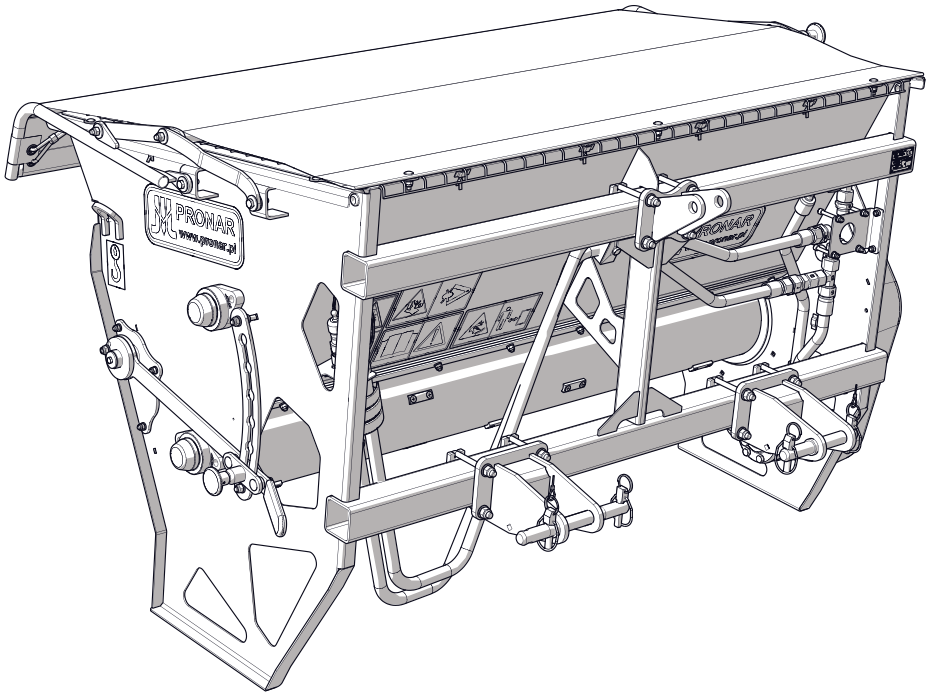
PRONAR Sp. z o.o.
17-210 NAREW, UL. MICKIEWICZA 101A, PODLASKIE PROVINCE
PHONE: +48 085 681 63 29 +48 085 681 64 29
+48 085 681 63 81 +48 085 681 63 82
FAX: +48 085 681 63 83 +48 085 682 71 10
www.pronar.pl

OPERATOR MANUAL

SALT AND SAND SPREADER

PRONAR PW120

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



SAFE FOR FUTURE USE

EDITION: 1A-11-2018 PUBLICATION NO.: 579.00.UM

EN

INTRODUCTION

INTRODUCTION

Information in this document is current at date of publication. As a result of improvements, some numerical values and illustrations in this publication may not correspond to the actual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate and improve the quality of machine operation, without making minor amendments to this Operator Manual.

This Operator Manual is an integral part of the machine documentation. Before using the machine, the user must carefully read this Operator Manual and observe all recommendations. This guarantees safe operation and ensures failure-free work of the machine. The machine is designed to meet obligatory standards, documents and legal regulations currently in force.

If the information in this Operator Manual needs clarification, refer for assistance to the sale point where the machine was purchased or to the Manufacturer.

It is recommended that the serial numbers of the machine and major subassemblies are inscribed in the spaces below after purchase of the machine.

Machine serial number

KEEP THIS MANUAL FOR FUTURE REFERENCE.

U.01.1.EN

SYMBOLS APPEARING IN THIS OPERATOR MANUAL

DANGER

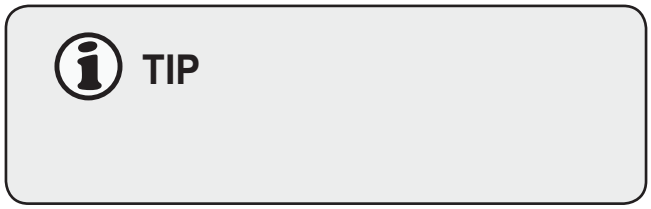
Information, descriptions of danger and precautions as well as recommendations and prohibitions associated with the safety of use are marked in the text with the sign **DANGER**. Failure to observe the instructions may endanger the machine operator's or other person's health or life.

ATTENTION

Vital information and instructions that must be observed are highlighted by a border and accompanied by the text: **IMPORTANT** Failure to observe the instructions may lead to damage to the machine as a result of improper operation, adjustment or use.

TIP

Additional tips included in the Operator Manual describe useful advice for the machine operation and are marked with the sign **TIP**.



In order to focus the user's attention on the need to perform maintenance, the relevant section of the Operator Manual is marked with the clock pictogram.

U.02.1.EN

DIRECTIONS USED IN THIS OPERATOR MANUAL

Left side – side to the left hand of the operator facing in the direction of machine's forward travel.

Right side – side to the right hand of the operator facing in the direction of machine's forward travel.

Rotation to the right – clockwise rotation of a mechanism (the operator is facing the mechanism).

Rotation to the left – counterclockwise rotation of a mechanism (the operator is facing the mechanism).

U.03.1.EN

PRONAR Sp. z o.o.
ul. Mickiewicza 101 A
17-210 Narew, Polska
tel./fax (+48 85) 681 63 29, 681 63 81, 681 63 82,
681 63 84, 681 64 29
fax (+48 85) 681 63 83
http://www.pronar.pl
e-mail: pronar@pronar.pl

EC DECLARATION OF CONFORMITY OF THE MACHINERY

PRONAR Sp. z o.o. declares with full responsibility, that the machine:

Description and identification of the machinery	
Generic denomination and function:	**Spreader**
Type:	**PW120**
Model:	–
Serial number:	
Commercial name:	**Spreader PRONAR PW120**

to which this declaration relates, fulfills all the relevant provisions of the Directive **2006/42/EC** of The European Parliament and of The Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (Official Journal of the EU, L 157/24 of 09.06.2006).

The person authorized to compile the technical file is the Head of Research and Development Department at PRONAR Sp. z o.o., 17-210 Narew, ul. Mickiewicza 101A, Poland.

This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

Z-CA DYREKTORA
d/s [illegible]
[illegible]
Roman [illegible]

Narew, the 2019-06-10

Place and date

Full name of the empowered person position, signature

TABLE OF CONTENTS

MAINTENANCE

SAND SPREADER PERFORMANCE

BASIC INFORMATION

SECTION 1

1.1 IDENTIFICATION

PRONAR PW120 sand spreader is marked with a data plate placed on the edge of the frame's upper beam - Figure *(1.1)*. When purchasing the machine, make sure that the serial numbers on the machine are the same as entered in the *Warranty Book*, in sales documents and in the *Operator Manual*.

The meaning of individual items of the nameplate – figure (1.1) are presented in the table below:

A - machine name,

B - machine type/symbol,

C – serial number,

D – year of manufacture,

E – gross weight [kg],

F – Quality Control stamp,

G – machine name, name extension.

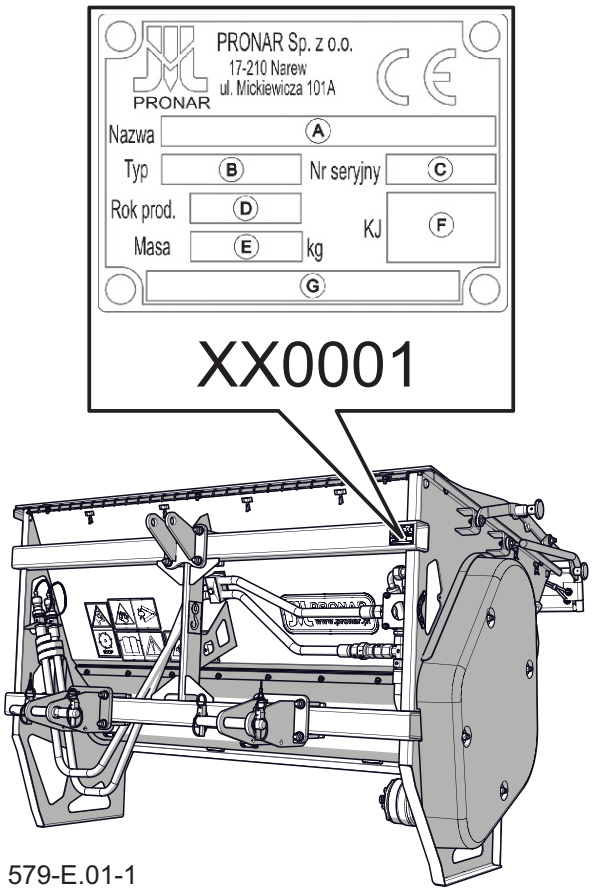


Figure 1.1 Location of the nameplate.

E.2.4.579.01.1.EN

1.2 INTENDED USE

PRONAR PW120 sand spreader is used for surface spreading of sand, salt and mixtures of sand and salt for winter maintenance of roads, squares and pavements. Sand spreaders may be mounted on carrier vehicles that meet the requirements set out in Table 1.1 Using it as intended also involves all actions connected with the safe and proper operation and maintenance of the machine.

Due to the above, the user is obliged to:

- carefully read the Operator Manual and comply with its recommendations,
- understand the machine's operating principle and how to operate it safely and correctly,
- comply with general safety regulations while working,
- prevent accidents,
- comply with road traffic regulations.

The machine may only be used by persons, who:

- are familiar with this publication and with the carrier vehicle's Operator Manual,
- have been trained in machine operation and safe working conditions,
- have the required authorisation to drive the vehicle and are familiar with the road traffic regulations and transport regulations.

NOTE

The machine must not be used for purposes other than those for which it is intended, in particular for:
· spreading fertilisers or liquids
· transporting people, animals or any items on the machine
· reloading work

The machine is designed for spreading the materials specified below in order to prevent and eliminate road slipperiness:

1. Salt:
   - content of substances insoluble in water - up to 8%,
   - water content - up to 3%,
   - content of anti-lumping agents - minimum 20 mg/kg,
   - granulation up to 8mm,
   - granulation: from 6 to 8mm- max.5%,
   - granulation: BELOW 1mm- max.40%
2. Coarse materials (aggregate):
   - natural aggregate (sand, gravel) or grit,

NOTE

If you spread materials other than those intended for this machine, you may risk:
problems in the spreading process, such as caking, clogging or spilling of the material
· damage to machine component,

- granulation from 1 to 6.3mm,
- granulation from 4 to 6.3mm,
- granulation below 0.075mm - max.3%,

3. Homogeneous mixtures of aggregates with salt with a composition by weight of 95 to 97% of aggregate and 5 to 3% of salt.

Aggregate used for roughening the surface should not be brittle, contain clay and clay impurities. The aggregate grain shape should be regular, not flattened.

Coarse materials should be delivered and stored dry.

Table 1.1. Requirements for carrier vehicle (agricultural tractor).

Contents	Unit	Requirements
Carrier vehicle's (tractor's) three-point linkage		Rear three-point linkage of Category I according to ISO 730 standard
Rear power take-off shaft (PTO) Type Max engine RPM Number of splines on PTO shaft Rotation direction	 - rpm pc. -	 Type 1 (1 3/8") acc. to ISO 500 540 z6 (ø35) the sand spreader can be adapted to the clockwise and anticlockwise PTO rotation direction
Carrier's load capacity:	kg	600 (for sand spreader with wall extension 800)
Hydraulic system pressure rating [1]	MPa (bar)	16 (160)
Nominal output of hydraulic system[1]	l/min	18
Maximum output of hydraulic system [1]:	l/min	70
Type of oil[1]		hydraulic, HL32
Hydraulic sockets[1]:		sockets 12.5 ISO 7241-1 Type A of one hydraulic section (for continuous operation)
Electric sockets		7-pin socket, 12V (power supply for rear lamp assembly)
Alternator[2]	12V 24V	12V, min 50A, 24V, min 30A,

[1)] *applies to the sand spreader with hydraulic drive system;*

[2)] *applies to the sand spreader with electric drive system;*

E.2.4.579.02.1.EN

1.3 EQUIPMENT

Table 1.2. PW120 sand spreader equipment

	PW120 sand spreader version			
	drive hydraulic	**drive electrical 12V**	**drive electrical 24V**	**PTO drive**
Standard equipment				
Operator Manual	x	x	x	x
Warranty Book	x	x	x	x
Tarpaulin cover with a frame	x	x	x	x
Drive shaft	-	-	-	x
Optional equipment				
Side extension	x	x	x	x
Lighting system, rear	x	x	x	x
Adapter on special order	x	x	x	x
Mixer	x	-	x	x
Side extension	x	x	x	x
PTO rotation - counterclockwise (left)	-	-	-	x

E.2.4.579.03.1.EN

1.4 TERMS & CONDITIONS OF WARRANTY

PRONAR Sp. z o.o. Narew guarantees the reliable operation of the machine when it is used according to its intended purpose as described in the *Operator Manual*. Defects discovered during the warranty period will be removed by the Warranty Service. The repair period is specified in the *Warranty Book*.

The warranty does not cover those parts and sub-assemblies of the machine which are subject to wear in normal usage conditions, regardless of the warranty period. Consumables include the following parts/ sub-assemblies:

- tarpaulin cover,
- chain,
- rubber and plastic strips (p. 5.1),

The warranty service only applies to such cases as: mechanical damage which is not the user's fault, factory defects of parts, etc.

In the event of damage arising from:

- mechanical damage which is the user's fault, damage caused by road accidents,
- incorrect use, adjustment or maintenance, use of the machine for purposes other than those for which it is intended,
- use of damaged machine,
- repairs carried out by unauthorised persons, repairs carried out improperly,
- making unauthorised alterations to machine design,

the user will lose the right to warranty service.

The user is obliged to immediately report all noticed damage, regardless of whether the damage is covered by the warranty or not. For detailed Terms & Conditions of Warranty, please refer to the *Warranty Book* attached to each newly purchased machine.

TIP

Demand that the seller carefully and accurately fills out the *Warranty Book* and warranty repair coupons. A missing date of purchase or sale point stamp may make the user ineligible for any warranty repair or refund.

Do NOT attempt to modify the machine without the written consent of the Manufacturer. In particular, do NOT weld, drill holes in, cut or heat the main structural elements of the machine, which have a direct impact on the machine operation safety.

1.5 TRANSPORT

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and any extra accessories.

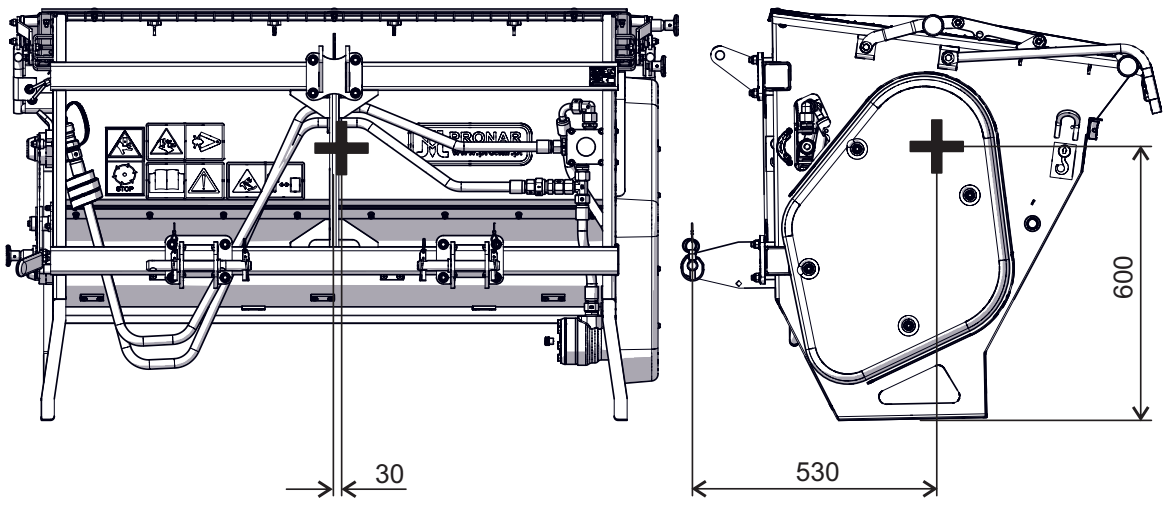
Delivery is either by transport on a vehicle or independently. Transport of the machine is permissible connected to a carrier vehicle provided the vehicle's driver familiarises himself with the machine's Operator Manual and particularly with information concerning safety and principles of hitching and transport on public roads.

When loading and unloading the machine, follow the general health and safety regulations for reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines. The machine should be attached to lifting equipment in places specially designed for this purpose (Figure 1.3), i.e. by the lugs on the tank and the top link of the three-point linkage.

The PW120 sand spreader should be firmly secured on the transport vehicle platform with belts or chains equipped with a tensioning mechanism. The fastening

NOTE

When transporting the machine independently, the user must carefully read this Operator Manual and observe all its instructions. When being transported on a motor vehicle the sand spreader must be secured on the vehicle's platform in accordance with the transport safety requirements. The driver of the vehicle should use extreme caution while driving. This is due to the vehicle's centre of gravity shifting upwards when the machine is loaded.



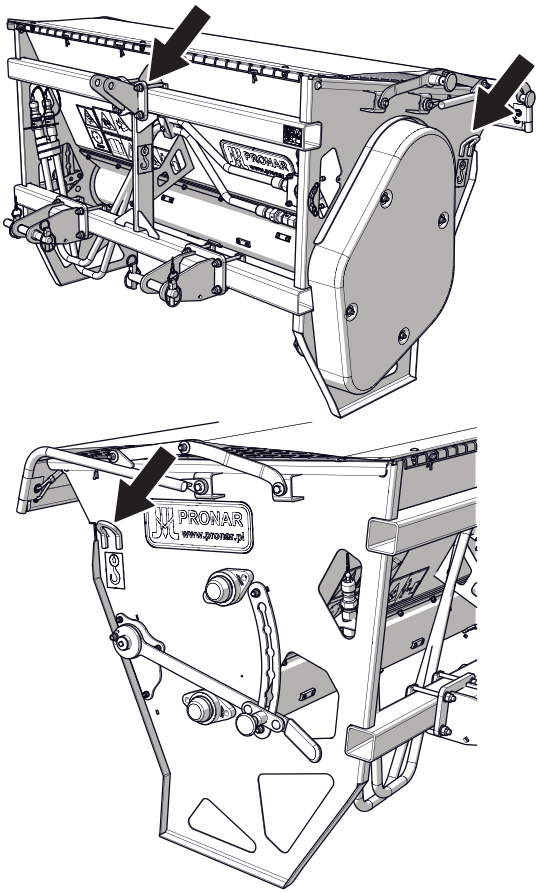
579-E.05-1

Figure 1.2 Sand spreader's centre of gravity

ATTENTION

Do not attach slings and any kind of cargo fasteners to elements other than those intended for this purpose (do NOT attach to hydraulic system and electrical system components).
Persons must NOT be present in the manoeuvring zone during transferring the machine to another means of transport.

equipment used must have a valid safety certificate. Exercise due caution when lifting the machine. During reloading work, special care should be taken not to damage the paint coating.



579-E.06-1

Figure 1.3 Location of transport lugs

E.2.4.579.05.1.EN

1.6 ENVIRONMENTAL RISK

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability. While carrying out maintenance and repair work, which involves the risk of an oil leak, this work should take place on an oil resistant floor or surface. In the event of oil leaking into the environment, first of all contain the source of the leak, and then collect the leaked oil using available means. Remaining oil should be collected using sorbents, or by mixing the oil with sand, sawdust or other absorbent materials. The oil contaminations, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container, and then passed on to the appropriate oil waste recycling centre. The container should be kept away from heat sources, flammable materials and food.
Oil which has been used up or is unsuitable for further use owing to loss of its properties should be stored in its original packaging in the conditions described above.

E.2.4.000.06.1.EN

1.7 WITHDRAWAL FROM USE

Should you decide to withdraw the machine from use, comply with the regulations in force in the given country regarding withdrawal from use and recycling of machines withdrawn from use.

Before proceeding to dismantle equipment, oil shall be completely removed from hydraulic system and transmission. Locations of drain plugs and method for draining oil are described in Section 5.

When spare parts are changed, worn out or damaged parts should be taken to a collection point for recyclable raw materials. Used oil and also rubber and plastic elements should be taken to the appropriate facilities dealing with the recycling of this type of waste.

DANGER

During dismantling, use the appropriate tools, equipment (overhead crane, crane or hoist etc.) and use personal protection equipment, i.e. protective clothing, footwear, gloves and eye protection etc.

E.2.4.000.07.1.EN

SECTION 2

SAFETY ADVICE

2.1 SAFE USE

- Before use, the user must carefully read this Operator Manual and the *Warranty Book*. When operating the machine, follow all instructions in these documents.
- The machine may only be used by persons qualified to drive carrier vehicles (tractors) and trained in machine operation. Machine can be operated by a single person only.
- If the information in this Operator Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and improper use and operation of the machine, and failure to comply with the instructions of this Operator Manual is dangerous to your health as well as health of bystanders.
- Be aware of the residual risk. Use caution when operating this machine and follow all relevant safety instructions.
- The machine must never be used by persons, who are not authorised to drive carrier vehicles (agricultural tractors), including children and people under the influence of alcohol or other drugs.
- The machine must not be used for purposes other than those for which it is intended. Anyone who uses the machine for purposes other than those for which it is intended takes full responsibility for any consequences of this potentially incorrect use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- The machine may only be used when all the protective features (i.e. safety guards, bolts, cotter pins, warning decals) are technically sound and correctly positioned. In the event of loss or damage to the protective features, they must be replaced with new ones.

F.2.4.579.01.1.EN

2.2 SAFETY WHEN HITCHING THE MACHINE

- Do NOT hitch the machine to the carrier vehicle if different types of hydraulic oil are used in both machines, or if the three point linkage system of the machine is not compatible with the category of the carrier vehicle's linkage system.
- After completion of hitching the machine, check the safeguards. Carefully read the carrier vehicle Operator Manual.
- Use only genuine pins and safeguards to hitch the machine to the carrier vehicle.
- The carrier vehicle (agricultural tractor) to which the machine will be coupled must be technically reliable and must meet all manufacturer's requirements.
- Be especially careful when hitching the machine to tractor.
- When hitching, there must be nobody between the machine and the carrier vehicle.
- Be especially careful when unhitching the machine from the carrier vehicle.
- Hitching and unhitching may only take place when the machine and tractor (carrier vehicle) are turned off.
- Machine unhitched from the carrier vehicle must be placed on level, sufficiently hard surface in such a manner as to ensure that it is possible to connect it again.

