded!

The motor-brakes are manganophosphatized as standard.

# MOTOR-BRAKE SPECIAL FEATURES

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Special Feature Description	Order Code	Motor type					
		B/MR	MT/B	MT/BX	MTM/B	SW	TW
Low Leakage	LL	○	-	○	○	-	-
Low Speed Valving	LSV	○	-	○	○	-	-
Free Running	FR	-	-	-	○		-
Reverse Rotation	R	○	○	○	○	-	-
Paint*	P	○	○	○	○	○	○
Corrosion Protected Paint*	PC	○	○	○	○	○	○
Special Paint**	PS	○	○	○	○	○	○
	PCS						
Check Valves		S	S	S	-	S	S

<b>O</b>	Optional
<b>-</b>	Not applicable
<b>S</b>	Standard

\* Colour at customer's request.

\*\* Non painted feeding surfaces, colour at customer's request.

# APPLICATION CALCULATION

## VEHICLE DRIVE CALCULATIONS

### 1. Motor speed: n, RPM

$$n = \frac{2,65 \times v_{km} \times i}{R_m} \quad n = \frac{168 \times v_{mi} \times i}{R_{in}}$$

$v_{km}$ - vehicle speed, km/h;

$v_{mi}$ - vehicle speed, mil/h;

$R_m$ - wheel rolling radius, m;

$R_{in}$ - wheel rolling radius, in;

$i$ - gear ratio between motor and wheels.

If no gearbox, use  $i=1$ .

### 2. Rolling resistance: RR, daN [lbs]

The resistance force resulted in wheels contact with different surfaces:

$$RR = G \times p$$

$G$ - total weight loaded on vehicle, daN [lbs];

$p$ - rolling resistance coefficient (Table 1).

Table 1

Rolling resistance coefficient In case of rubber tire rolling on different surfaces	
Surface	$p$
Concrete- faultless	0.010
Concrete- good	0.015
Concrete- bad	0.020
Asphalt- faultless	0.012
Asphalt- good	0.017
Asphalt- bad	0.022
Macadam- faultless	0.015
Macadam- good	0.022
Macadam- bad	0.037
Snow- 5 cm	0.025
Snow- 10 cm	0.037
Polluted covering- smooth	0.025
Polluted covering- sandy	0.040
Mud	0.037÷0.150
Sand- Gravel	0.060÷0.150
Sand- loose	0.160÷0.300

### 3. Grade resistance: GR, daN [lbs]

$$GR = G \times (\sin \alpha + p \times \cos \alpha)$$

$\alpha$ - gradient negotiation angle (Table 2)

Table 2

Grade %	$\alpha$ Degrees	Grade %	$\alpha$ Degrees
1%	0° 35'	12%	6° 5'
2%	1° 9'	15%	8° 31'
5%	2° 51'	20%	11° 19'
6%	3° 26'	25%	14° 3'
8%	4° 35'	32%	18°
10%	5° 43'	60%	31°

### 4. Acceleration force: FA, daN [lbs]

Force  $FA$  necessary for acceleration from 0 to maximum speed  $v$  and time  $t$  can be calculated with a formula:

$$FA = \frac{v_{km} \times G}{3,6 \times t}, [daN] \quad FA = \frac{v_{mi} \times G}{22 \times t}, [lbs];$$

$FA$ - acceleration force, daN [lbs];

$t$ - time, [s].

### 5. Tractive effort: DP, daN [lbs]

Tractive effort  $DP$  is the additional force of trailer. This value will be established as follows:

-acc.to constructor's assessment;

-as calculating forces in items 2, 3 and 4 of trailer; the calculated sum corresponds to the tractive effort requested.

### 6. Total tractive effort: TE, daN [lbs]

Total tractive effort  $TE$  is total effort necessary for vehicle motion; that the sum of forces calculated in items from 2 to 5 and increased with 10 % because of air resistance.

$$TE = 1,1 \times (RR + GR + FA + DP)$$

$RR$  - force acquired to overcome the rolling resistance;

$GR$ - force acquired to slope upwards;

$FA$ - force acquired to accelerate (acceleration force);

$DP$ - additional tractive effort (trailer).

### 7. Motor Torque moment: M, daNm [lb-in]

Necessary torque moment for every hydraulic motor:

$$M = \frac{TE \times R_m [R_{in}]}{N \times i \times \eta_m}$$

$N$ - motor numbers;

$\eta_m$ - mechanical gear efficiency (if it is available).

### 8. Cohesion between tire and road covering: M<sub>w</sub>, daNm [lb-in]

$$M_w = \frac{G_w \times f \times R_m [R_{in}]}{i \times \eta_m}$$

To avoid wheel slipping, the following condition should be observed  $M_w > M$

$f$  - frictional factor;

$G_w$ - total weight over the wheels, daN [lbs].

Table 3

Surface	Frictional factor f
Steel on steel	0.15 ÷ 0.20
Rubber tire on polluted surface	0.5 ÷ 0.7
Rubber tire on asphalt	0.8 ÷ 1.0
Rubber tire on concrete	0.8 ÷ 1.0
Rubber tire on grass	0.4