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استاندارد ملی ایران

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ماشین آلات و تجهیزات راهسازی و راهداری -
انواع اصلی - شناسایی و توصیف

**Road construction and road maintenance
machinery and equipment - Basic types -
Identification and description**

ICS:93.080.10

بنام خدا

آشنایی با موسسه استاندارد و تحقیقات صنعتی ایران

موسسه استاندارد و تحقیقات صنعتی ایران به موجب بندیک ماده ۳ قانون اصلاح قوانین و مقررات موسسه استاندارد و تحقیقات صنعتی ایران، مصوب بهمن ماه ۱۳۷۱ تنها مرجع رسمی کشور است که وظیفه تعیین، تدوین و نشر استاندارد های ملی (رسمی) ایران را برعهده دارد.

تدوین استاندارد در حوزه های مختلف کمیسیون فنی مرکب از کارشناسان موسسه* صاحب نظران مراکز و موسسات علمی، پژوهشی، تولید و اقتصادی آگاه و مرتبط انجام می شود و کوششی همگام با مصالح ملی و با توجه به شرایط تولیدی، فناوری و تجاری است که از مشارکت آگاهانه و منصفانه صاحبان حق و نفع، شامل تولید کنندگان، مصرف کنندگان، صادر کنندگان و وارد کنندگان، مراکز علمی و تخصصی، نهادها، سازمان های دولتی و غیردولتی حاصل می شود. پیش نویس استاندارد های ملی برای نظر خواهی به مراجع ذی نفع و اعضاء کمیسیون های فنی مربوطه ارسال می شود. و پس از دریافت نظرها و پیشنهادهای در کمیته ملی مرتبط با آن رشته طرح در صورت تصویب به عنوان استاندارد ملی (رسمی) ایران چاپ و منتشر می شود.

پیش نویس استانداردهایی که موسسات و سازمانهای علاقه مند ذی صلاح نیز با رعایت ضوابط تعیین شده تهیه می کنند در کمیته ملی طرح و بررسی و در صورت تصویب، به عنوان استاندارد ملی (رسمی) چاپ و منتشر می شود. بدین ترتیب، استانداردهایی ملی تلقی می شود که براساس مفاد نوشته شده در استاندارد ملی ایران شماره ۵ تدوین و در کمیته ملی استاندارد مربوطه که موسسه استاندارد تشکیل می دهد به تصویب رسیده باشد.

موسسه استاندارد و تحقیقات صنعتی ایران از اعضای اصلی سازمان بین المللی استاندارد (ISO)^۱ کمیسیون بین المللی الکتروتکنیک (IEC)^۲ و سازمان بین المللی اندازه شناسی قانونی (OIML)^۳ است و به عنوان تنهاریابط^۴ کمیسیون کدکس غذایی (CAC)^۵ در کشور فعالیت می کند. در تدوین استاندارد های ملی ایران ضمن توجه به شرایط کلی و نیاز مندی های خاص کشور، از آخرین پیشرفت های علمی، فنی و صنعتی جهان و استاندارد های بین المللی بهره گیری می شود.

موسسه استاندارد و تحقیقات صنعتی ایران می تواند با رعایت موازین پیش بینی شده در قانون برای حمایت از مصرف کنندگان، حفظ سلامت و ایمنی فردی و عمومی، حصول اطمینان از کیفیت محصولات و ملاحظات زیست محیطی و اقتصادی اجرای بعضی از استانداردهای ملی ایران را برای محصولات تولیدی داخل کشور و / یا اقلام وارداتی با تصویب شورای عالی استاندارد، اجباری نماید. موسسه می تواند به منظور حفظ بازارهای بین المللی برای محصولات کشور، اجرای استاندارد کالاهای صادراتی و درجه بندی آن را اجباری نماید. همچنین برای اطمینان بخشیدن به استفاده کنندگان از خدمات سازمان ها و موسسات فعال، در زمینه آموزش، مشاوره، بازرسی، ممیزی و صدور گواهی سیستم های کیفیت و مدیریت زیست محیطی، آزمایشگاه ها و مراکز کالیبراسیون (واسنجی) و وسایل سنجش، موسسه استاندارد این گونه سازمان ها موسسات را براساس ضوابط نظام تایید صلاحیت ایران ارزیابی می کند و در صورت احراز شرایط لازم، گواهی تایید صلاحیت با آنها اعطاء و بر عملکرد آنها نظارت می کند. ترویج دستگاه بین المللی یکا های کالیبراسیون (واسنجی) و وسایل سنجش، تعیین عیار فلزات گرانبها و انجام تحقیقات کاربردی برای ارتقاء سطح استاندارد های ملی ایران از دیگر وظایف این موسسه است.