F.2.4.579.02.1.EN

2.3 SAFETY RULES WHEN MAINTAINING HYDRAULIC SYSTEM

- The hydraulic system is under high pressure when operating.
- Regularly check the technical condition of the hydraulic lines and connections. There must be no oil leaks.
- In the event of the hydraulic system malfunction, discontinue using the machine until the malfunction is corrected.
- When connecting hydraulic lines to carrier vehicle, make sure that the hydraulic system is not under pressure. If necessary, reduce residual pressure in the system.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may find its way under the skin and cause infections. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. In the event of contact of oil with skin wash the area of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene).
- Use the hydraulic oil recommended by the Manufacturer. Never mix two types of oil.
- After changing the hydraulic oil, the used oil should be properly disposed of. Used oil or deteriorated oil should be stored in original containers or replacement containers resistant to hydrocarbons. Replacement containers must be clearly marked and appropriately stored.
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Rubber hydraulic lines must be replaced every 4 years regardless of their technical condition.
- Repair and replacement of hydraulic system elements should be entrusted to the appropriately qualified persons.

F.2.4.579.03.1.EN

2.4 SAFETY DURING TRANSPORT TRAVEL

- When driving on public roads, observe all road traffic regulations in force in the country, in which the machine is used.
- Make sure that the hitched sand spreader does not cover the rear lights of the carrier vehicle. If the lights are covered, use the optionally available rear lights mounted on the sand spreader.
- Do not exceed the maximum speed resulting from road conditions and design restrictions (maximum of 20 km/h). Adjust speed to the prevailing road conditions and other limitations arising from road traffic regulations.
- Do NOT leave the machine raised and unsecured while the carrier vehicle is parked. When parked, the machine should be lowered.
- Do NOT ride on the machine or transport any materials on it.
- Before using the machine always check its technical condition, especially in terms of safety. In particular, check the technical condition of the hitch system and elements connecting the hydraulic system.
- During transport, the carrier vehicle's three-point linkage should be locked in the up position to prevent its accidental lowering.
- Reckless driving and excessive speed may cause accidents.

F.2.4.579.04.1.EN

2.5 MAINTENANCE

- During the warranty period, any repairs may only be carried out by warranty service authorised by the Manufacturer. It is recommended that necessary repairs to machine should be undertaken by specialised workshops.
- In the event of any fault or damage, do not use the machine until the fault has been corrected.
- During work, use appropriate, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic systems it is recommended to use oil resistant gloves and protective goggles.
- Any modification of the machine releases the manufacturer (PRONAR Narew) from any responsibility for damage or detriment to health which may arise as a result.
- Before commencing any work on the machine, turn off the carrier vehicle (agricultural tractor) engine and wait until all rotating parts have come to a stop.
- Regularly check the technical condition of the safety devices and correct tightening of bolt connections.
- Regularly perform service inspections of machine as recommended by the Manufacturer.
- Do NOT perform maintenance or repair work under raised and unsupported machine.
- Before beginning repairs on hydraulic systems, reduce oil pressure.
- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.
- Repair, maintenance and cleaning work should be carried out with the carrier vehicle (agricultural tractor) engine turned off and the ignition key removed. Immobilise the carrier vehicle (agricultural tractor) with parking brake. Ensure that unauthorised persons do not have access to the carrier vehicle (agricultural tractor) cab.
- Should it be necessary to change individual parts, use only original parts. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and

invalidate the warranty.

- Regularly check technical condition and mounting of all guards and protective elements.
- In the event of work requiring the machine to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the machine, stable and durable supports must also be used. Do NOT carry out work under a machine, which has been raised only with the three point linkage.
- The machine must not be supported using fragile elements (bricks or concrete blocks).
- After completing work associated with lubrication, remove excess oil or grease.
- In order to reduce the danger of fire the machine must be kept in a clean condition.

MACHINE CLEANING

The machine should be cleaned as needed.

Before using the pressure washer the user is obliged to acquaint himself with the operating principles and recommendations concerning safe use of this equipment.

- Before washing, remove manually and as accurately as possible any remaining spread material.
- Use only clean running water. Cleaning detergents with neutral pH may be used, which do not react aggressively with the machine's structural elements.
- The use of pressure washers increases the effectiveness of washing, but be careful when using them. During washing, the washer nozzle may not be placed closer than 50 cm from the cleaned surface.
- Water temperature should not exceed 55˚C.
- Do not aim the water jet directly at system components and equipment, i.e. control valves, bearings, electric and hydraulic plugs, lights, electrical connectors, information and warning decals, nameplate, cable connectors, lubrication points, control panels, safety switches etc. High pressure water jet may penetrate the machine, resulting in mechanical damage or corrosion.
- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. In the event of doubt it is recommended to make a test on an unseen surface area.
- Surfaces smeared with oil or grease

should be cleaned by application of white spirit or other degreasing agents and then washed with clean water with added detergent. Follow the cleaning agent manufacturer instructions.

- Detergents should be kept in original containers, optionally in replacement containers, but very clearly marked. Preparations may not be stored in food and drink containers or in unmarked containers.
- Observe the environmental protection rules, wash the machine in places designed for this purpose.
- Washing and drying the machine must take place at temperature above 0°C.
- Each time after washing lubricate the machine.

DANGER

Carefully read the instructions for application of detergents and maintenance preparations.
While washing with detergents, wear appropriate protective clothing and goggles protecting against splashing.

F.2.4.579.05.1.EN

2.6 SAFETY DURING MACHINE OPERATION

- Before lifting or lowering the machine mounted on the carrier vehicle, make sure that there are no bystanders near the machine.
- Do not use lumpy or frozen materials or materials non-compliant with point 1.2.
- Before starting the carrier vehicle with hitched machine, make sure the PTO drive (machine with PTO drive) or the external hydraulic system circuit (machine with hydraulic drive) is not engaged and control panel is not switched on. Otherwise, the machine may be started in an uncontrolled manner.
- Before starting the machine make sure that there are no bystanders (especially children) or animals in the danger zone. The machine operator is obliged to ensure proper visibility of the machine and the working area.
- During machine operation do not occupy a different position than that of the operator in the tractor cab. Do NOT leave the cab, when the machine is in operation.
- Do NOT stand within the material spreading zone or between the machine and the carrier vehicle.
- Do NOT approach the spreading roller until the rotating parts come to a complete stop.
- Carrier vehicle should be equipped with warning lights.

F.2.4.579.06.1.EN

2.7 SAFE OPERATION OF THE PTO SHAFT

- Reversing with live (drive-dependent) PTO is forbidden.
- The machine may only be connected to the carrier vehicle (tractor) by means of an appropriately selected PTO shaft recommended by the Manufacturer.
- Adjust the length of PTO shaft to compatible carrier vehicle (tractor) according to the Operator Manual of PTO shaft.
- The PTO shaft has markings on the casing, indicating which end of the shaft shall be connected to the carrier vehicle (tractor).
- Never use a damaged PTO shaft, it may cause an accident. A damaged shaft must be repaired or replaced.
- Disconnect the shaft drive each time when it is not necessary to drive the machine, or when the carrier vehicle (tractor) and the machine are positioned at an unsuitable angle with regard to each other.
- The chains preventing the shaft cover from turning while the shaft is working, shall be secured to a fixed element of machine structure.
- Do NOT use the securing chains to support the shaft while machine is parked or when transporting the machine.
- Before using the machine, carefully read the PTO shaft Operator Manual and follow all instructions.
- The drive shaft must be equipped with a cover. Do NOT use the shaft with damaged or missing guards.
- After connecting the shaft, ensure that it is correctly and safely connected to the carrier vehicle (tractor) and to the machine.
- Before connecting PTO shaft, make certain that the PTO rotation direction is correct.
- Before disconnecting PTO shaft, disengage PTO drive, turn off the engine of the carrier vehicle (tractor) and remove the key from the ignition.
- Do NOT wear loose clothing, straps or whatever that may become wrapped round the rotating drive shaft. Contact with rotating PTO shaft may cause severe injuries.
- Do NOT go over and under the shaft or stand on it equally during work as also when the machine is parked.

2.8 RESIDUAL RISK

Pronar Sp. z o. o. in Narew has made every effort to eliminate the risk of accidents. There is, however, a certain residual risk, which could lead to an accident, and this is connected mainly with the actions described below:

- using the machine for purposes other than those for which it is intended,
- being between the carrier vehicle (agricultural tractor) and the machine while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- operating the sand spreader with removed or faulty safety guards,
- failure to maintain a safe distance from the danger zone or being within the zones while the machine is operating,
- machine operation by unauthorized persons or persons under the influence of alcohol
- cleaning, maintenance and technical checks when carrier vehicle (agricultural tractor) is connected and engine is running.

The residual risk may be kept to a minimum by following the recommendations below:

- operate the machine in prudent and unhurried manner,
- sensibly apply the remarks and recommendations contained in the Operator Manual,
- carry out repairs and maintenance work in line with operating safety rules,
- repair and maintenance work should be carried out by persons trained to do so,
- use close fitting protective clothing,
- ensure unauthorised persons have no access to the machine, especially children,
- maintain a safe distance from prohibited or dangerous places
- do not climb on the machine when it is operating

F.2.4.579.08.1.EN

2.9 INFORMATION AND WARNING DECALS

The machine is labelled with the information and warning decals mentioned in table 2.1. Throughout the machine use, you must ensure that any warning messages and information decals located on the machine are clear and legible. If any are destroyed or damaged, they must be replaced with new. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. During machine cleaning do not use solvents, which may damage the coating of information decals and do not subject them to strong water jets.

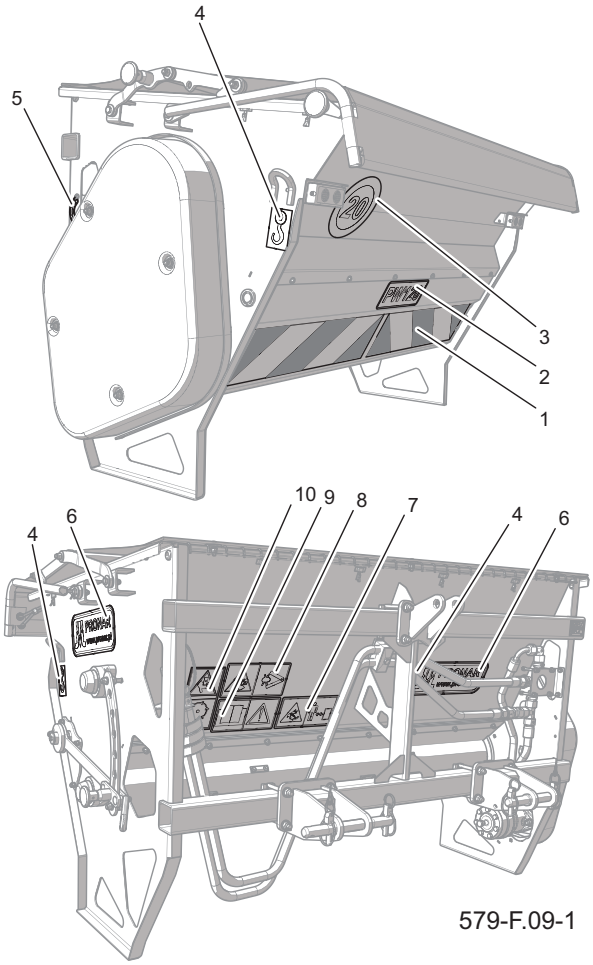
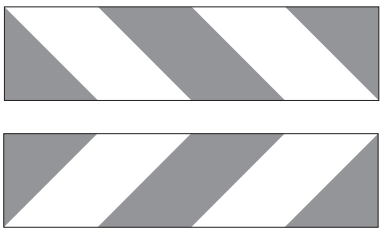
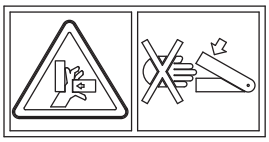
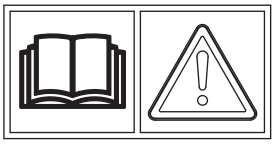


Figure 2.1 Locations of information and warning decals.

Table 2.1. Information and warning decals

Item	Decal	Meaning
1		Outline marking. **334N-97000001P, 334N-97000001L**

Item	Decal	Meaning
2		Machine type **579N-97000001**
3		Permissible speed **19N-12000004**
4		Transport belts or chains fastening points **35N-27000009**
5		Drum speed control **317N-06000004**
6		Manufacturer **142N-16000005**
7		Pressurised liquid. Keep a safe distance. **12N-15000009**
8		Do not reach into crushing space because elements may move. Danger of crushing hands or fingers **35N-27000008**

Item	Decal	Meaning
9		Before use carefully read the Operator Manual. **35N-27000007**
10		Do not touch any rotating elements until they come to a complete stop. **129N-00000003**
11		Do not exceed the maximum PTO speed **185N-00000004**

F.2.4.579.09.1.EN

SECTION 3

DESIGN AND OPERATION

3.1 TECHNICAL SPECIFICATION

Table 3.1. Standard equipment specification

Contents	Unit	PW120
Mounting method*:		three-point linkage cat. I according to ISO 730
Spreading width	m	1.2
Spreading range - tank (tank with wall extensions): - salt (with a basis weight of 30 g/m2) - sand or mix (with a basis weight of 200 g/m2)	km	 13 (20) 1.5 (2.3)
Capacity of tank (with wall extensions)	m^3	0.25 (0.385)
Max. tank carrying capacity (with wall extensions) for a bulk density of 1.5 t/ m^3	kg	375 (580)
PTO maximum speed (sand spreader version with PTO drive) *Standard PTO rotation direction - clockwise looking at the PTO shaft front*	rpm	540
PTO shaft		special - acc. to Fig. 3.1
Power consumed (max)	kW	4
Operating speed	km/h	5 – 20
Maximum transport speed	km/h	20
Electric power supply (sand spreader version with electric drive)	V	12 or 24
Length	mm	1050
Width	mm	1460
Weight of the machine without wall extensions ready to work (with wall extensions)	kg	155 (170)
Nominal pressure in the hydraulic system	MPa	16
Oil delivery min-max	l/min	18-70
Hydraulic quick coupler plug		12.5 MALE 15L ISO 7241-A
Emitted sound pressure	dB	>70.0 dB (at nominal PTO revs of 540 rpm)
Other information		single person operation
Power consumed	kW	4

*- The manufacturer allows the possibility of using other adapters to hitch the sand spreader to other carrier vehicles.

G.2.5.39.01.1.EN

3.2 DESIGN AND OPERATION

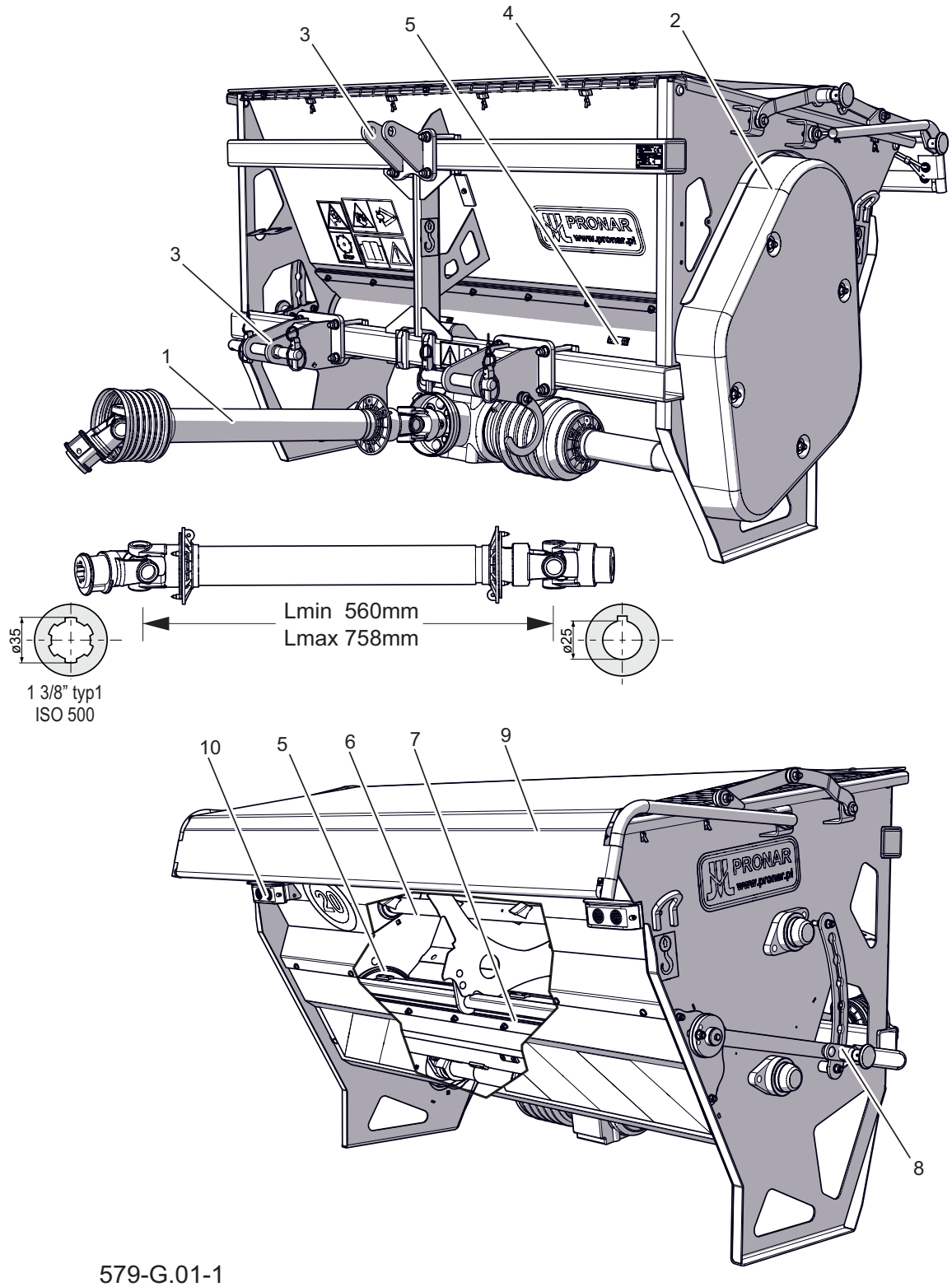


Figure 3.1 Design of the sand spreader (version with mechanical drive)

(1) mechanical drive *(2) chain transmission* *(3) three-point linkage*
(4) protective grid *(5) spreading roller* *(6) agitator*
(7) spreading roller barrier *(8) barrier lever* *(9) tarpaulin cover with a frame*
(10) rear lights

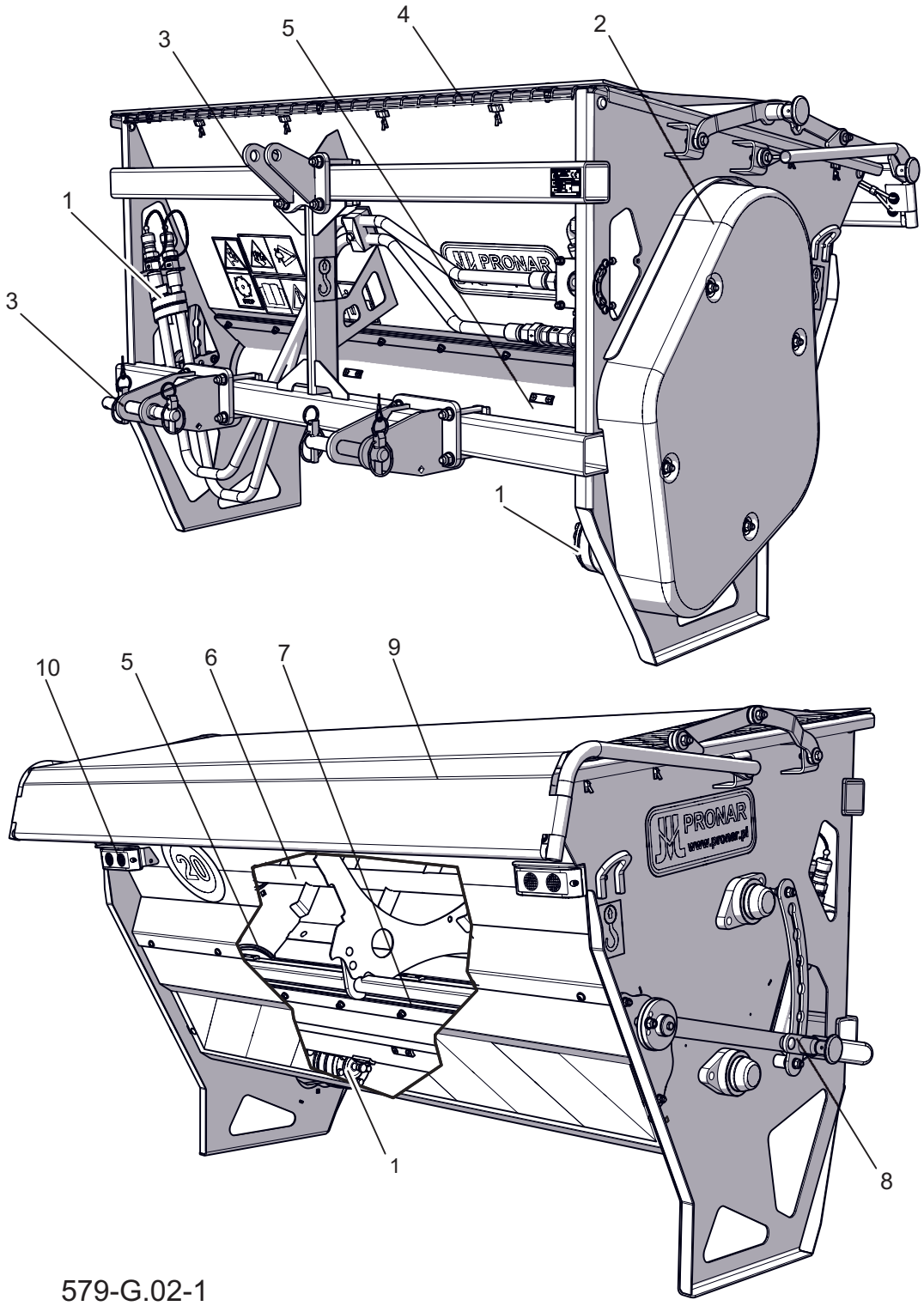


Figure 3.2 Design of the sand spreader (version with hydraulic drive)

(1) hydraulic drive *(2) chain transmission* *(3) three-point linkage*
(4) protective grid *(5) spreading roller* *(6) agitator*
(7) spreading roller barrier *(8) barrier lever* *(9) tarpaulin cover with a frame*
(10) rear lights