* موسسه استاندارد و تحقیقات صنعتی ایران

1- International Organization for standardization

2- International Electrotechnical commission

3 - International Organization for Legal Metrology (Organization International de Metrology Legal)

4 - Contact point

5 - Codex Alimentarius commission

کمیسیون فنی تدوین استاندارد

" ماشین آلات و تجهیزات راهسازی و راهداری - انواع اصلی - شناسایی و توصیف "

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وزارت جهاد کشاورزی - مؤسسه تحقیقات فنی و مهندسی

شرکت بازرسی فنی فلات پژوهاک

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پیش گفتار

استاندارد " ماشین آلات و تجهیزات راهسازی و راهداری - انواع اصلی - شناسایی و توصیف " که پیش نویس آن توسط بنیاد آموزش های فنی و حرفه ای ایرانیان و بر اساس راهنمای ۲۱ ایزو " پذیرش منطقه ای یا ملی استاندارد های بین المللی و دیگر مدارک استاندارد " در کمیسیون های مربوطه تهیه و تدوین شده و در سیصد و چهل و هفتمین اجلاس کمیته ملی استاندارد خودرو و نیرو محرکه مورخ ۱۳۸۷/۷/۲۱ مورد تصویب و پذیرش قرار گرفته است ، اینک به استناد بند یک ماده ۳ قانون اصلاح قوانین ومقررات موسسه استاندارد و تحقیقات صنعتی ایران مصوب بهمن ماه ۱۳۷۱ به عنوان استاندارد ملی ایران منتشر می گردد .

برای حفظ همگامی و هماهنگی با تحولات و پیشرفت های ملی و جهانی در زمینه صنایع ، علوم و خدمات ، استاندارد های ملی ایران در مواقع لزوم تجدید نظر خواهد شد و هر پیشنهادی که برای اصلاح یا تکمیل این استاندارد ها ارائه شود ، در هنگام تجدید نظر در کمیسیون فنی مربوط مورد توجه قرار خواهد گرفت . بنابر این همواره از آخرین تجدید نظر آنها استفاده می گردد .

در تدوین این استاندارد ملی ایران ، استاندارد زیر به صورت الزام آور مورد ارجاع قرار گرفته است :

ISO 22242:2005, Road construction and road maintenance machinery and equipment —
Basic types — Identification and description

ماشین آلات و تجهیزات راهسازی و راهداری - انواع اصلی - شناسایی و توصیف

۱ هدف و دامنه کاربرد

هدف از تدوین این استاندارد، شناسایی و توصیف ماشین آلات و تجهیزات مورد استفاده در ساخت و ساز و تعمیر و نگهداری راه ها، جاده ها ، بزرگ راه ها، باند پرواز، توقف گاه ها، و غیره می باشد. این استاندارد برای ماشین ها و تجهیزات خاص جهت کف سازی و تعمیر و نگهداری جاده ها کاربرد دارد .

این استاندارد واژه ها را تعریف نمی کند و شکل ها به صورت شماتیک و طرح کلی نمایش داده شده اند .

چکیده

چکیده موضوعات مطرح شده در این استاندارد به شرح زیر است:

- در بند ۱-۲ تعاریف و شکل تجهیزات و ماشین های مربوط به ساخت و نگهداری جاده ارائه شده است .
- در بند ۲-۲ تعاریف و شکل ماشین ها و تجهیزات مربوط به قیرپاشی ارائه شده است .
- در بند ۳-۲ تعاریف و شکل ماشین ها و تجهیزات مربوط به تولید مخلوط آسفالت ارائه شده است.
- در بند ۴-۲ تعاریف و شکل ماشین ها و تجهیزات مربوط به کف سازی آسفالت بتون ارائه شده است .
- در بند ۵-۲ تعاریف و شکل ماشین ها و تجهیزات مربوط به ساخت راه بتونی ارائه شده است .
- در بند ۶-۲ تعاریف و شکل ماشین ها و تجهیزات مربوط به کارهای روسازی (روکش) جاده ارائه شده است .

سایر بندهای استاندارد بین المللی ISO 22242:2005 در مورد این استاندارد ملی الزامی می باشد .

INTERNATIONAL
STANDARD

ISO
22242

First edition
2005-09-15

**Road construction and road maintenance
machinery and equipment — Basic
types — Identification and description**

*Machines et matériels pour la construction et l'entretien des routes —
Principaux types — Dénomination et description*



Reference number
ISO 22242:2005(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 22242 was prepared by Technical Committee ISO/TC 195, *Building construction machinery and equipment*.