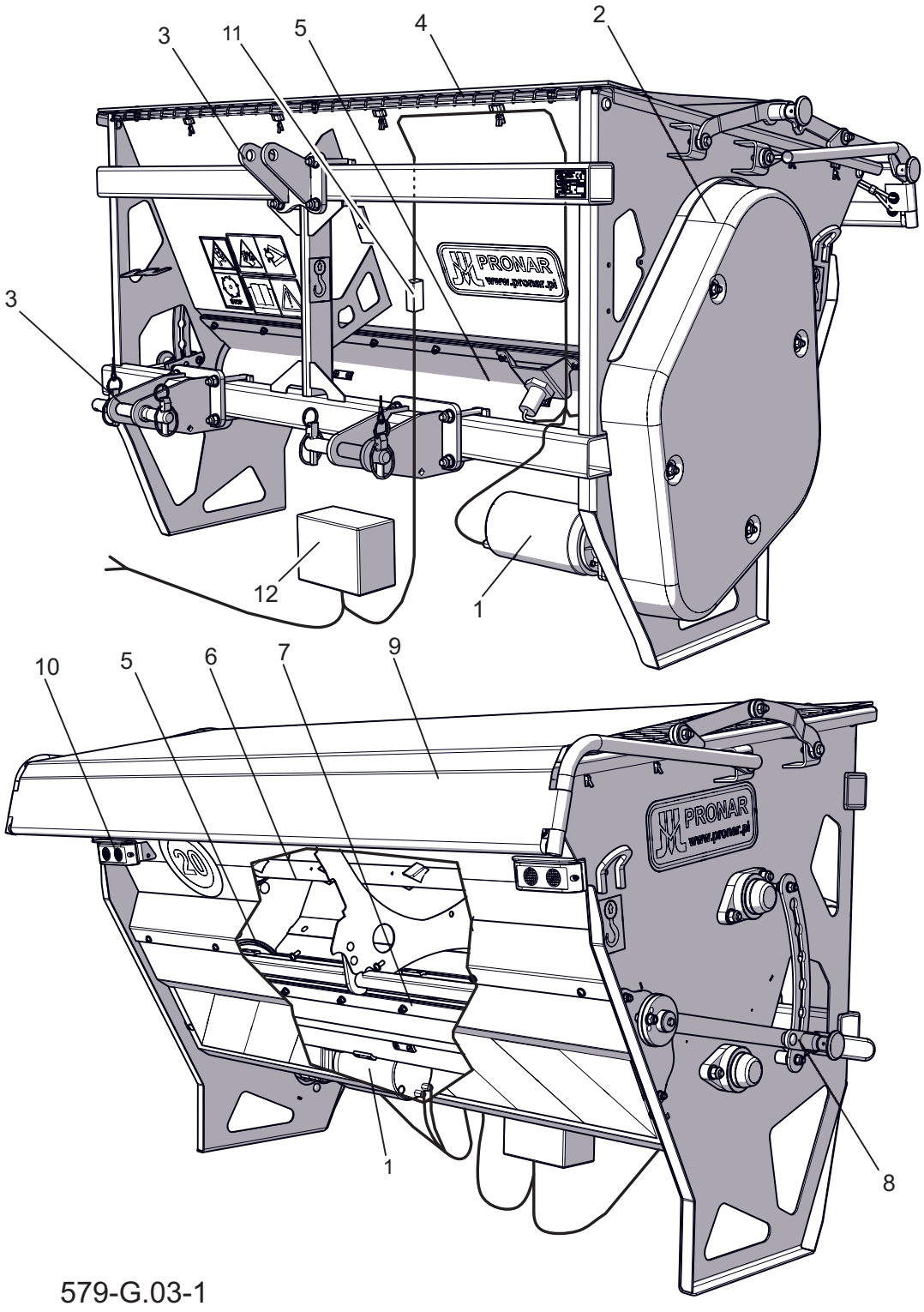


Figure 3.3 Design of the sand spreader (version with electric drive)

(1) electric drive *(2) chain transmission* *(3) three-point linkage*
(4) protective grid *(5) spreading roller* *(6) agitator*
(7) spreading roller barrier *(8) barrier lever* *(9) tarpaulin cover with a frame*
(10) rear lights *(11) connector (socket / plug)* *(12) control panel*

The PW120 sand spreader (Figure 3.1 / 3.2 / 3.3) is a mounted machine that can be hitched to a carrier vehicle (agricultural tractor) using a three-point linkage of category I. On special request, other adapters can be used to hitch the sand spreader to other carrier vehicles.

Loading of the sand spreader is done manually.

Sand spreading is carried out by means of slat scrapers to the width of the working roller (5) driven by the chain gear (2), which also drives the agitator (6). Depending on the sand spreader version (electric, hydraulic, mechanical), the chain gear can be driven by:

- electric motor (1) 12V (version without agitator) (Figure 3.3)
- electric motor 24V (Figure 3.3),
- hydraulic motor (1) (Figure 3.2)
- tractor PTO (1) (Figure 3.1).

Drive is transmitted through a PTO shaft and bevel gearing.

The obtained spreading density (the amount of spread material in [g] per 1 m^2) depends on the driving speed and the spreading roller rotation speed regulated by:

- a manual knob of the three-way throttle valve (2) (Figure 3.4) (hydraulic version of the spreader),
- using the panel (1) (Figure 3.5) - electric version of the spreader,
- the carrier vehicle engine speed (mechanical version of the spreader).

The barrier (7) with adjustable pressure force enables steplike adjustment of spreading density and quick emptying of the tank. It protects the machine against damage.

The standard equipment includes a manually foldable tarpaulin cover on the frame (9) to protect the material against precipitation, a protective grid (2), a PTO shaft for mechanical sand spreaders. The machine is optionally equipped with rear lights (10) (parking lights, stop lights, direction indicators).

3.3 HYDRAULIC SYSTEM

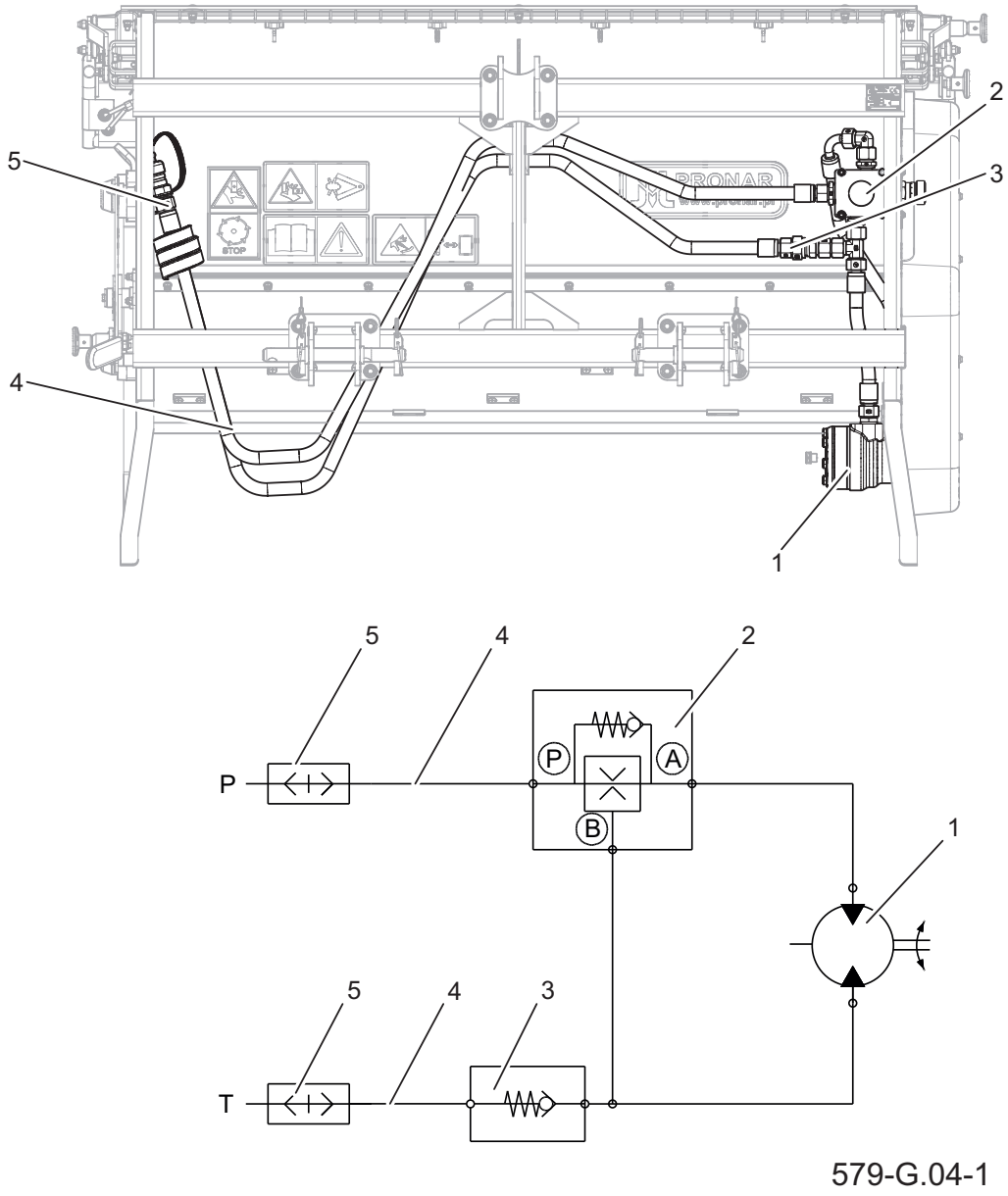


Figure 3.4 Design of the hydraulic system of the sand spreader with hydraulic drive

(1) hydraulic motor *(2) three-way flow regulator* *(3) check valve*

(4) hydraulic conduits *(5) hydraulic coupler plugs*

G.2.4.579.03.1.EN

3.4 ELECTRICAL SYSTEM

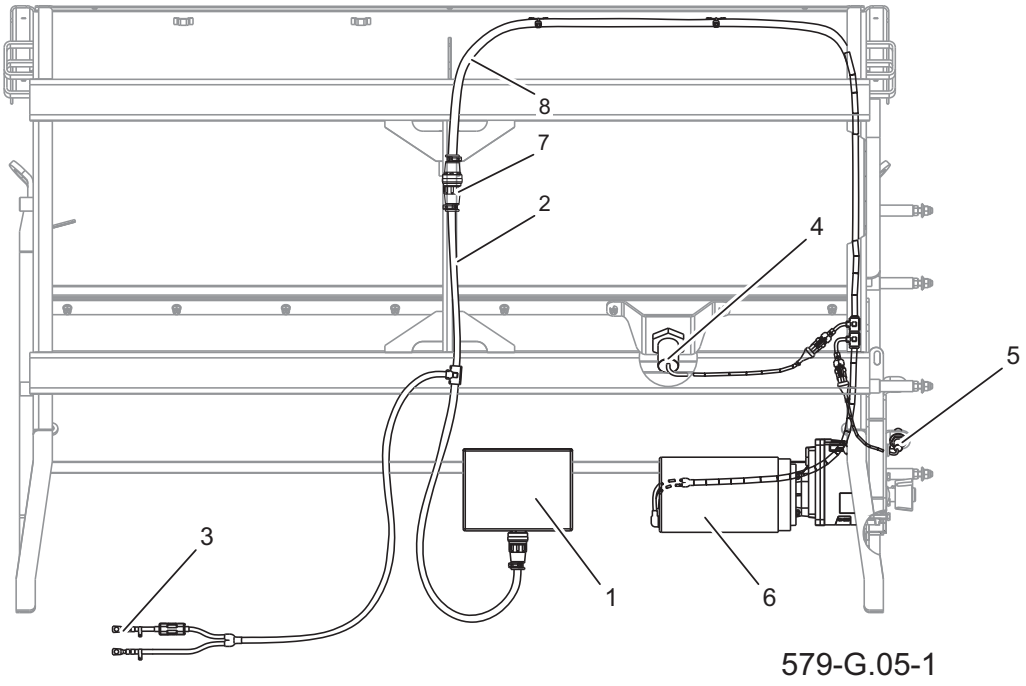


Figure 3.5 Design of the electric system of the sand spreader with electric drive
(1) control panel (2) wiring harness (detachable) (3) power terminals
(4) tank emptying sensor (5) spreading roller rotation speed sensor
(6) electric motor (7) connector (socket / plug) (8) wiring harness

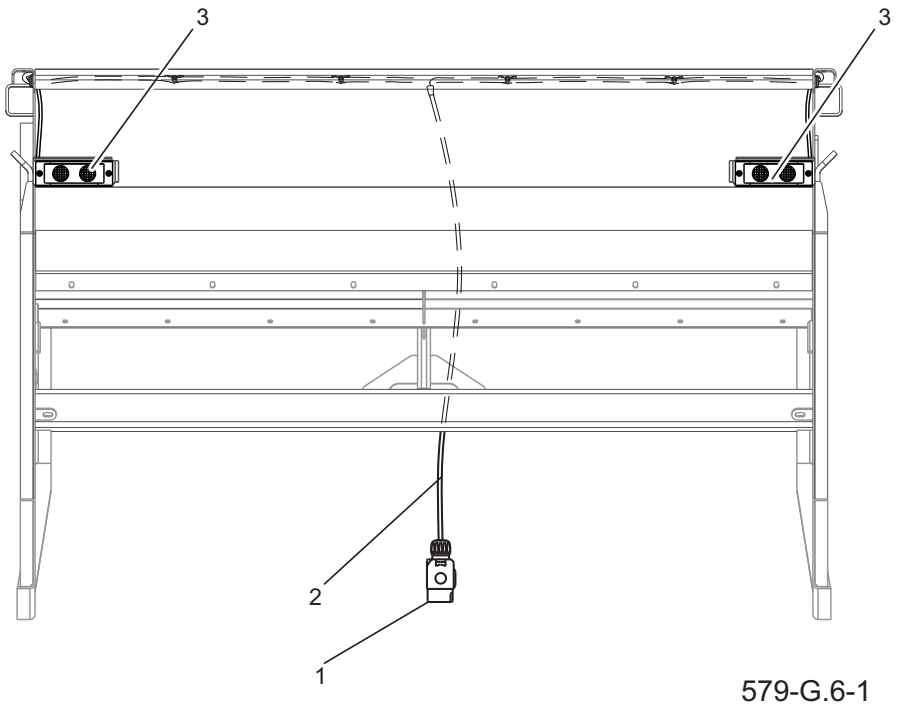


Figure 3.6 Rear lights electrical system design
(1) 7 pin electrical plug (2) lighting wiring harness (3) rear lamp

G.2.4.579.03.1.PL

CORRECT USE

SECTION 4

4.1 GET READY FOR OPERATION

The manufacturer guarantees that the machine is fully operational and has been checked according to quality control procedures and is ready for use. This does not release the user from an obligation to check the machine's condition after delivery and before first use. The machine is delivered to the user completely assembled. Prior to connecting to the carrier vehicle (tractor), machine operator must verify the machine technical condition. In order to do this:

ATTENTION

Before using the machine always check its technical condition. In particular, check the technical condition of the linkage system and drive system (hydraulic, electrical, mechanical), the completeness of protective covers and lights (direction indicators, stop lights, parking lights).

- the user must carefully read this Operator Manual and observe all recommendations, understand the design and the principle of machine operation,
- make sure that the machine's linkage is compatible with that of the carrier vehicle (tractor)
- make sure that power take-off shaft is compatible, e.g. tip type, RPM, rotation direction (version with mechanical drive),
- make sure that the telescopic articulated shaft (PTO) can be connected to the tractor (the shaft should be compatible with the tractor in terms of length, type, strength, etc. - see the PTO operating manual provided by the manufacturer) - machine version with mechanical drive,
- make sure that electrical wiring and hydraulic system outlets are compatible,
- inspect machine's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- check technical condition of hydraulic system and electrical system (if installed),
- check technical condition of spreading roller,
- check the technical condition of the suspension system components, guards and safety pins and if

ATTENTION

Before beginning work lubricate all lubrication points.

DANGER

Before using the machine, the user must carefully read this Operator Manual
Careless and incorrect use and operation of the machine, and failure to follow instructions in this Operator Manual is dangerous to your health.
The machine must never be used by persons, who are not authorised to drive agricultural tractors (carrier vehicles), including children and people under the influence of alcohol or other drugs.
Non-compliance with the safety rules of this Operator Manual can be dangerous to the health and life of the operator and others.
Before starting the machine, ensure that there are no bystanders in the danger zone.

mounting is correct.

If all the above checks have been performed and there is no doubt as to the machine's good technical condition, it can be connected to carrier vehicle, started and all its individual systems checked. In order to do this:

- hitch the machine to carrier vehicle (see 4.3 “HITCHING TO CARRIER VEHICLE”),
- after connecting hydraulic system lines and electrical system wiring (depending of the machine version), check the correct operation of systems and inspect the hydraulic system tightness.

In the event of a disruption in the operation of the machine immediately discontinue its use, find and remove the fault. If a fault cannot be rectified or the repair could void the warranty, please contact the Manufacturer for additional clarifications.

ATTENTION

In order to ensure proper operation of the machine, first start the carrier vehicle (tractor) to heat the oil to operating temperature.

DANGER

When starting the sand spreader for the first time as well as after servicing its hydraulic system, extreme caution should be exercised because the aerated hydraulic system causes accelerated movement of the sand spreader components.

H.2.4.579.01.1.EN

4.2 TECHNICAL INSPECTION

To get the machine ready for use, check components according to guidelines presented in Table 4.1.

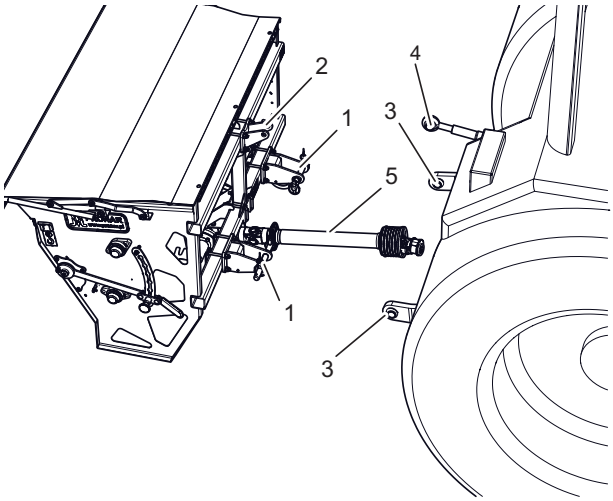
Table 4.1. Technical inspection schedule

Description	Maintenance activities	Frequency
Technical condition of safety guards	Check the technical condition of safety guards, if complete and correctly mounted.	Before starting work
Technical condition of the hydraulic system.	Visually inspect the technical condition of the system, check the operation.	
Technical condition of the electrical system and lighting system components (if installed)	Visually inspect the technical condition, check the operation.	
Check if all main nut and bolt connections are properly tightened	Tightening torque should be according to Table 5.4.	Once a week
Technical condition of chain transmission, spreading roller and agitator	Check technical condition of chain, tensioner, sprockets and check for axial play, lubrication and correct mounting.	Every 50 working hours
Lubrication	Lubricate elements according to section 5.5 “LUBRICATION”.	According to Table 5.4

E.2.4.579.02.1.EN

4.3 HITCHING THE SAND SPREADER TO CARRIER VEHICLE (TRACTOR).

Sand spreader may be hitched to a carrier vehicle (tractor) which meets the requirements specified in Table 1.1 "*Requirements for carrier vehicle (tractor)"*.



579-H.01-1

Figure 4.1 Hitching sand spreader to carrier vehicle

(1) lower pins point (2) upper attachment point (3) lower links of the three-point linkage (4) top link (5) PTO shaft

When hitching the sand spreader to carrier (tractor) three-point linkage do the following (Figure 4.1):

- move the lower links of carrier vehicle three-point linkage (3) to the lower linking points of the sand spreader;

DANGER

Use only genuine pins and safeguards to hitch the machine to the carrier vehicle.

DANGER

Before connecting the PTO shaft it is absolutely necessary to carefully read the Operator Manual attached by the Manufacturer of the shaft and observe the instructions contained in it.
Before connecting to the carrier vehicle, check technical condition of shaft guards as well as completeness and condition of protecting chains.

set lower links at an appropriate height,

- turn off carrier vehicle engine and prevent the vehicle from moving,
- connect the lower pins (1) of the sand spreader linkage with the lower links (3) of the three-point linkage and secure with cotter pins, in the case of the hook linkage, place balls on the sand spreader linkage pins, secure with cotter pins and lift the links (3) until balls lock in hooks,
- connect carrier vehicle upper link (4) (central connector) to the upper attachment point (2) of the sand spreader's linkage using a pin and

TIP

The proper alignment of the PTO shaft of the carrier vehicle (tractor) with the shaft of the sand spreader's drive system significantly extends the life of the drive shaft (1) (Figure 4.1).

DANGER

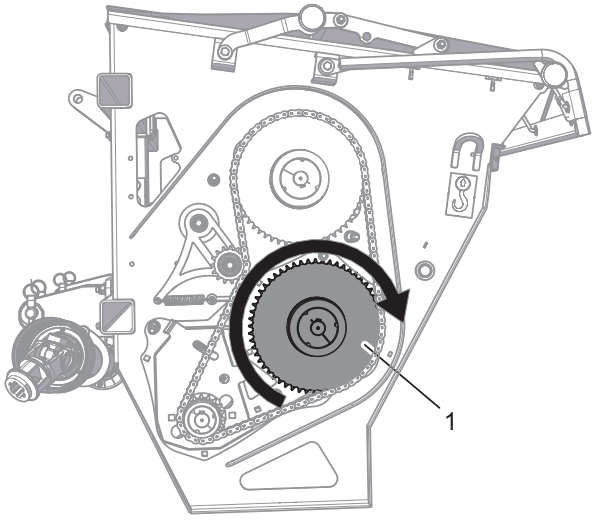
Before connecting the PTO shaft, turn off the carrier vehicle (tractor) engine and remove the key from the ignition. Ensure that unauthorised persons do not have access to the carrier vehicle (tractor) cab. The use of PTO shaft and its technical condition must be in accord with the Operator Manual of PTO shaft.

secure with a cotter pin,

- eliminate lateral movements of sand spreader by appropriate adjustment of the stabilisers of the lower links of the carrier vehicle three-point linkage (both lower links of the three-point linkage are recommended to be set at the same height)

CONNECTING THE ARTICULATED TELESCOPIC SHAFT (PTO SHAFT) IN THE SAND SPREADER WITH MECHANICAL DRIVE

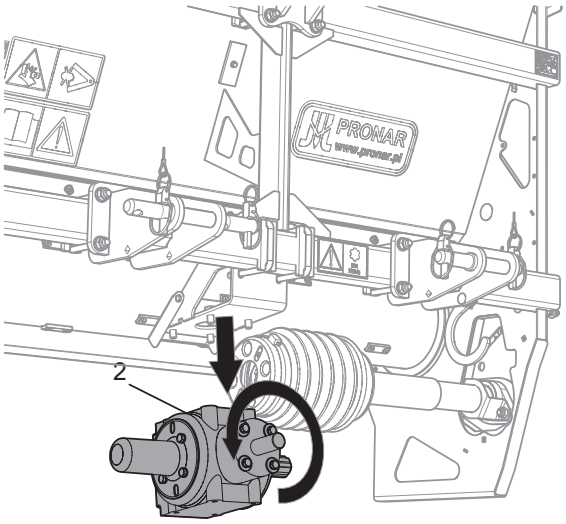
- Connect the articulated telescopic shaft (PTO shaft) (5) to the PTO of the carrier vehicle (tractor) and secure it with safety chains.
- connect the plugs of the sand spreader's electrical lighting system (if any) to the appropriate sockets in the carrier vehicle (SECTION 4.3.4);
- after hitching the sand spreader, raise it on the three-point linkage to the appropriate height so as to obtain the smallest possible operating angles of



579-H.02-1

Figure 4.2 Correct direction of the spreading roller rotation

(1) spreading roller cogwheel



579-H.03-1

Figure 4.3 Reversing the direction of the machine power input connection shaft rotation

(2) bevel gear

the articulated telescopic shaft (PTO shaft), which extends its service life;

- PTO drive may be engaged only when the articulated telescopic shaft (PTO shaft) is set horizontally. Before

ATTENTION

Changing the direction of the sand spreader bevel gearbox rotation should only be performed by specialist service workshops of the dealer or the manufacturer.
This must not be performed by the user of the sand spreader.

lowering the sand spreader to the ground, disengage the PTO drive.

In the hitched machine, check the spreading roller rotation direction (Figure 4.2). The spreading roller should rotate clockwise when viewed from the chain transmission side.

If the spreading roller rotates counter-clockwise, the PTO rotation direction is wrong.

If the sand spreader is to be hitched on carrier vehicles with different PTO rotation directions, the sand spreader can be adapted to them by turning the bevel gear by 180° (Figure 4.3).

ATTENTION

Raising and lowering the sand spreader with the PTO engaged may damage the machine.

CONNECTING THE HYDRAULIC SYSTEM

In the sand spreaders with hydraulic drive system, the hydraulic conduit couplers should be connected to the sockets in one section of the carrier vehicle's external hydraulic system, designed for continuous operation.

When connecting the hydraulic conduit plugs of the sand spreader drive system, only one flow direction is possible. Therefore, after connecting the hydraulic conduit quick-couplers to the carrier vehicle's hydraulic system section (e.g. with the locking function in switched on position), check, by starting for the first time, whether the sand spreader drive is working

DANGER

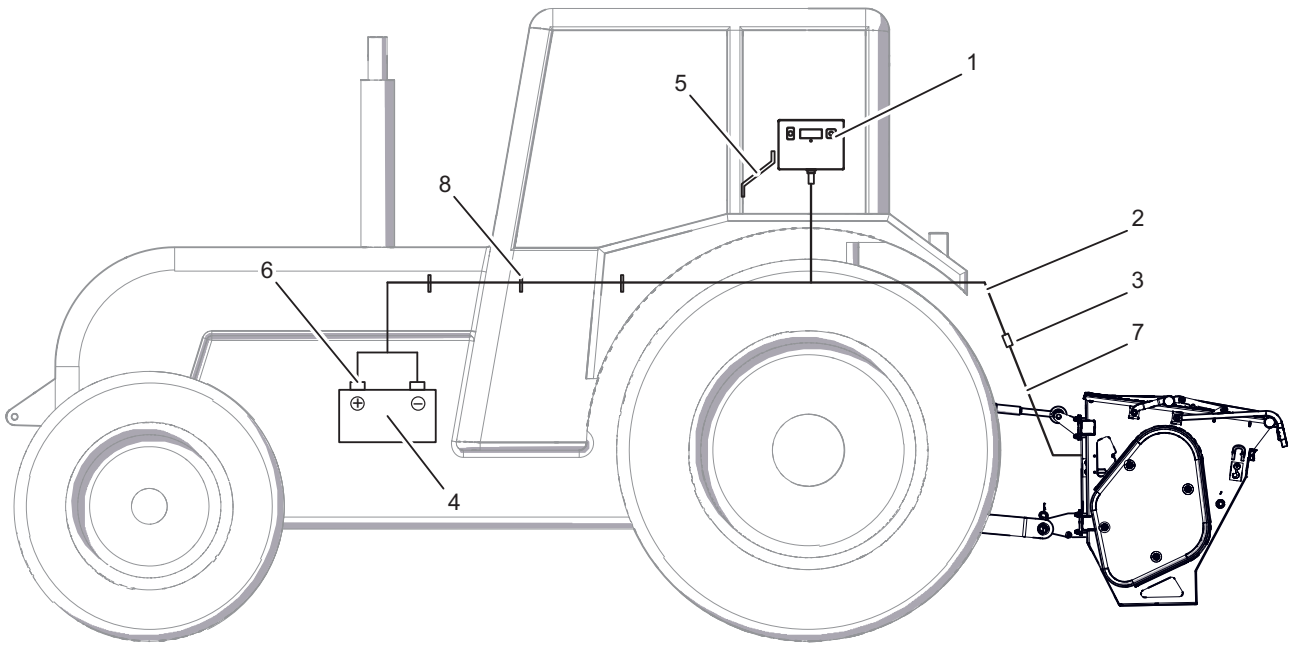
Reduce pressure in the system prior to connecting the machine to the hydraulic system.

ATTENTION

Prior to connecting the hydraulic system lines, carefully read the Operator Manual of the carrier vehicle and observe all manufacturer's recommendations.

ATTENTION

Hydraulic conduits should be routed so that they do not get entangled in moving machine and carrier vehicle parts.



579-H.07-1

Figure 4.4 Electrical system connection diagram
(1) control panel *(2) wiring harness (hung on the carrier vehicle)*
(3) socket / plug connectors *(4) battery* *(5) control panel handle*
(6) power terminals, *(7) wiring harness (of the sand spreader)*
(8) cable ties,

properly. If the sand spreader drive cannot be started, swap the quick couplers of the hydraulic conduits of the sand spreader drive.

CONNECTING THE ELECTRICAL SYSTEM

Lead the electric wiring harness (Figure 4.4) from the battery to the carrier vehicle's cab. Attach the cables to the fixed elements of the carrier vehicle with cable ties (8) (not included in the machine equipment). Connect the terminals (6) of the sand spreader harness (2) supply

ATTENTION

In the systems with rated voltage of 12V, the carrier vehicle's alternator should generate current of at least 50A. The minimum speed of the carrier vehicle engine during the sand spreader operation should be 1500min^{-1}

ATTENTION

Prior to connecting the electrical system leads, carefully read the Operator Manual of the carrier vehicle and observe all manufacturer's recommendations.

ATTENTION

Electrical leads should be routed so that they do not get entangled in moving machine and carrier vehicle parts.

cables to the appropriate clamps in the vehicle's battery (4). Connect the red wire to the positive end of the vehicle's battery (+) and the black wire to the negative battery end (–). Connect the sand spreader's wiring harness (2) to the control panel (1) and place the complete set in the operator cab in an accessible place. Align the panel with the handle (5).

After hitching the machine, use the connector (3) to connect the carrier vehicle's wiring harness (2) with the sand spreader's wiring harness (7). Start the carrier vehicle and use the control panel (Figure 4.10) to check if the sand spreader is working properly: whether the sand spreader turns on, whether the spreading roller rotation speed changes. When starting up for the first time, check the spreading roller rotation direction (Figure 4.2).

E.2.4.579.03.1.EN

4.4 BALLASTING THE CARRIER VEHICLE (TRACTOR)

Before hitching the machine to the carrier vehicle, confirm that the carrier vehicle is suitable for this purpose. Installation of implements on the rear three-point linkage must not result in exceeding the permissible total weight, permissible axle load and load capacity of carrier vehicle's tyres. The carrier vehicle's front axle must be always loaded with at least 20% of the carrier vehicle's weight.

Make the following calculations in order to confirm that these conditions are met:

Calculation of the minimum front ballast G_{Vmin}

$$G_{Vmin} = \frac{G_H \bullet (c+d) - T_V \bullet 0{,}2T_L \bullet b}{a+b}$$

Calculation of the minimum rear ballast G_{Hmin}

$$G_{Hmin} = \frac{G_V \bullet a - T_H \bullet b \bullet 0{,}45T_L \bullet b}{b+c+d}$$

It is assumed that all parameters for the calculation of the minimum front ballast are known.

If the parameters are unknown and cannot be determined, make the measurements using a weighing scale (Figure 4.5 – II).

Table 4.2. Ballasting the carrier vehicle (tractor)

Symbol / dimension (FIGURE 4.2)	Unit	Description
T_L	kg	Tractor tare weight
T_V	kg	Front axle load for tractor without machine
T_H	kg	Rear axle load for tractor without machine
t	kg	Load applied to axles of tractor with machine
t_V	kg	Front axle load for tractor with machine
t_H	kg	Rear axle load for tractor with machine
G_H	kg	Total weight of a rear-mounted machine
G_V	kg	Total weight of a front weight
a	m	Distance between the centre of gravity of the front weight and the front axle
b	m	Tractor axle base
c	m	Distance from the rear axle to the three-point linkage axis
d	m	Distance from the three-point linkage axis to the centre of gravity of the rear-mounted machine

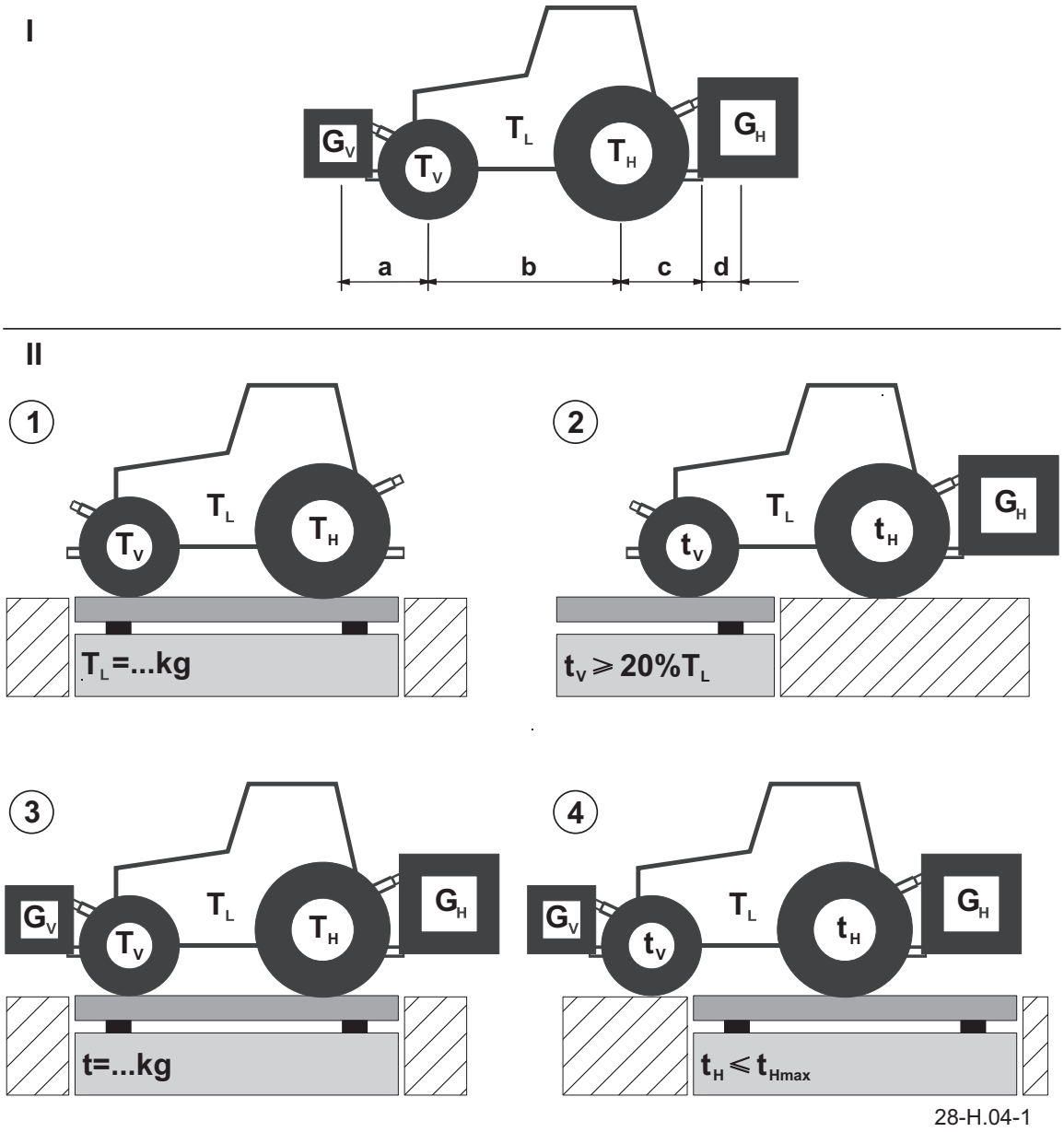


Figure 4.5 Ballasting the carrier vehicle (tractor) front axle.

Measurement of permissible axle loads using a weighing scale.

- Measure the tare weight of the carrier vehicle (T_L).
- Hitch the sand spreader to the carrier vehicle and measure the front axle load (t_V). If the axle load is smaller than 20% of the carrier vehicle weight (T_L), add weights to exceed the minimum axle load value ($t_V \geq 20\% T_L$).
- Measure the total weight (t) of the carrier vehicle with the machine and weights. Check in the carrier vehicle's Operator Manual that the measured value is lower than the carrier vehicle's Permissible Tare Weight.

ATTENTION

The load on each axle of the carrier vehicle (tractor) must be at least 20% of its own weight.

- Measure the rear axle load (t_H) and check in the carrier vehicle's Operator Manual if the measured value is smaller than the maximum permissible rear axle load of the carrier vehicle (t_{Hmax}).

The above calculations should also be made when the sand spreader is hitched to the front of the carrier vehicle.

H.2.4.579.04.1.EN

4.5 SAND SPREADER OPERATION

DANGER

During machine operation do not occupy a different position than that of the operator in the tractor cab.
Do NOT leave the cab, when the machine is in operation.
Do NOT stay between the carrier and the machine.
Do NOT approach the spreading roller until it comes to a complete stop.

LOADING

Fold the tarpaulin cover (1) before loading the tank (2) (Figure 4.6). To do this, pull the handle (2), then use both hands to fold the tarpaulin cover attached to the frame towards the carrier vehicle using the handles (2) and (3).

Materials are loaded through protective grid (4). Be especially careful not to damage the machine and protective grid during loading.

After filling the tank, unfold the tarpaulin cover with both hands using the handles (2) and (3).

DANGER

Be especially careful when folding and unfolding the tarpaulin cover.
Moving elements of the tarpaulin cover folding system pose a risk of crushing fingers or hands. The tarpaulin cover should be folded and unfolded with both hands.

DANGER

Spreading materials other than those recommended by the Manufacturer, including frozen materials or materials containing stones, may result in damage to the machine.

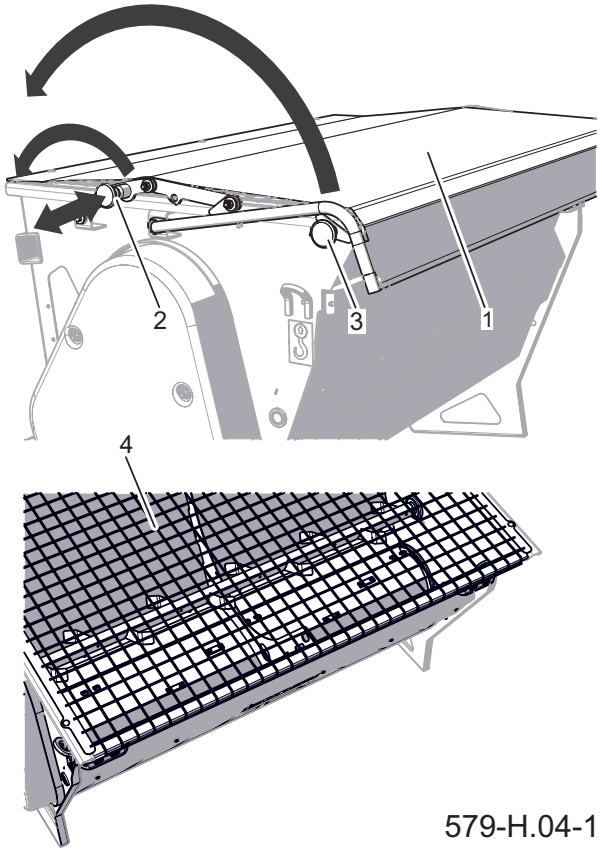


Figure 4.6 Opening the tarpaulin cover before loading the sand spreader

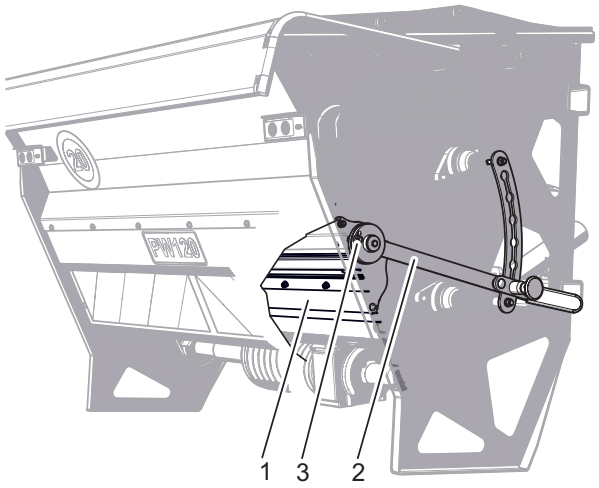
(1) tarpaulin cover (2) pull handle for tarpaulin cover mechanism (3) fixed handle for tarpaulin cover mechanism (4) grid

DANGER

Be especially careful when loading the machine.
Do NOT load the sand spreader with the drive engaged. This may result in damage to the machine or an accident.

BARRIER ADJUSTMENT

The barrier (1) (Figure 4.7) of the spreading roller enables steplike adjustment of the spreading material amount.



579-H.08-1

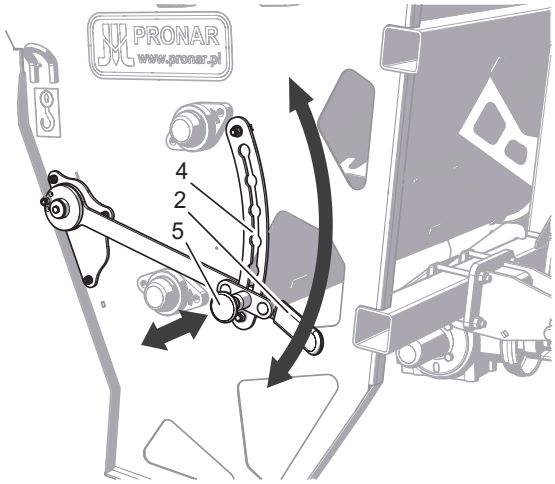
Figure 4.7 Spreading roller barrier adjustment.

(1) spreading roller barrier, (2) barrier lever (3) bolt for angular adjustment of the barrier tilt lever, (4) barrier bracket

To change the position of the barrier (1), and thus the amount of the spread material, unlock the lock lever (Figure 4.8) (2) by pulling out the lock handle (5). Then move the barrier lever (2) to the required position. The lock handle (5) should engage the lever in a set position on the bracket (4).

The barrier lever can be set in one of the six holes in the bracket, depending on the wear of the barrier rubber.

Turn the lever (2) clockwise to increase the spreading material dose, turn the lever anti-clockwise to reduce the spreading material dose. The barrier pressure can be increased, using one of the three holes, by changing the position between the lever



579-H.09-1

Figure 4.8 Spreading roller barrier adjustment.

(1) spreading roller barrier, (2) barrier lever (3) bolt for angular adjustment of the barrier tilt lever, (4) barrier bracket (5) lock handle

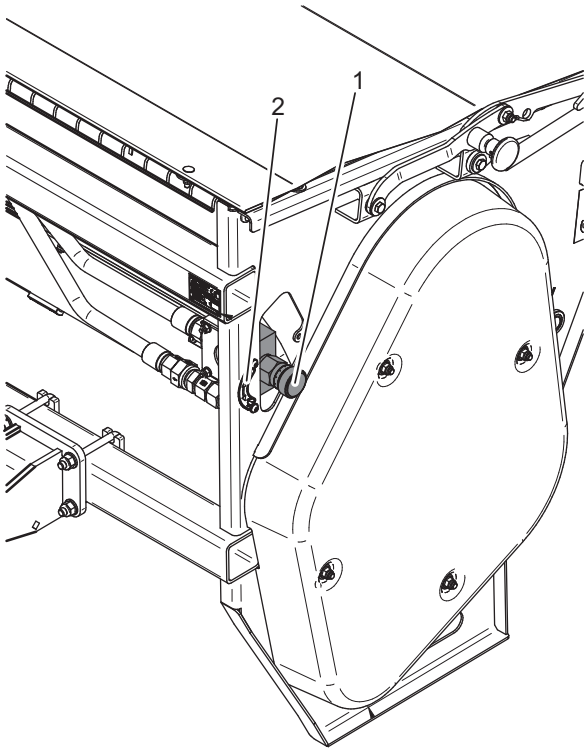
(2) and the barrier using the screw (3)

CONTROLLING THE SAND SPREADER - VERSION WITH HYDRAULIC DRIVE

To engage on the drive of the hydraulically driven sand spreader, switch on the supply of a corresponding section of the carrier vehicle's external hydraulic system supplying the sand spreader drive system. Rotation speed of the spreading roller is adjusted using the knob (1) (Figure 4.9) of the three-way flow regulator in the sand spreader. Screw out the knob (1) until resistance is felt to stop the spreading roller.

Initial adjustment of rotation speed should be done with the help of other authorized people or by the operator after immobilizing the carrier vehicle and turning off the sand spreader drive.

The attached table shows the theoretical spreading parameters for the hydraulic drive (see the annex at the end of the Operator Manual).



579-H.06-1

Figure 4.9 Adjustment of the spreading roller speed - hydraulic drive.
(1) three-way flow regulator knob (2) information decal "work pace"

CONTROLLING THE SAND SPREADER - VERSION WITH MECHANICAL DRIVE

DANGER

Before starting the carrier engine make sure that the PTO drive is disengaged. Otherwise, the sand spreader may start uncontrollably and endanger the life and health of bystanders.
The sand spreader drive may only be started when all protective guards are installed properly.
Before engaging PTO drive, make sure that there are no bystanders, especially children, near the sand spreader.

To engage the drive of the mechanically driven sand spreader, engage the carrier vehicle's PTO drive.

DANGER

Do NOT exceed the PTO rotation speed of 540 rpm. Otherwise, the sand spreader may get damaged.

Independent 540 RPM PTO allows the engine speed-dependant adjustment of the spreading roller speed. The spreading roller speed is increased by increasing the engine speed.

The attached table shows the theoretical spreading parameters for the mechanical drive (see the annex at the end of the Operator Manual).

CONTROLLING THE SAND SPREADER - VERSION WITH ELECTRICAL DRIVE

To engage the drive of the electrically driven sand spreader, set the switch lever (1) on the control panel to the POWER position. Rotation speed of the spreading roller is controlled using the knob (2). Turn the knob clockwise to gradually increase the rotation speed. Turn the knob in the opposite direction to reduce the rotation speed. The display (3) shows the percentage value of the rotation speed (RPM). To disengage the drive, set the switch lever to OFF position.

ATTENTION

When operating the sand spreader with 12V electric drive, keep the engine speed at a minimum level of 1500 rpm. This will reduce the risk of undercharging the carrier vehicle battery.

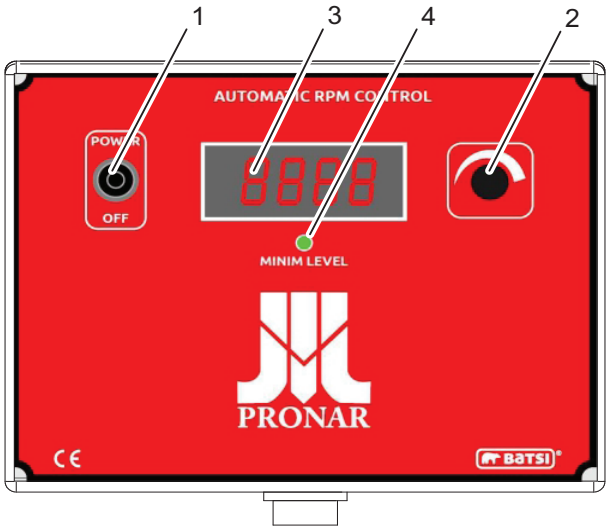
After turning the power off, the last settings of the spreading roller rotation speed are not deleted, the spreading is restarted according to the last setting on the panel.

In the central part of the control panel, there is a LED indicating that the tank is empty. When the LED is on or flashing, the tank is empty.

T*he attached table shows the theoretical spreading parameters for the electrical drive (see the annex at the end of the Operator Manual).*

TIP

The knob has no extreme position.



579-H.05-1

Figure 4.10 Control panel - sand spreader version with electrical drive

(1) switch lever (2) knob

(3) display (4) LED, indicates the minimum level of sand in the tank

The control of the machine is based on the feedback principle. This ensures that the roller rotation speed is kept constant irrespective of the load. The operator is informed about the lack of communication with the rotation speed sensor by the error message on the control panel display: “Err2”.

Other possible causes:

- motor cable disconnected;
- sensor disconnected;
- locked motor cannot turn;
- faulty sensor;

H.2.5.579.03.1.EN

CAPACITIVE SENSOR CALIBRATION PROCEDURE

There is a LED (4) on the control panel (Fig. 4.10), which indicates the minimum level of spreading material in the tank. When the tank is full, the LED is OFF. To check if the diode indications are correct, start the sand spreader with empty tank - then the diode should blink.

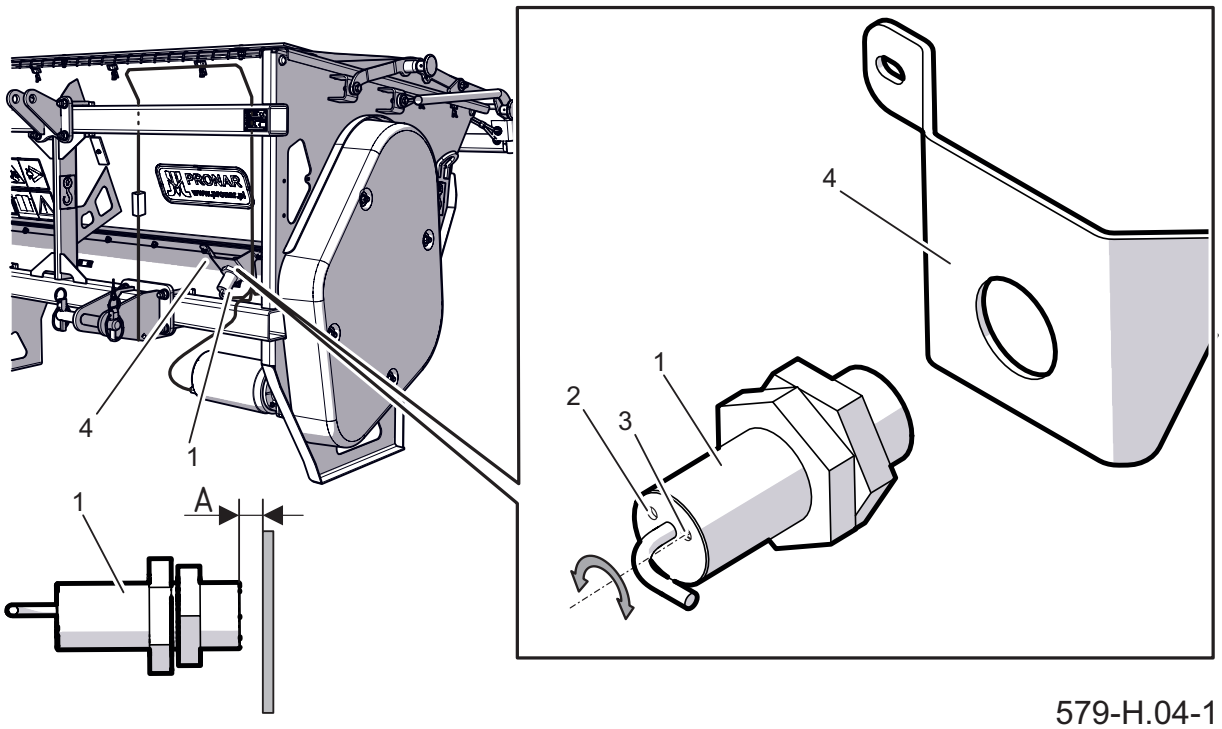
1. If the LED does not show any signal (with empty tank), correct the setting of the capacitive sensor (1) on the handle (4) Figure 4.11 by increasing the distance (A) of the sensor from the shield. To do this: loosen the sensor nuts, change the sensor position and re-lock the nuts);
2. If the LED (with empty tank) is on continuously, reduce the distance

TIP

Perform the sensor adjustment when the sand spreader tank is empty.

ATTENTION

The sand spreader is started: the roller and the agitator rotate. Be especially careful.



579-H.04-1

Figure 4.11 Capacitive sensor

(1) tank level sensor *(2) signalling diode* *(3) sensitivity regulator knob*
(4) sensor holder

(A) of the sensor from the shield by changing its position on the handle. For adjustment see point 1;

3. When the sensor is damaged, which can be determined by the lack of a signal Figure. 4.11 (2) - no matter how far it is from the shield - it should be replaced with a new one. Before installing a new sensor in the holder, by placing it as described in point 1 and point 2, set its sensitivity:

3.1. Connect the new sensor to the wiring harness and turn on POWER on the control panel (the LEDs on the panel and on the sensor are ON)

3.2. Bring the sensor close to a metal or rubber element until the diode turns off (distance A) Fig. 4.11.

3.3. Use the knob (3) Figure 4.11 to adjust the sensor sensitivity to a fixed distance of A = 3-5mm (to reduce the sensitivity - turn clockwise)

3.4. Mount the sensor (1) adjusted in this way in the holder (4) Figure 4.11

3.5. Check the operation of the sensor and, if necessary, correct its position according to point 1 and point 2.

H.2.5.579.04.1.EN

4.6 DRIVING ON PUBLIC ROADS

When driving on public roads, respect the road traffic regulations, exercise caution and prudence. If the machine is operated on pavements special attention should be paid to the bystanders likely to be near the working machine. Listed below are the key guidelines.

- Before moving off make sure that there are no bystanders, especially children, near the machine and the carrier vehicle (tractor). Ensure that the driver has sufficient visibility.
- Make sure that the machine is correctly attached to the carrier vehicle (tractor), and linkage is properly secured.
- Do not exceed the design speed and maximum speed allowed by road traffic regulations. Ground speed should be adjusted to existing road conditions, pavement condition and other conditions. While operating the machine, turn on the orange beacon light in the carrier vehicle (tractor).
- While driving on public roads, the machine should be marked with slow-moving vehicle warning sign placed on the rear of the carrier vehicle.
- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the machine and the carrier vehicle to suddenly tilt. Driving near ditches or canals is dangerous as there is a risk of the wheels sliding down the slope or the slope collapsing.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving on uneven terrain, reduce speed due to dynamic loads and the risk of damage to the machine or tractor.

Take account of the following:

- When driving with the machine raised, it may limit the operator’s view.
- When driving secure the tractor (carrier vehicle) linkage against falling or accidental dropping.

H.2.4.579.05.1.EN

4.7 UNHITCHING THE MACHINE FROM THE CARRIER VEHICLE

Before unhitching the sand spreader from the carrier vehicle, slowly lower the sand spreader to the ground. The sand spreader must be placed on a level, sufficiently hard surface in such a manner as to ensure that it is possible to connect it again.

DANGER

Before unhitching the machine from the carrier vehicle, turn off the carrier vehicle's engine, engage parking brake and secure cab against access of unauthorised persons.
Be especially careful when unhitching the machine from the carrier vehicle.

In order to unhitch the sand spreader from the carrier vehicle, proceed as follows:

1. Open the barrier (1) maximally (Figures 4.7 and 4.8) and engage the spreading roller to empty the sand spreader tank completely.

ATTENTION

When operating the mechanically driven sand spreader, empty the tank in the operating position of the articulated telescopic shaft (PTO shaft) (shaft set horizontally).

2. Put the machine in the parking position.
3. Switch off engine, remove key from ignition and engage parking brake.

Depending on spreader version:

- Reduce residual pressure in the hydraulic system by moving the appropriate control lever of the hydraulic circuit in the carrier.

DANGER

Reduce pressure prior to disconnecting the hydraulic system.

- Disconnect hydraulic conduit plugs from carrier vehicle, secure with stoppers and place in special brackets on the sand spreader frame.
- Disconnect the sand spreader's electrical system cable plugs from the carrier vehicle (tractor) (depending on the machine version)
- Disconnect PTO shaft from the carrier vehicle's PTO (sand spreader with mechanical drive)
- Place the disconnected PTO shaft in the bracket located in the left lug of the three-point linkage.

H.2.4.579.06.1.EN

MAINTENANCE

SECTION 5

5.1 MAINTENANCE OF SPREADING UNIT

Technical condition of the front and rear sealing strips should be checked periodically. Excessively worn or damaged sealing strips should be replaced.

In the rear part of the sand spreader, the spreading roller is sealed with strips (1), (3) and (2) (Figure 5.1). The strips are mounted in the spreading roller barrier and to the sand spreader frame. To replace the strips in this unit, dismantle the rear cover (5), unscrew the securing nuts, dismantle

ATTENTION

Pay attention to the order of installation of the strips, the arrangement of the strips in the front and rear sealing unit is different.

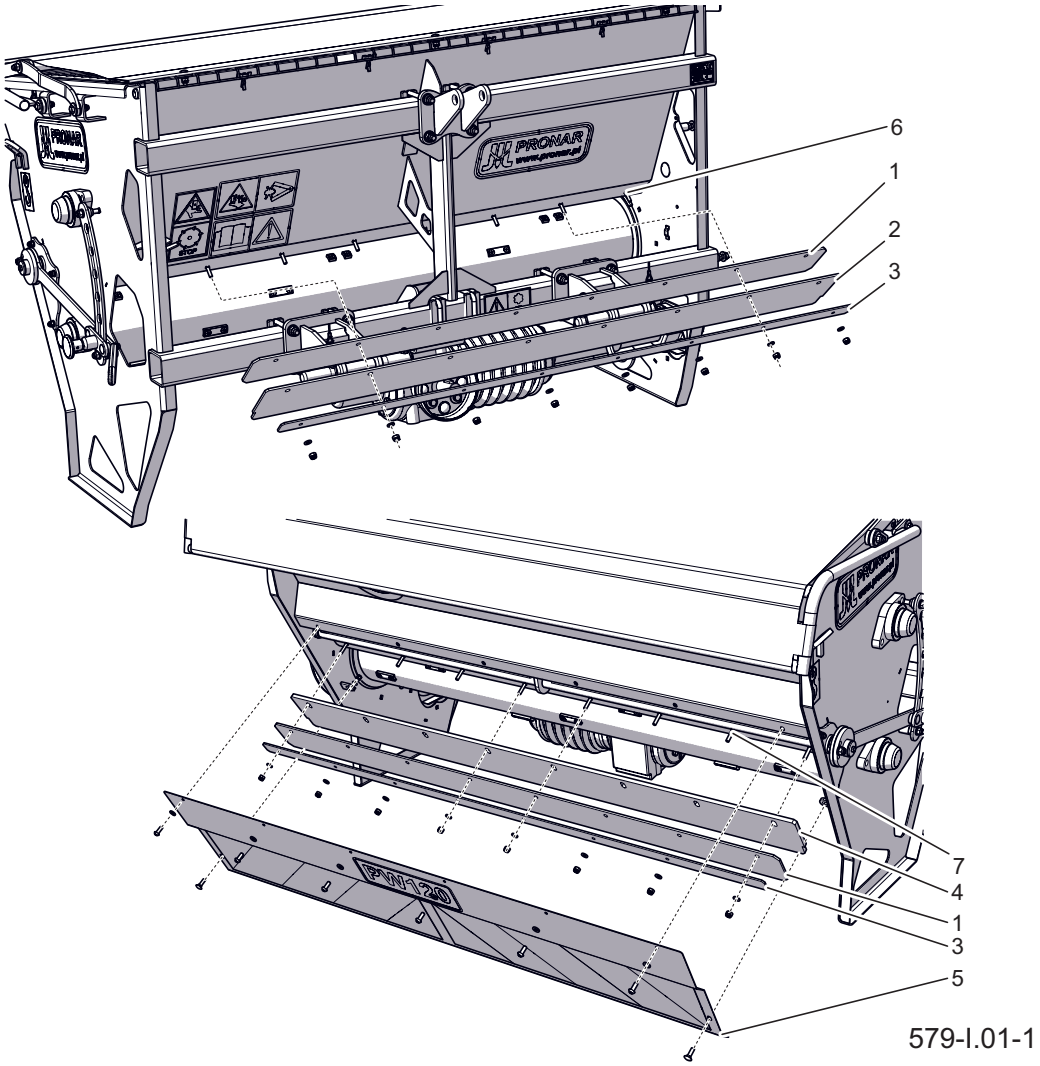


Figure 5.1 Sealing strips

(1) - plastic strip; *(2) - rubber strip I;* *(3) - clamping strip;*
(4) - rubber strip II; *(5) - rear shield* *(6)- sand spreader frame*
(7) - adjustable barrier

the clamping strip (3), the plastic strip (1) and replace the damaged rubber strip (4). To replace the front rubber sealing strip (2) installed on the sand spreader frame, unscrew the securing nuts, remove the clamping strip (3) and replace the defective element with a new one (Figure 5.1).

Table 5.1. Replacement of rubber strips

Marking Figure 5.1	Name, part No.	Quantity
1	Plastic strip / 579N-07000002	2
2	Rubber strip I / 579N-95000004	1
4	Rubber strip I / 579N-07000001	1

I.2.4.579.01.1.EN

5.2 HYDRAULIC SYSTEM MAINTENANCE

ATTENTION

Before starting work, visually inspect the hydraulic system components.

DANGER

The machine with a leaking hydraulic system must NOT be used.

Hydraulic system maintenance duties:

- check leaktightness of hydraulic motor (Figure 3.4) and hydraulic connections;
- check technical condition of hydraulic conduits and quick couplers;

The hydraulic system of new machine is factory filled with HL32 hydraulic oil. Because of its composition, the oil is not classified as a dangerous substance, however long-term action on the skin or eyes may cause irritation.

In the event of contact of oil with skin wash the place of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract.

The condition of hydraulic system should be inspected regularly while using the machine.

Hydraulic lines should be replaced every four years.

Table 5.2. Hydraulic oil characteristics

Item	Name	Value
1	ISO 3448VG viscosity classification	32
2	Kinematic viscosity at 40°C	28.8 – 35.2 mm2/s
3	ISO 6743/99 quality classification	HL
4	DIN 51502 quality classification	HL
5	Flash point, [°C]	Above 210°C
6	Maximum operating temperature, [°C]	80

DANGER

Oil fires should be quenched with carbon dioxide (CO_2), foam or extinguisher steam. Do NOT use water for fire extinguishing!

A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released.

Spilt oil should be immediately collected and placed in a marked tight container.

Used oil should be taken to the appropriate facility dealing with recycling or regeneration of oils.

The hydraulic system must be tight.

Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the machine until faults are remedied.

If an oil leak is found on hydraulic connections, tighten the connections. If this does not remedy the problem, replace the lines and connection components. Always exchange each mechanically damaged component.

Table 5.3. Hydraulic components tightening torque

Symbol	Nut thread	Line diameter	Tightening torque [Nm]
L15	M22x1,5	1/2”	70 Nm
L22	M30x2	3/4”	120 Nm

I.2.4.579.02.1.EN

5.3 DRIVE TRANSMISSION SYSTEM MAINTENANCE

DANGER

If the machine is hitched to carrier vehicle, switch off the vehicle's PTO, engine, remove the key from the ignition and immobilise the vehicle with parking brake before you inspect or adjust tension or replace the drive transmission system chain.

The first change of oil in bevel gear should be made after the first 50 hours of work. The next oil changes should be made every 500 hours or once a year (whichever occurs first).

Drive transmission system maintenance involves:

- inspecting and lubricating the chain transmission of the spreading roller drive
- periodic inspection and change of oil in bevel gear (sand spreader with PTO drive Figure 3.1)

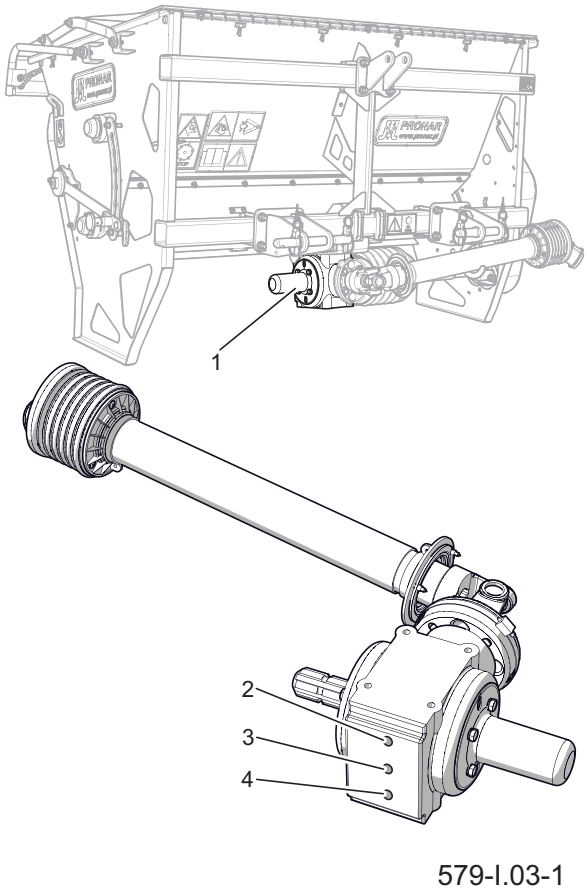


Figure 5.2 Inspection and change of oil in the transmission (version with PTO drive)

(1) - transmission; (2)- filler plug; (3)- inspection plug; (4) drain plug;

TIP

To lubricate bevel gear (Figure 5.2) use SAE 90EP oil in the amount of 1.1l.

DANGER

Repairs of bevel gear during warranty period may only be performed at authorised mechanical workshops.

Proper oil level in the bevel gear (1) (Figure 5.2) should reach the lower edge of the inspection plug opening (3). It is best to

TIP

Part numbers of the chains used in the chain transmission of the spreading roller drive:
08B-80PS, length L = 1016mm (version without agitator) or
08B-120PS, length L = 1524mm (version with agitator)

change oil immediately after completing work when the gear is still hot and impurities are suspended in oil. Plug (4) installed in the lower part of the gear (Figure 5.2) is used for draining oil.

Oil is topped up through the filler plug (2). If a leak is noticed, carefully inspect seals and check oil level. Operating the transmission with insufficient amount of oil or without oil may cause permanent damage.

Maintenance of the chain transmission (Figure 5.3) of the spreading roller drive involves periodic inspection, adjustment and lubrication of the chain.

Dismount the shield (3) to gain access to the chain transmission. Chain transmission is equipped with the spring tensioner (2). The chain tension can be changed using the nut (6). To remove the chain, loosen the nut (6) and the screw (5) and disconnect the chain clip. After installing the chain, tension the tensioner spring (4) by stretching it about 5 mm with the tensioning nut (6) and install the shield (3).

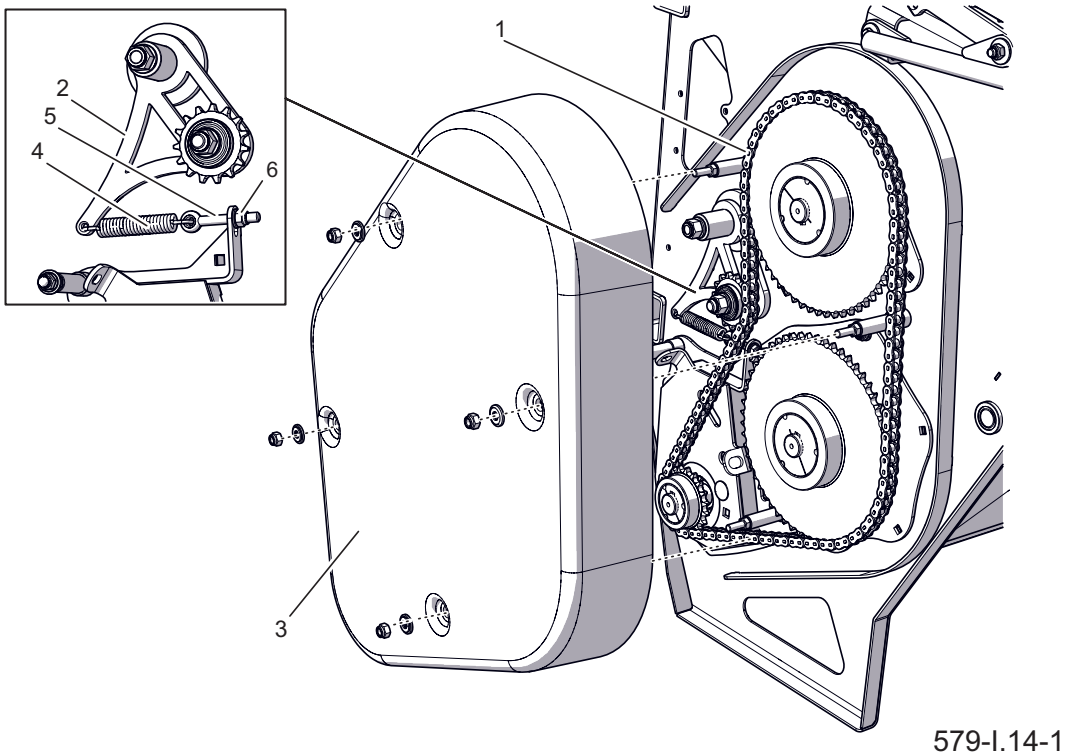


Figure 5.3 Chain transmission of the spreading roller drive, version with agitator
(1) - chain; *(2) - tensioner;* *(3)- shield;*
(4)- tension spring; *(5) - eyebolt* *(6) - tensioning nut*

I.2.4.579.03.1.EN

5.4 ELECTRICAL SYSTEM MAINTENANCE

DANGER

Do not independently repair electrical system, except items described in chapter ELECTRICAL SYSTEM MAINTENANCE. All electrical system repairs must be performed only by suitably qualified personnel.

The electrical system maintenance involves checking the control system operation (sand spreader with electric drive) (Figure 3.5) and the lighting system (option) (Figure 3.6).

Light-emitting diodes (LED) are used as the source of light in lamp assemblies. Therefore, the lamps are maintenance-free, a defective lamp should be replaced with a new one.

If the electrical system of the control system

ATTENTION

Before beginning repairs of electrical system, disconnect the machine from power source.

ATTENTION

Do NOT travel with out of order lighting system. Burned-out or damaged lamps must be replaced with new ones.

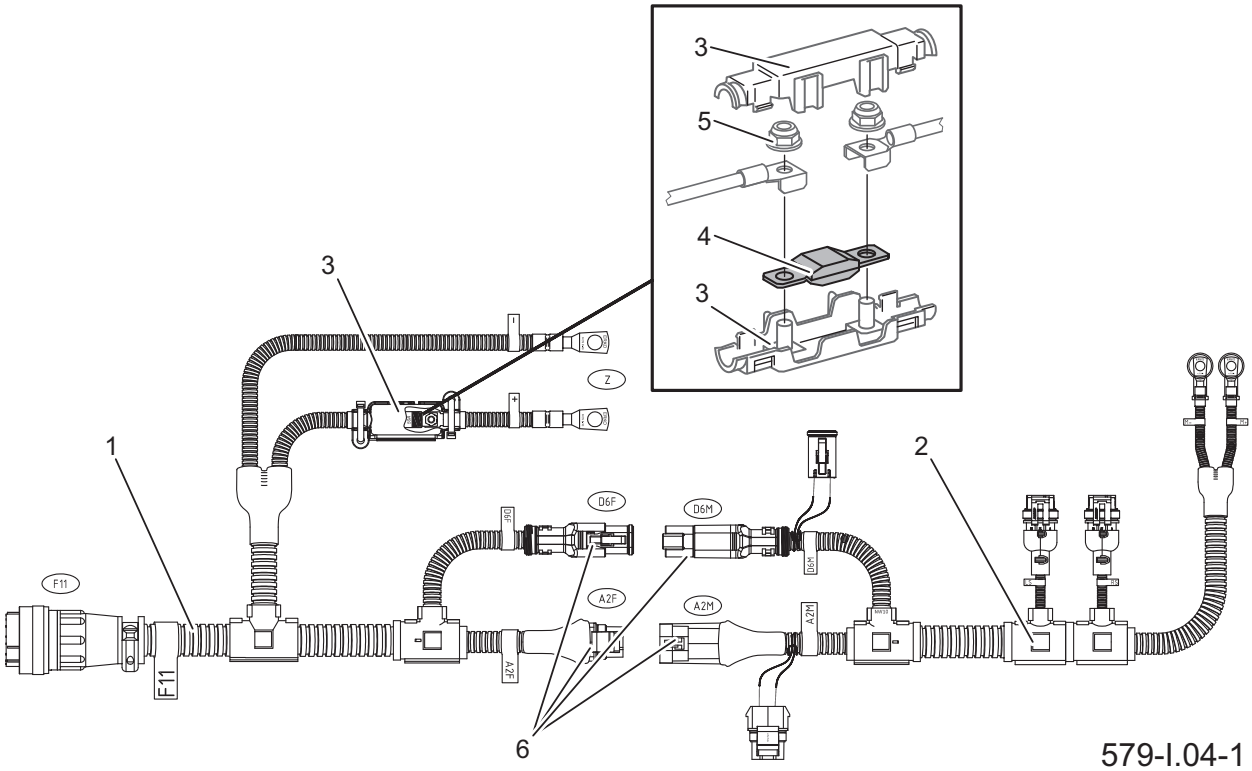
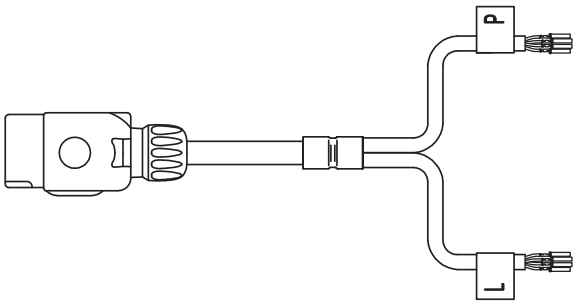


Figure 5.4 Replacement of fuses in the control wiring harness

(1)- wiring harness (of the tractor); (2) - wiring harness (of the sand spreader); (3)- fuse holder; (4)- fuse 50A (12V) or 30A (24V); (5)- nuts; (6)- connectors (socket - plug)

fails, check the fuse (4) in the holder (3) on the "+" wire of the power harness (1). To remove the damaged fuse from the holder and replace it with a new one, unscrew the securing nuts.



579-I.06-1

Figure 5.5 Lighting wiring harness

I.2.4.579.04.1.EN

5.5 LUBRICATION

Lubricate the machine using a grease gun, filled with ŁT-43-PN/C-96134 grease. Clean the lubrication points before lubricating. Remove and wipe off excess oil or grease Additionally, lubricate the drive shaft (option) in accordance with the drive shaft's Operator Manual provided by the drive shaft manufacturer.

Before lubricating the chain, clean it of old grease, and then lubricate its entire length.

When using the machine the user is obliged to observe lubrication instructions according to attached schedule. Excess lubricant causes depositing of additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine components clean.

DANGER

Lubricate the sand spreader only when it is lowered on its supports and resting on the ground.
Before lubricating, turn off engine, remove key from ignition and engage carrier vehicle brake.

Table 5.4. Lubrication points and lubrication frequency

Item	Name	Number of lubrication points	Type of grease	Lubrication frequency
A	Tensioner arm	1	grease	50 hours
B	The chain of the chain transmission of the spreading roller drive	1	grease	50 hours
C	Bevel gear (sand spreader version with PTO drive)	-	gear oil SAE 90EP	50 hours - first change every 500 hours or once a year
D	PTO shaft (sand spreader version with PTO drive)	*	*	*
E	Overload coupling 300Nm	1	grease	50 hours

**- For detailed information on operation and maintenance please refer to Operator Manual enclosed with the shaft.*

Marking description in Item column (TABLE 5.4) conforms with numbering shown (FIGURE 5.6)

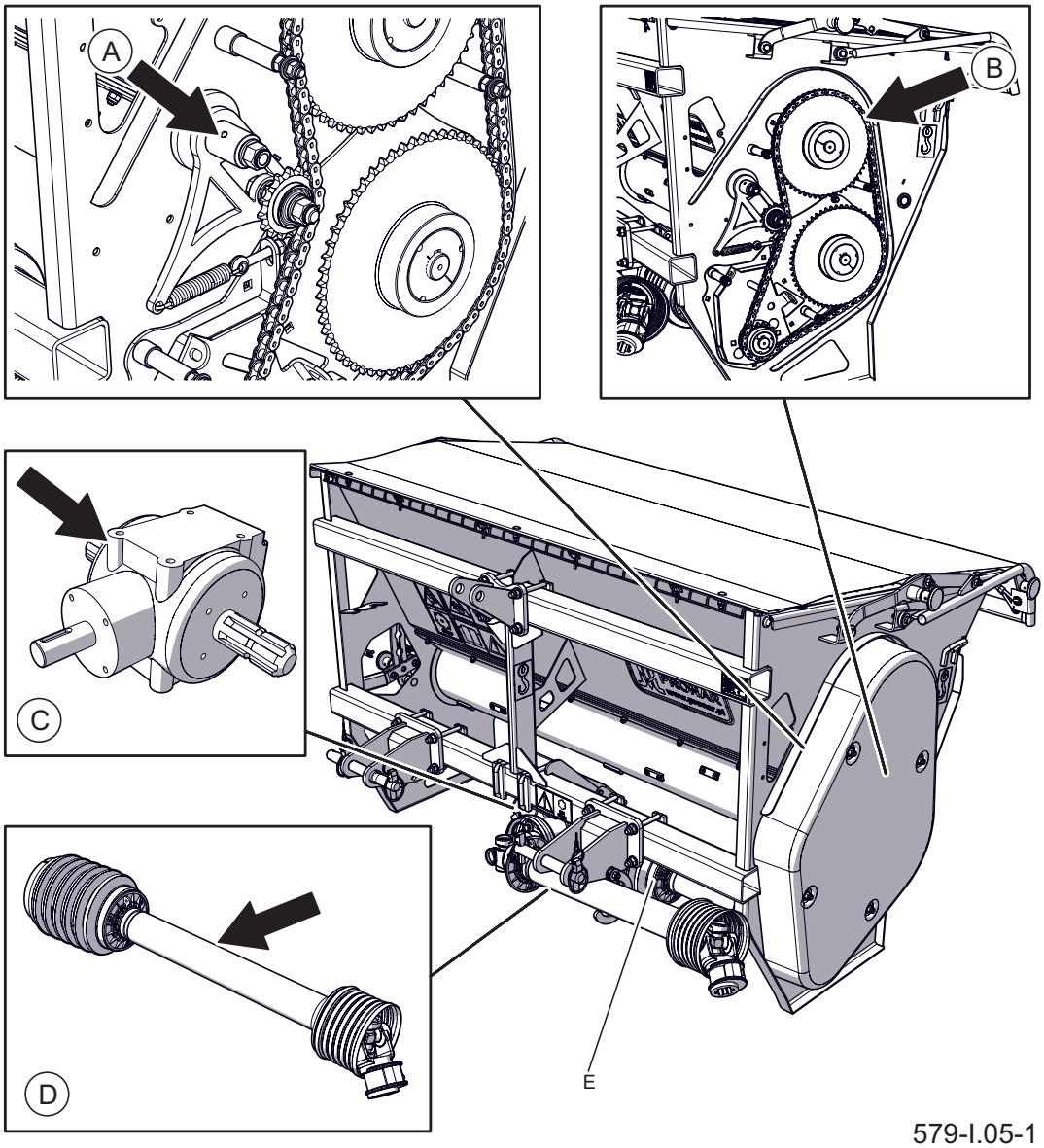


Figure 5.6 Lubrication points

Lubrication points are detailed in TABLE 5.4

I.2.5.28.05.1.EN

5.6 TIGHTENING BOLT CONNECTIONS

Before each use of the machine and during maintenance and repair work, confirm that all bolt connections are properly tightened. If any clearances in bolt connections are found, tighten bolt connections using appropriate tightening torque (TABLE 5.3), unless other tightening parameters are given. Recommended torque values apply to non-greased steel bolts.

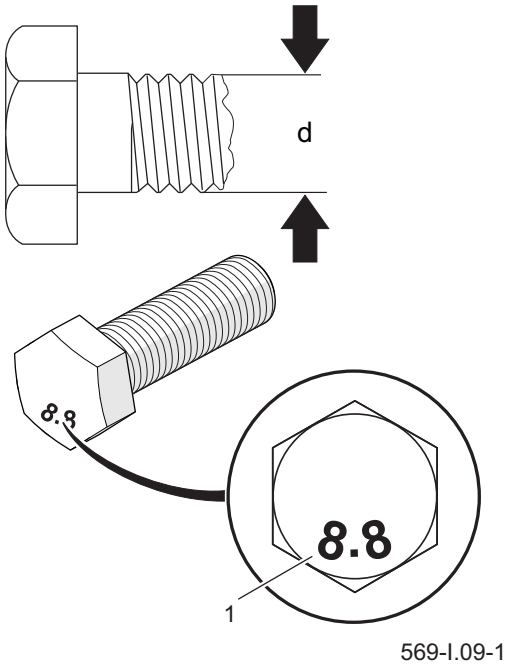


Figure 5.7 Bolt with metric thread
(1) resistance class (d) thread diameter

Table 5.5. Tightening torque for nut and bolt connections

THREAD MARKING [mm]	8.8	10.9
	TIGHTENING TORQUE [Nm]	
M6	10	15
M8	25	36
M10	49	72
M12	85	125
M14	135	200
M16	210	310
M20	425	610
M24	730	1,050
M27	1,150	1,650
M30	1,450	2,100
M32	1,450	2,100

I.2.5.28.06.1.EN

5.7 STORAGE

After finishing work, clean and wash the sand spreader thoroughly with a water jet. While washing do not direct a strong water or steam jet at information and warning decals, bearings, hydraulic lines or electrical wires. Nozzle of pressure or steam washer should be kept at a distance of not less than 30 cm from cleaned surface.

After cleaning, inspect the whole machine, inspect technical condition of individual elements. Repair or replace any used or damaged components.

In the event of damage to the paint coat, clean rust and dust from damaged area, degrease and then paint with undercoat and after it is dry paint with surface coat paint retaining colour uniformity and even thickness of protective coating. Until the time of touch-up painting, the damaged place may be covered with a thin layer of grease or anticorrosion preparation. Sand spreader should be kept in a closed or roofed building.

If the machine will not be used for an extended period of time, protect it against adverse weather conditions. Sand spreader should be lubricated according to the instructions provided regardless of the date of the last lubrication. Protect against corrosion all mating components, such as pins or articulated joints. Cover them with a thin layer of grease.

Sand spreader should be stored in a roofed building inaccessible for unauthorized people and animals. The machine unhitched from the carrier vehicle should be placed on level, sufficiently hard surface in a way as to ensure that it is possible to hitch it again.

I.2.4.579.07.1.EN

5.8 TROUBLESHOOTING

Table 5.6. Troubleshooting

TYPE OF FAULT	CAUSE	REMEDY
Spreading roller does not rotate	PTO drive in the carrier vehicle not engaged or damaged sand spreader drive system (applies to the sand spreader with PTO drive)	Engage the PTO drive in the carrier vehicle or have the drive system repaired at an authorised service point
	Wrong PTO rotation direction	Turn the bevel gear. Repair at a Manufacturer's Authorised Service Point
	The hydraulic system of the roller drive is not connected or connected incorrectly (applies to the sand spreader with hydraulic drive)	Check connection of hydraulic lines to the carrier vehicle's hydraulic system. Engage supply of the external hydraulic system of the carrier vehicle
	Defective fuse (applies to the sand spreader with electric drive)	Check and, if necessary, replace the fuse inside the control panel or on the wiring harness.
	Control panel not connected - no communication (applies to the sand spreader with electric drive)	Check connection of the control panel to the carrier vehicle's system and to the machine Check the electrical system in the carrier vehicle.
	Carrier vehicle's hydraulic system switched off or inoperative (applies to the sand spreader with hydraulic drive)	Swap quick coupling plugs or change flow direction using selective control valve in the carrier vehicle (tractor)
	Error on the control panel display Err2	Correct sensor setting or replace sensor

I.2.4.579.08.1.EN

SAND SPREADER PERFORMANCE

APPENDIX NO. 1

INSTRUCTIONS FOR USING NOMOGRAMS

This appendix presents nomograms that are helpful for controlling the sand spreader roller rotation speed in order to obtain the spreading intensity depending on the carrier vehicle's travelling speed.

TIP

The diagrams are indicative - they do not apply exactly to each spreading material and the actual spreading intensity may differ from the assumed one.

The "d" curves (d_1, d_2, d_3, d_4) correspond to the assumed speed of the carrier vehicles [km/h], controlled by the operator, and show the relationship between ("X" axis) the number of revolutions per minute [RPM] of the spreading roller, which the operator adjusts to obtain ("Y" axis) appropriate spreading intensity [g/m^2].

The "T" curves (T_1, T_2, T_3, T_4) correspond to the carrier vehicle speed in [km / h] and show the relationship between ("X" axis) time [h] of emptying the spreading material tank and the distance [km] the carrier vehicle travels during this time ("Y" axis) with the spreading intensity [g / m2] set by the operator. The spreading intensity is regulated by the spreading roller speed [RPM].

The dotted line in the diagram shows the characteristic settings of the spreading roller speed.

The data is approximate and it depends mainly on the properties of the spreading material, but also on the barrier pressure and the size of the scrapers installed on the drum.

There are 12 nomograms in the manual, which are presented for all versions of the sand spreader

- depending on the drive:
  - electric (spreading roller rotation control with a potentiometer, scale%=RPM),
  - mechanical (controlling the spreading roller speed with 540RPM PTO by changing the carrier vehicle engine speed, e.g. 2100=540=46RPM),
  - hydraulic (controlling the spreading roller speed using the three-way flow regulator, scale 1-10=RPM);
- depending on tank capacity:
  - without wall extension: 0.25 m^3,
  - with wall extension: 0.385 m^3,
- depending on spreading material:
  - salt,
  - sand.

After selecting the appropriate nomogram by the operator, e.g. sand spreader:

- electric drive
- without wall extension
- salt

The operator can set the appropriate spreading roller speed to obtain a given spreading density, for example: 50g/ m^2. The nomogram shows two curves of the travel speed at which the operator will obtain spreading density of 50g/m^2:

- curve d_1 5km/h, 50% spreading roller speed is set on the control panel, which corresponds to 13 RPM

- curve d_2 10km/h, about 86% spreading roller speed is set on the control panel, which corresponds to ~25 RPM.

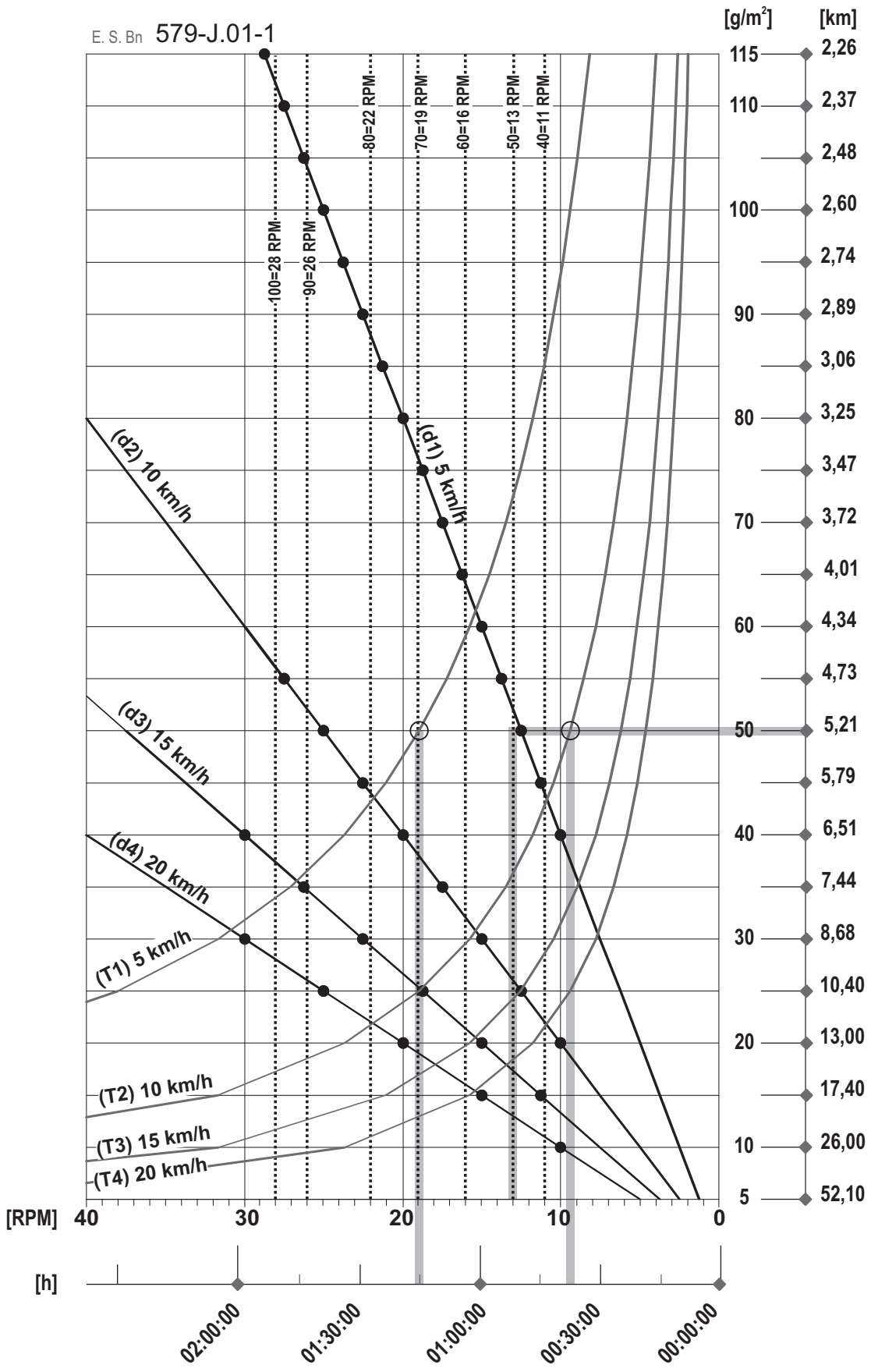
The operator can also obtain information after what time and after what distance the spreading material tank will be empty.

The “T” curves are used for this purpose depending on which travel speed has been selected to get spreading intensity of 50g/m^2:

- curve T_1 5km/h, at this speed the tank will be empty after ~ 1 hour and 10 minutes.
- curve T_2 10km/h, at this speed the tank will be empty after ~ 35 minutes.

The distance travelled for spreading intensity of 50g/m^2 will be 5.2 km for both speeds.

I.2.4.579.04.1.PL

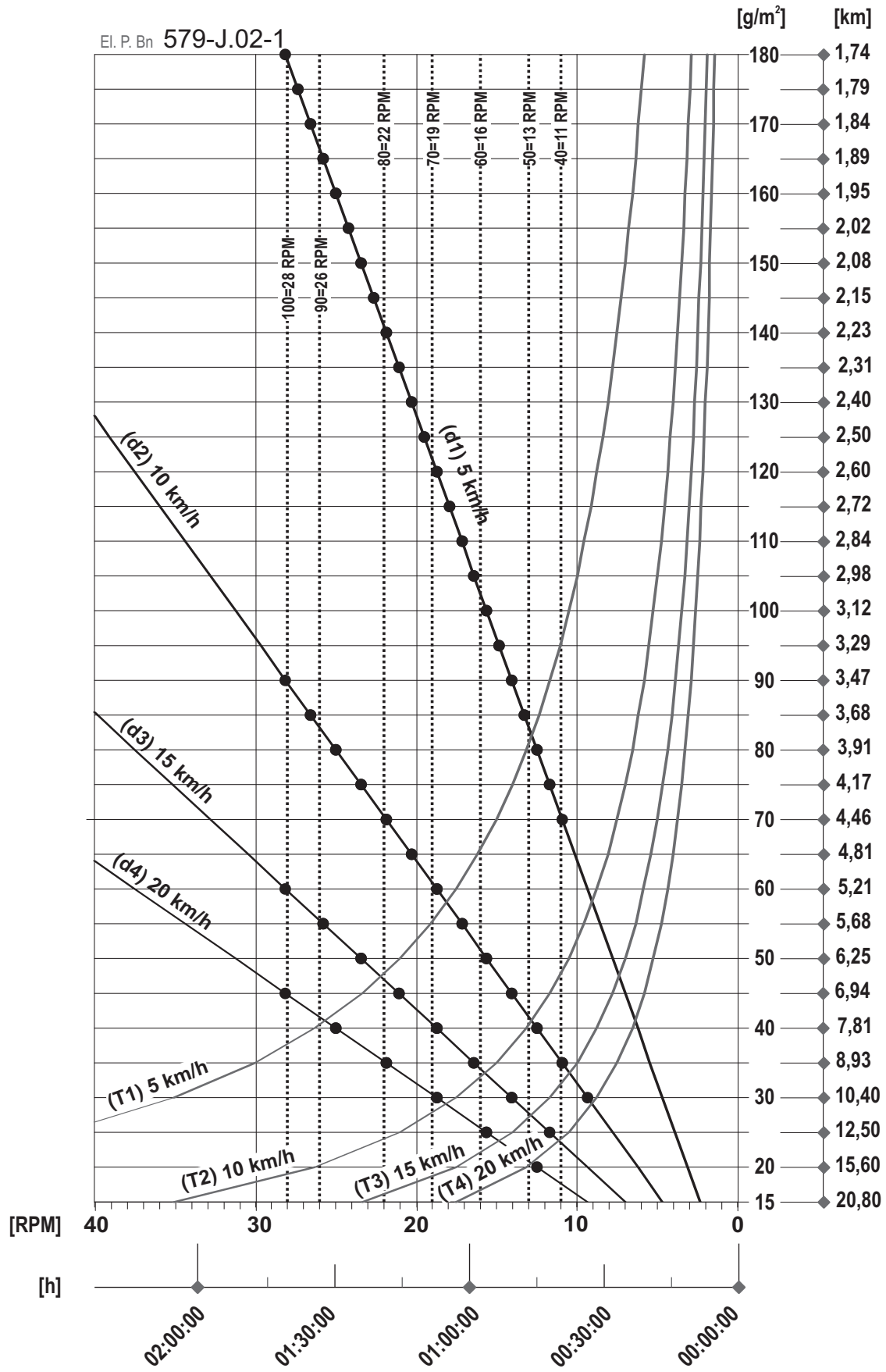


Nomogram 8.1 Approximate parameters for salt spreading for the sand spreader with electric drive without wall extension

Assumed parameters:

total material weight: 312.5 kg; tank capacity: 0.25 m³; salt bulk density: 1250 kg/m³;

The scale on the control panel (40-100%) corresponds to (11-28 RPM) of the spreading roller

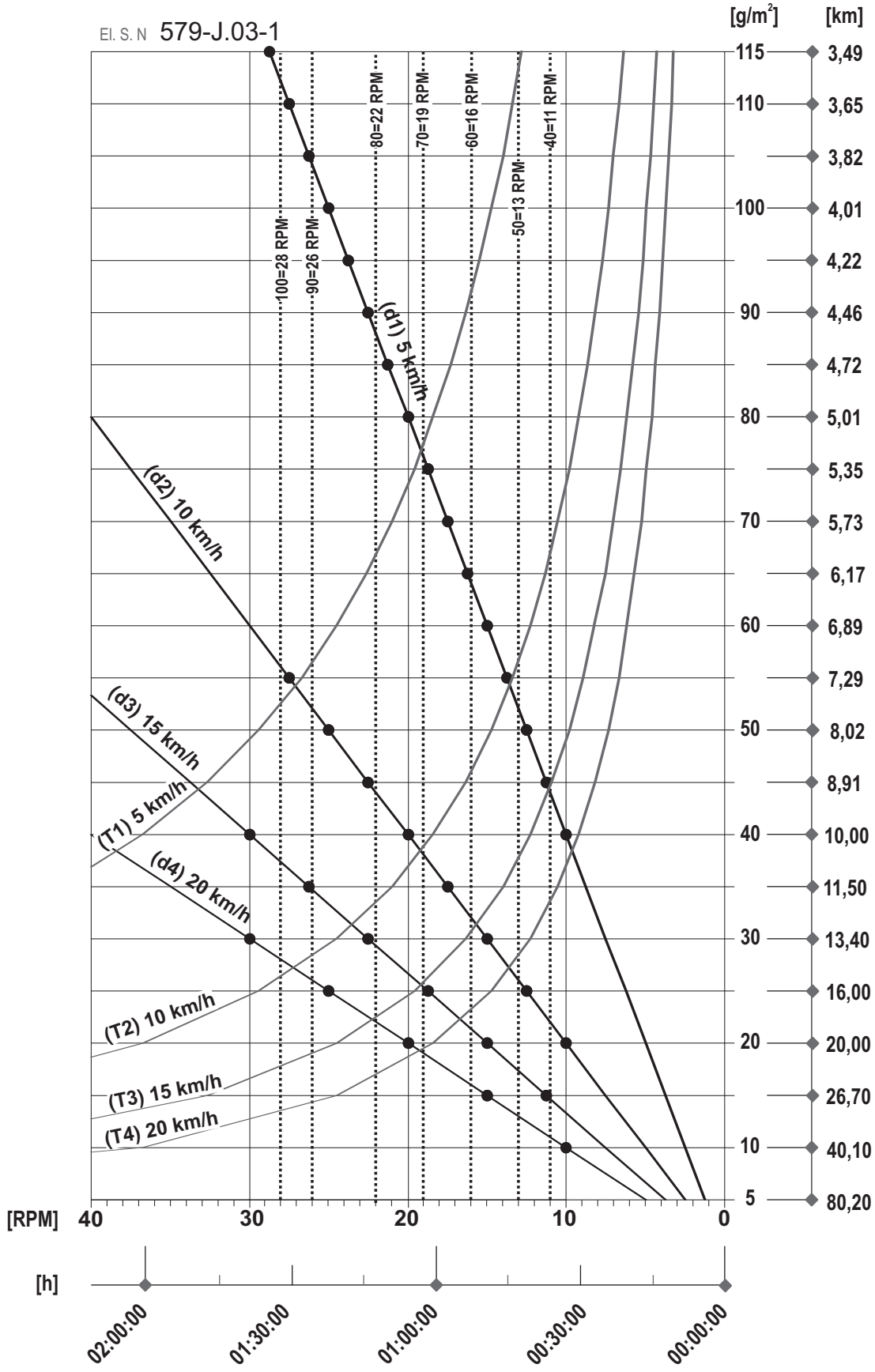


Nomogram 8.2 Approximate parameters for sand spreading for the sand spreader with electric drive without wall extension

Assumed parameters:

total material weight: 375 kg; tank capacity: 0.25 m³; sand bulk density: 1500 kg/m³;

The scale on the control panel (40-100%) corresponds to (11-28 RPM) of the spreading roller

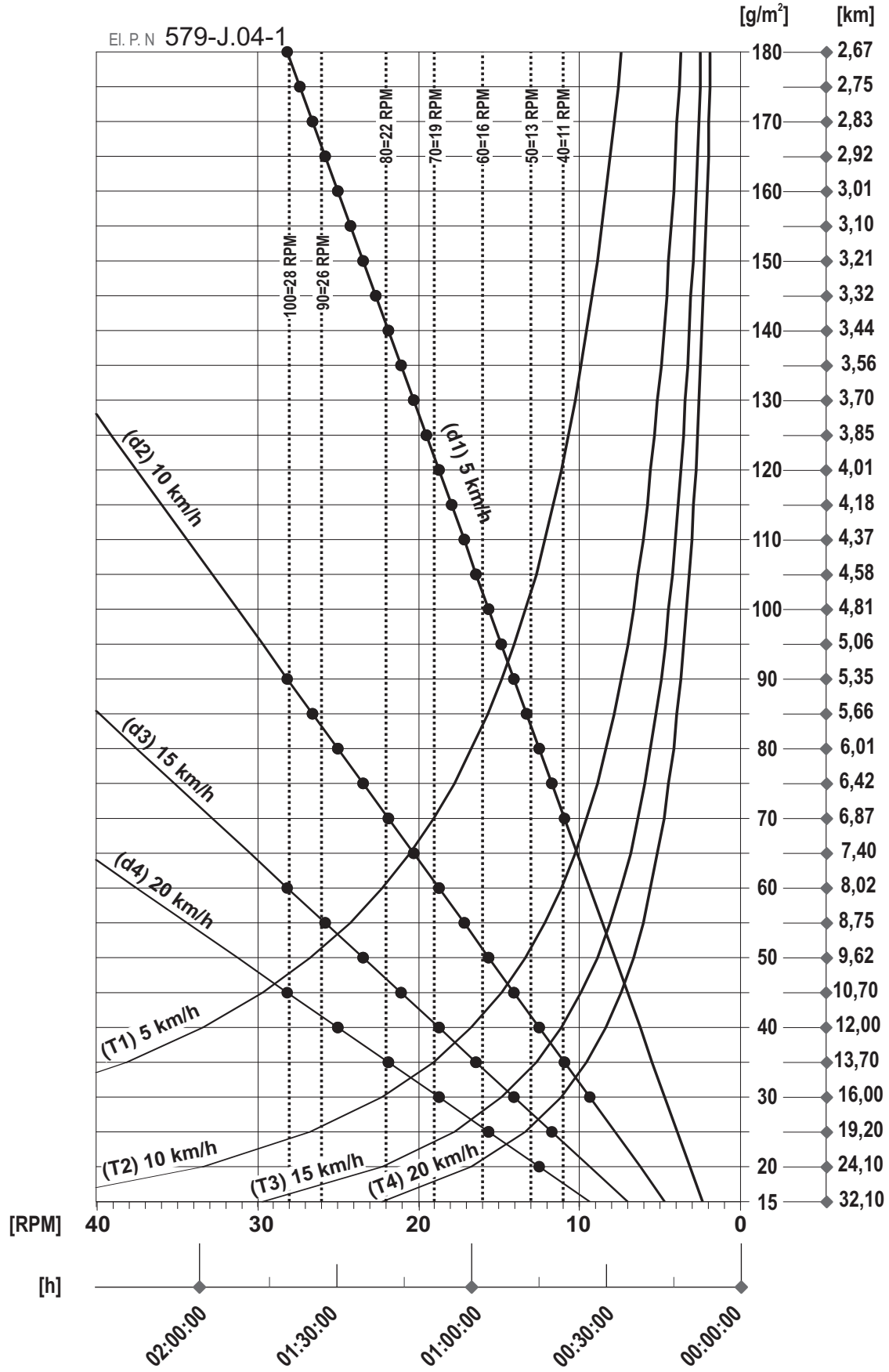


Nomogram 8.3 Approximate parameters for salt spreading for the sand spreader with electric drive with wall extension

Assumed parameters:

total material weight: 481.25 kg; tank capacity: 0.385 m³; salt bulk density: 1250 kg/m³;

The scale on the control panel (40-100%) corresponds to (11-28 RPM) of the spreading roller

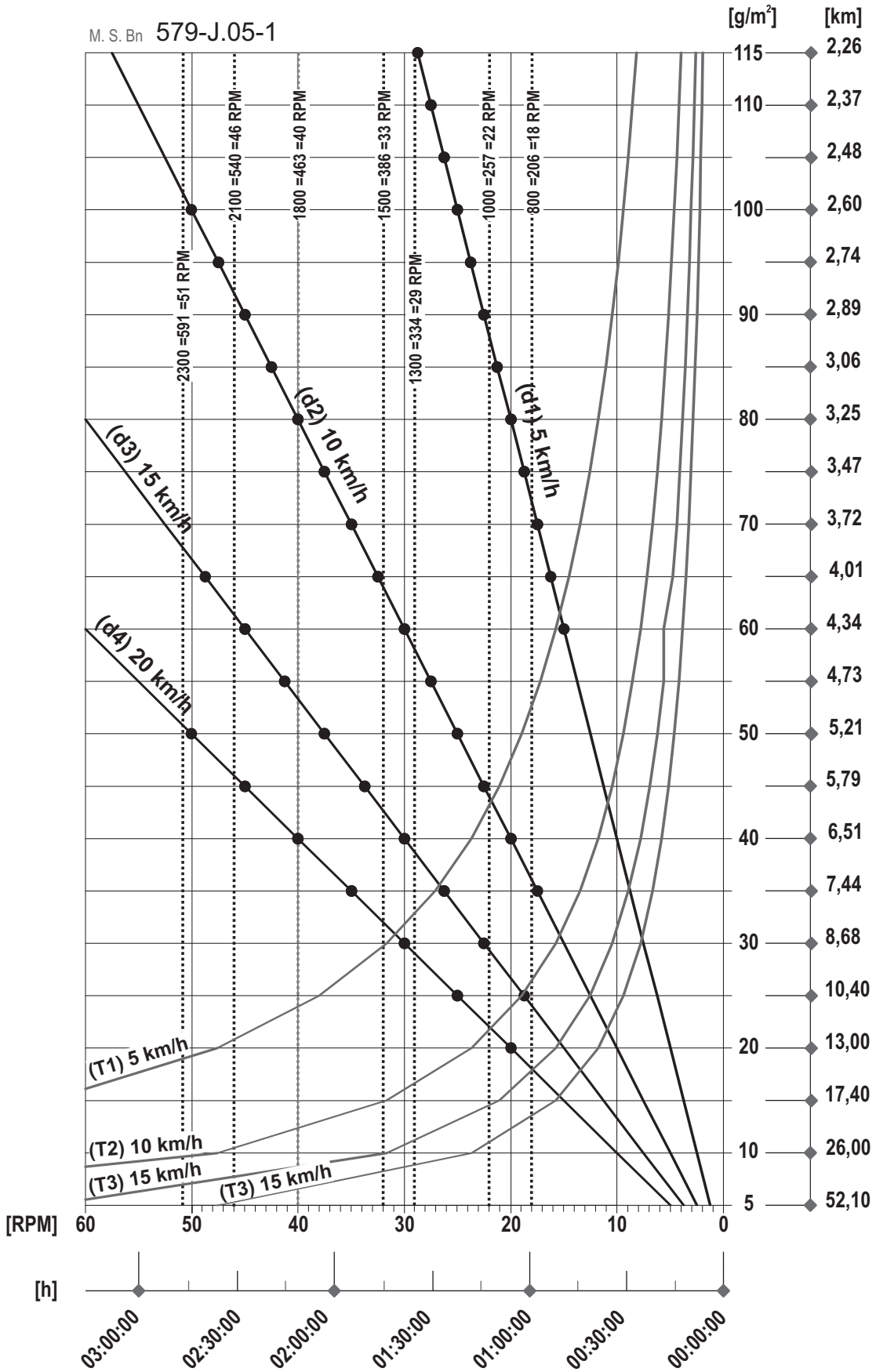


Nomogram 8.4 Approximate parameters for sand spreading for the sand spreader with electric drive with wall extension

Assumed parameters:

total material weight: 577.5 kg; tank capacity: 0.385 m³; sand bulk density: 1500 kg/m³;

The scale on the control panel (40-100%) corresponds to (11-28 RPM) of the spreading roller

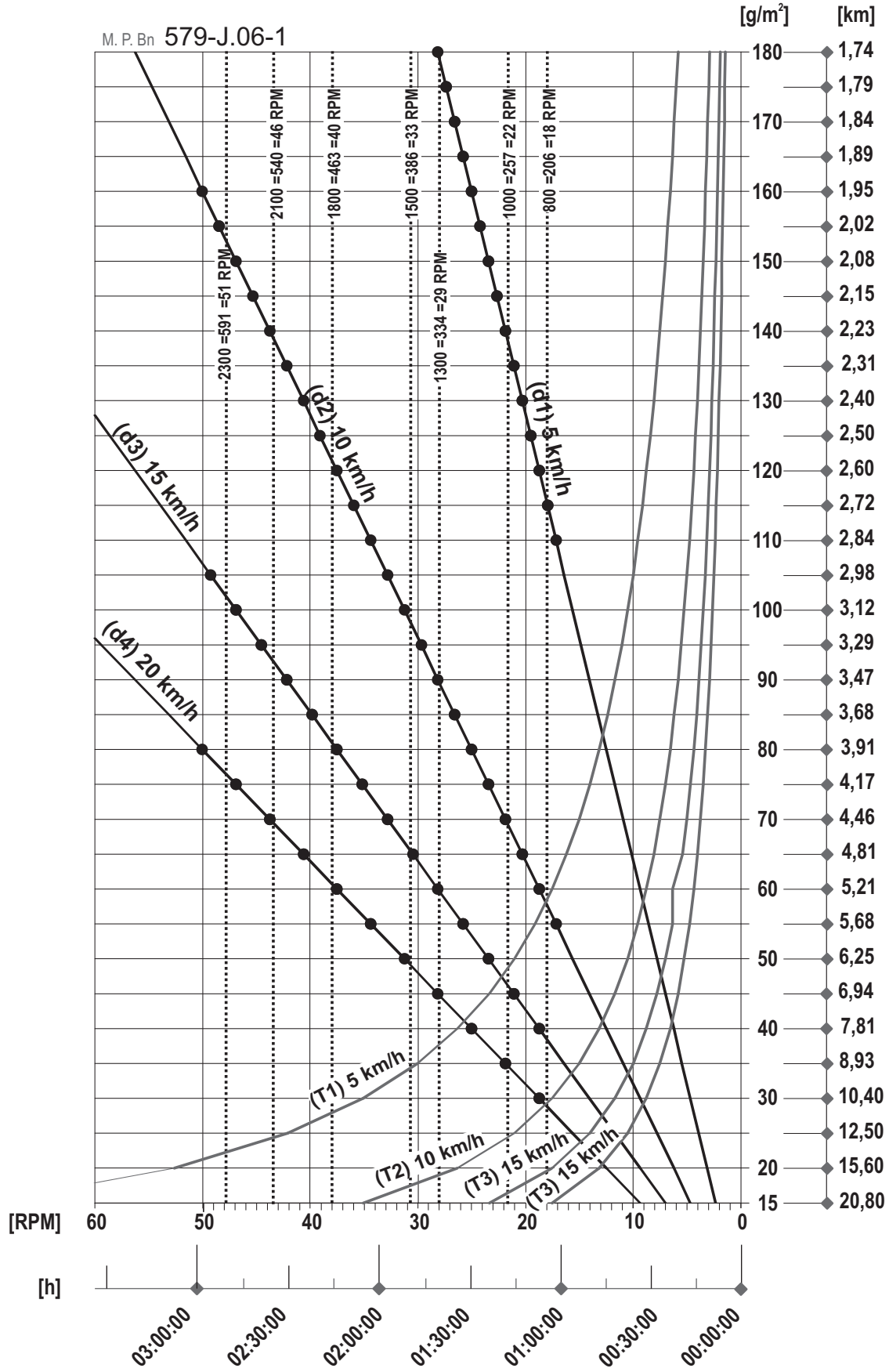


Nomogram 8.5 Approximate parameters for salt spreading for the sand spreader with mechanical drive without wall extension

Assumed parameters:

total material weight: 312.5 kg; tank capacity: 0.25 m³; salt bulk density: 1250 kg/m³;

For live (drive-dependent) 540 RPM PTO, the carrier vehicle engine speed (800-2100 RPM) corresponds to (18-46 RPM) of the spreading roller

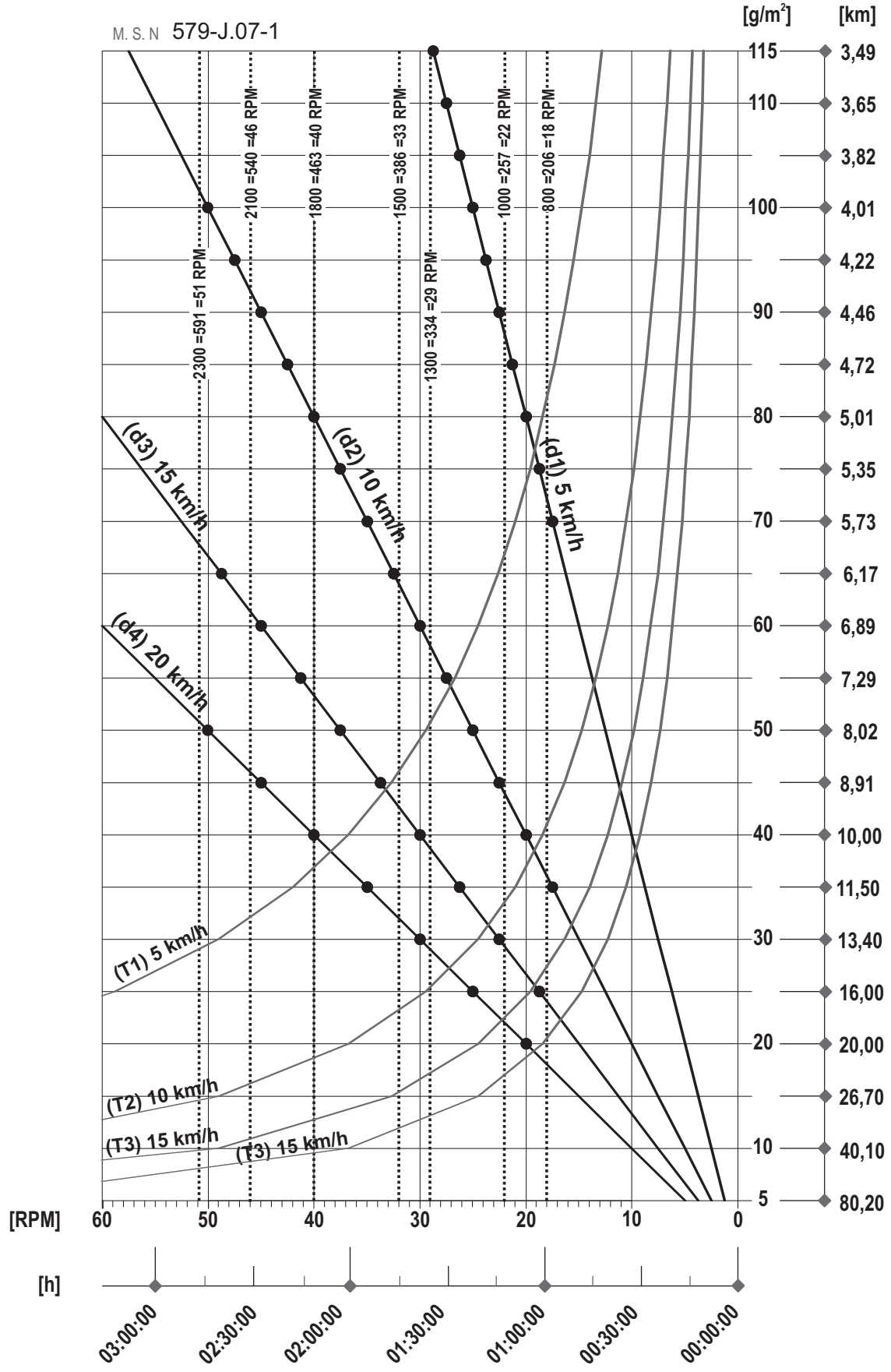


Nomogram 8.6 Approximate parameters for sand spreading for the sand spreader with mechanical drive without wall extension

Assumed parameters:

total material weight: 375 kg; tank capacity: 0.25 m³; sand bulk density: 1500 kg/m³;

For live (drive-dependent) 540 RPM PTO, the carrier vehicle engine speed (800-2100 RPM) corresponds to (18-46 RPM) of the spreading roller

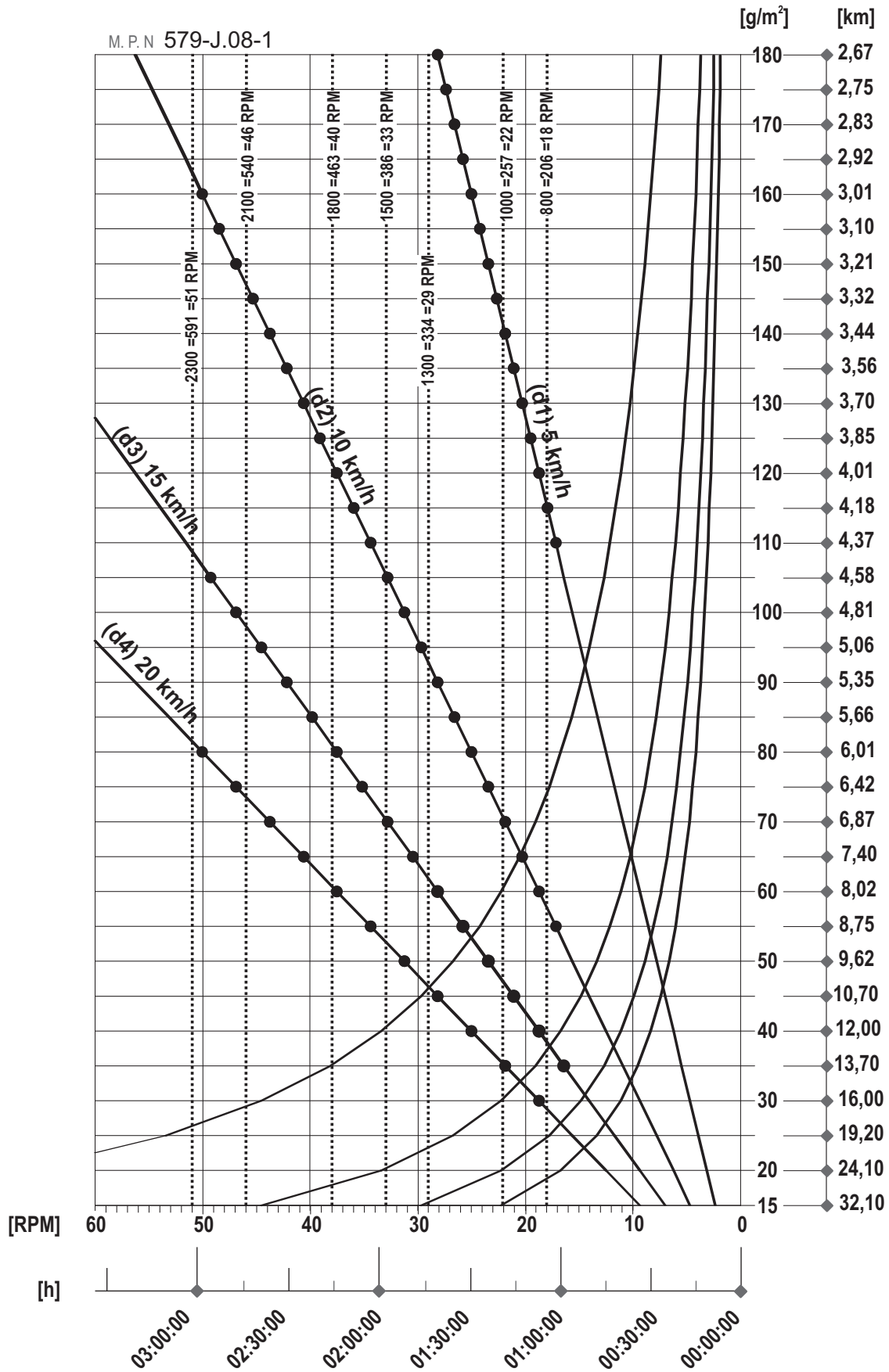


Nomogram 8.7 Approximate parameters for salt spreading for the sand spreader with mechanical drive with wall extension

Assumed parameters:

total material weight: 481.25 kg; tank capacity: 0.385 m³; salt bulk density: 1250 kg/m³;

For live (drive-dependent) 540 RPM PTO, the carrier vehicle engine speed (800-2100 RPM) corresponds to (18-46 RPM) of the spreading roller

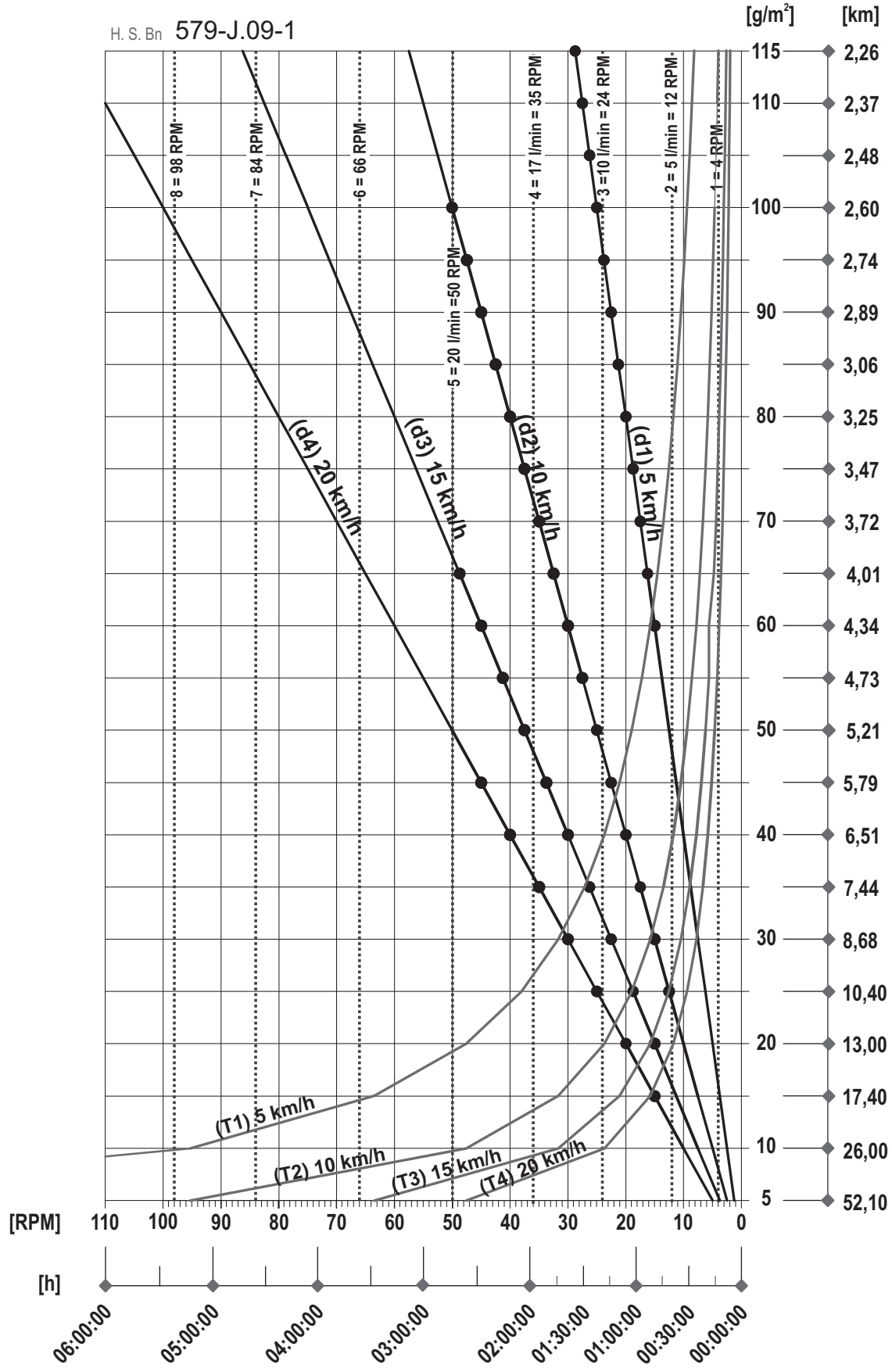


Nomogram 8.8 Approximate parameters for sand spreading for the sand spreader with mechanical drive with wall extension

Assumed parameters:

total material weight: 577.5 kg; tank capacity: 0.385 m³; sand bulk density: 1500 kg/m³;

For live (drive-dependent) 540 RPM PTO, the carrier vehicle engine speed (800-2100 RPM) corresponds to (18-46 RPM) of the spreading roller

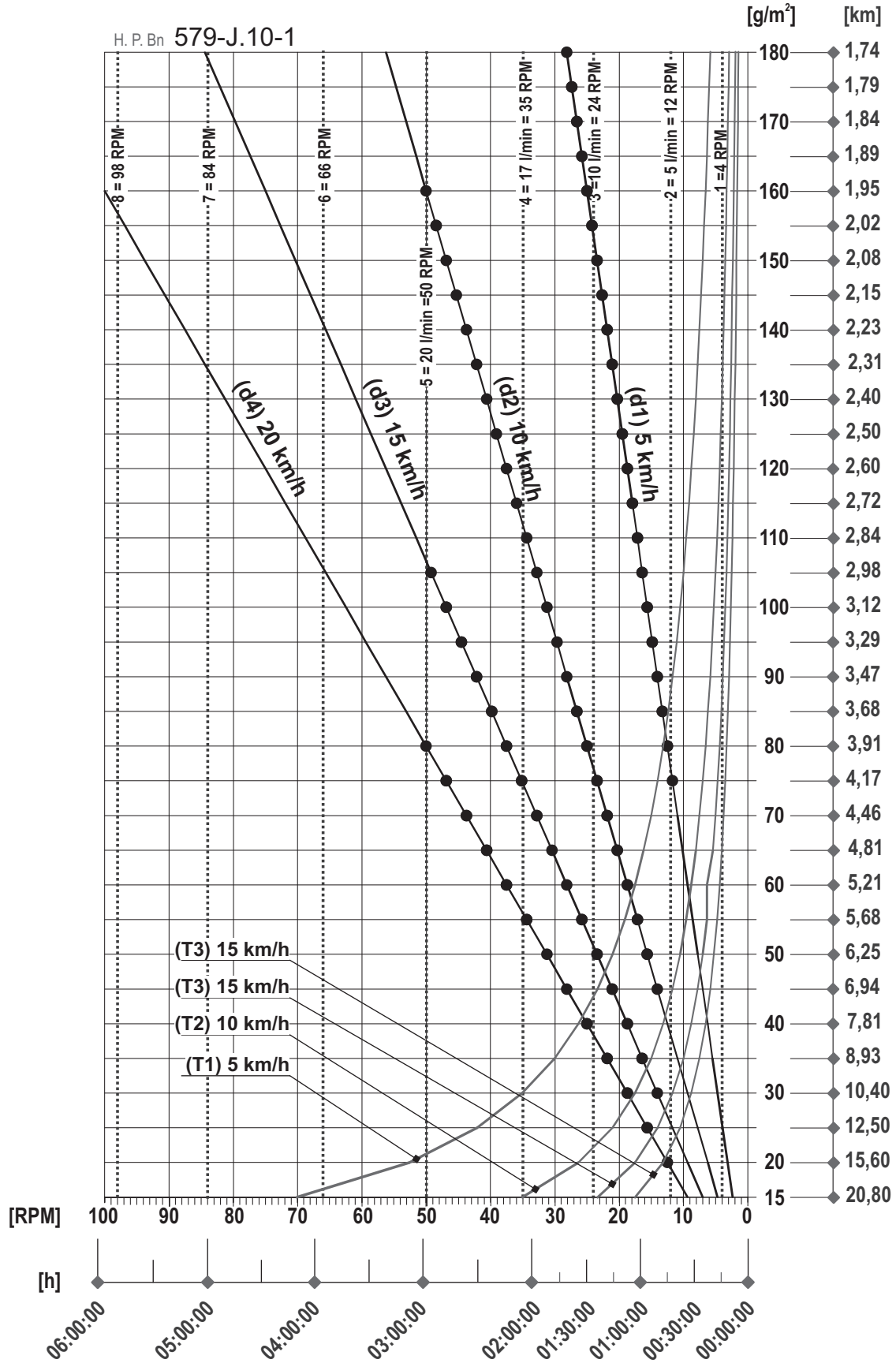


Nomogram 8.9 Approximate parameters for salt spreading for the sand spreader with hydraulic drive without wall extension

Assumed parameters:

total material weight: 312.5 kg; tank capacity: 0.25 m³; salt bulk density: 1250 kg/m³;

The scale of the three-way flow regulator (1-8) corresponds to (4-100 RPM) of the spreading roller

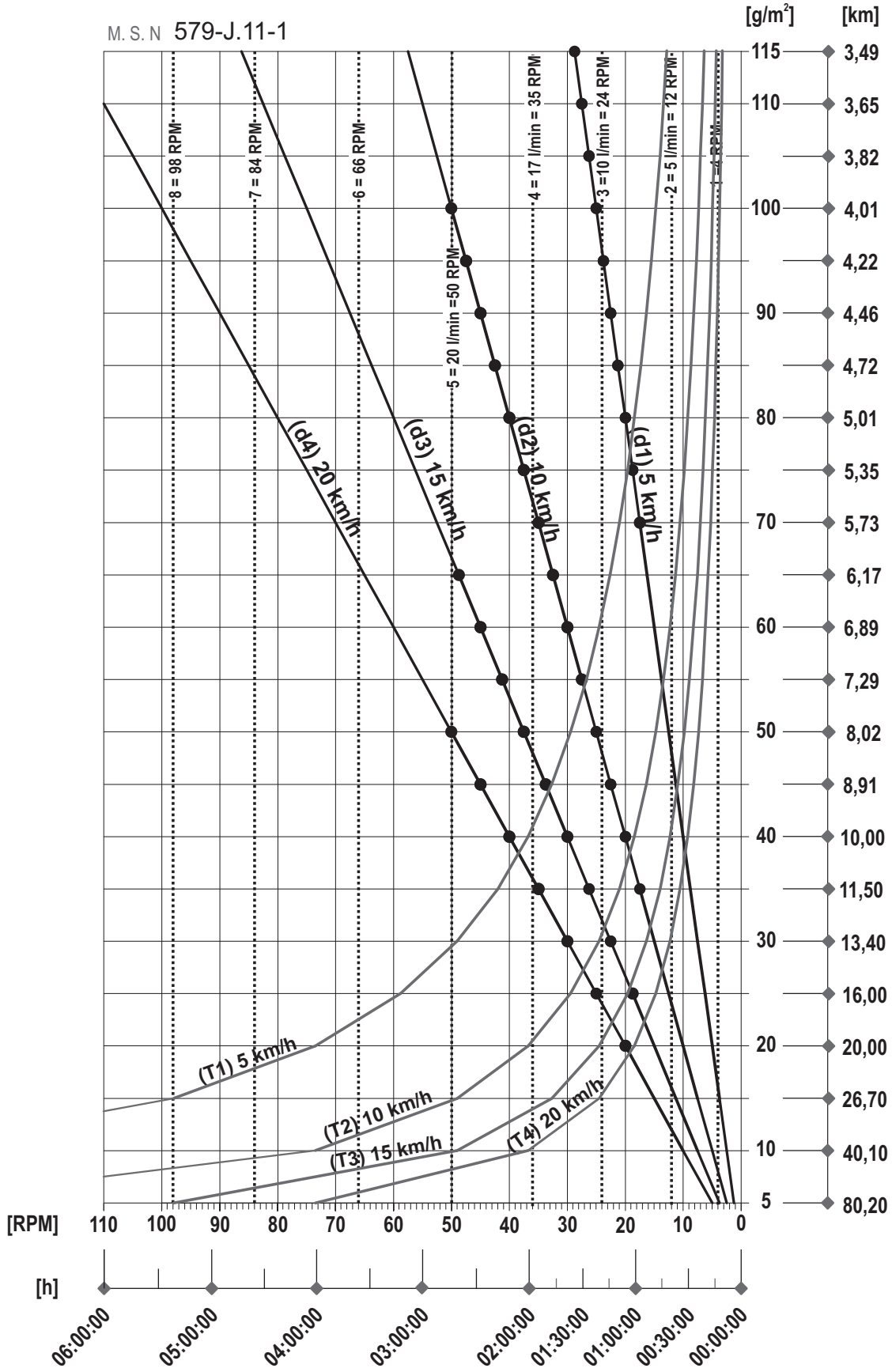


Nomogram 8.10 Approximate parameters for sand spreading for the sand spreader with hydraulic drive without wall extension

Assumed parameters:

total material weight: 375 kg; tank capacity: 0.25 m³; sand bulk density: 1500 kg/m³;

The scale of the three-way flow regulator (1-8) corresponds to (4-100 RPM) of the spreading roller

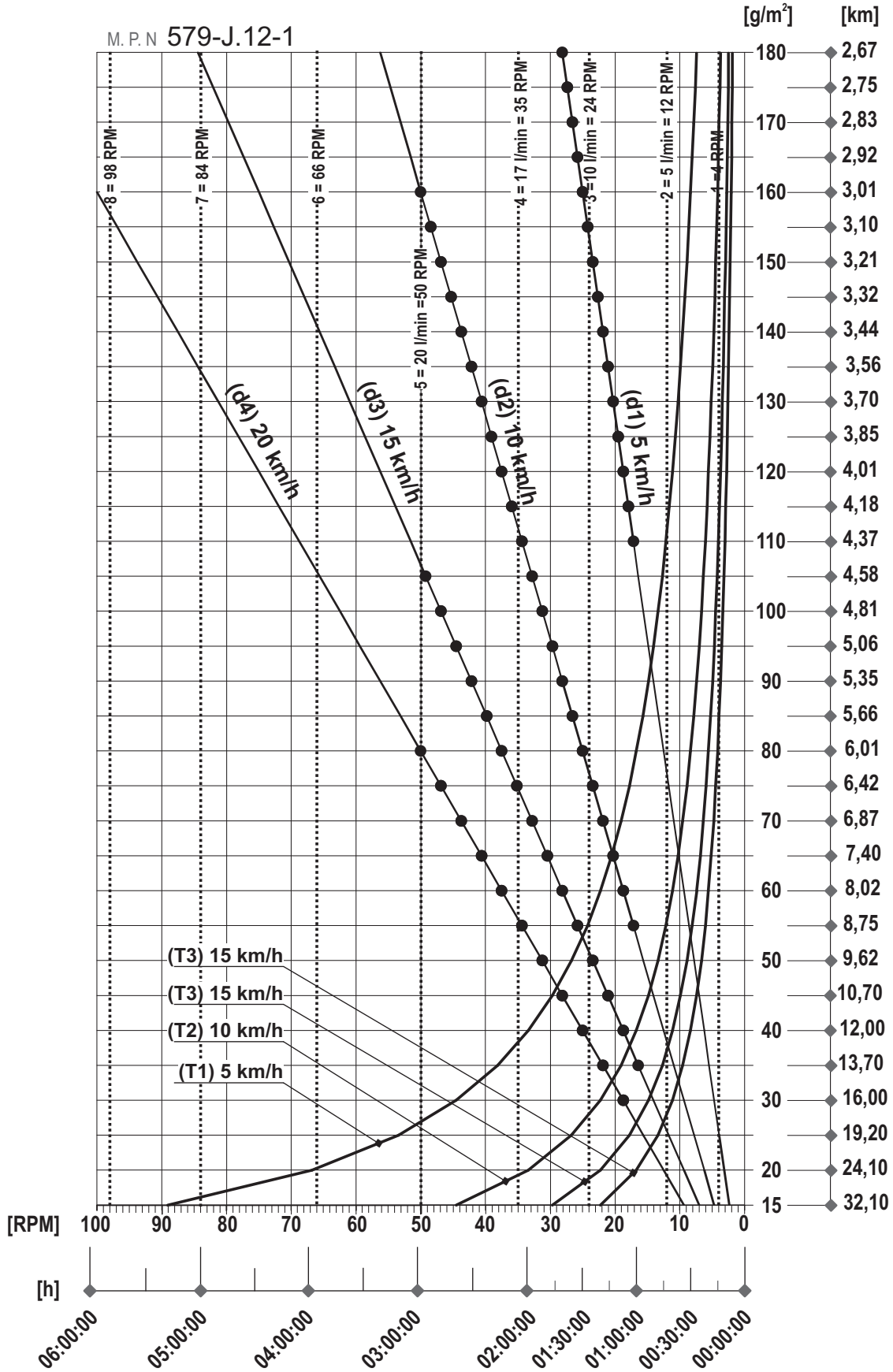


Nomogram 8.11 Approximate parameters for salt spreading for the sand spreader with hydraulic drive with wall extension

Assumed parameters:

total material weight: 481.25 kg; tank capacity: 0.385 m³; salt bulk density: 1250 kg/m³;

The scale of the three-way flow regulator (1-8) corresponds to (4-100 RPM) of the spreading roller



Nomogram 8.12 Approximate parameters for sand spreading for the sand spreader with hydraulic drive with wall extension

Assumed parameters:

total material weight: 577.5 kg; tank capacity: 0.385 m³; sand bulk density: 1500 kg/m³;

The scale of the three-way flow regulator (1-8) corresponds to (4-100 RPM) of the spreading roller