Introduction

A whole range and many different types of machinery are needed for building and maintaining traffic routes, roads, highways, runways, aprons, etc. These can be divided into the following main groups, falling within the particular scopes of ISO Technical Committees.

— Tractors and machinery for agriculture and forestry (ISO/TC 23)

EXAMPLE Brush-cutters and brush saws, log loaders, portable chain saws, branches-shredders, drainage pipe layers, digger ploughs and other machines defined in ISO 3339.

— Earth-moving machinery (ISO/TC 127)

EXAMPLE Excavators, tractor dozers, scrapers, loaders, dumpers, trenchers, graders, rollers, vibratory plates, rammers and other machines defined in ISO 6165, ISO 6747, ISO 7131, ISO 7132, ISO 7133, ISO 7134 and ISO 8811.

— Building construction machinery and equipment (ISO/TC 195)

EXAMPLE Formworks, drum mixers, machines and equipment for concrete-mix production, truck concrete mixers and concrete transport skips, concrete pumps, vibrating beams, floating machines, concrete vacuum treatment units, core drilling units and other machines defined in ISO 11375.

— General-use machinery and equipment

EXAMPLE Power tools such as hammers, industrial vacuum cleaners, blowers, water pumps, portable chain saws, liquid gas heating units, infrared heaters.

— Machines and equipment designed especially for road construction and maintenance (ISO/TC 195).

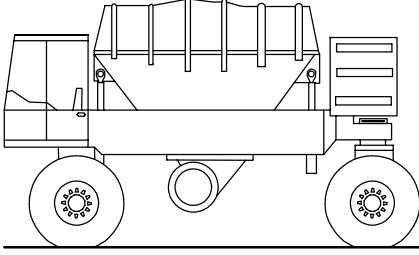
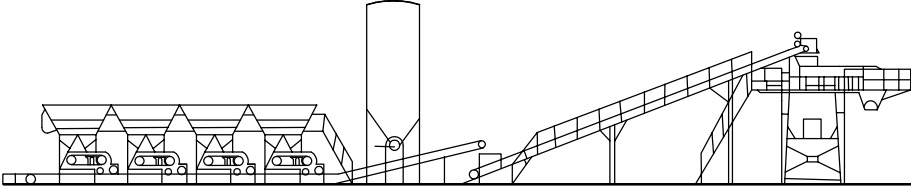
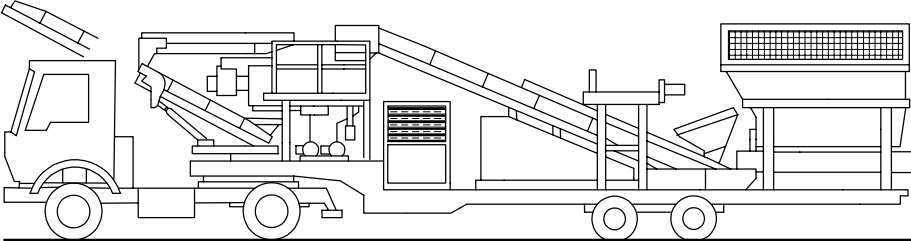
This International Standard identifies and describes elements of this last group.

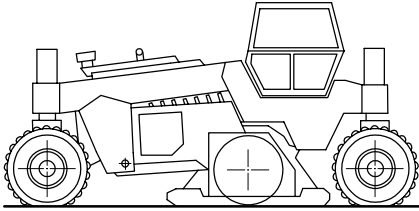
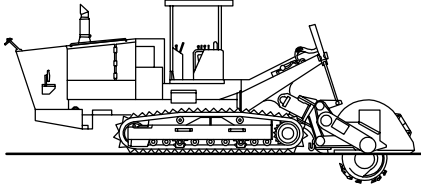
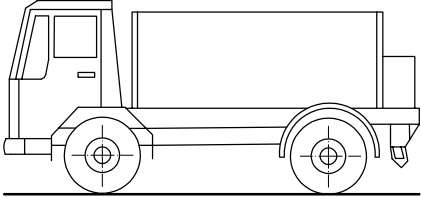
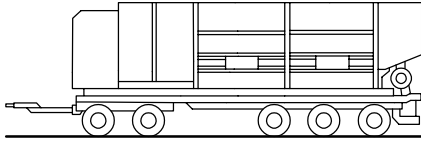
Road construction and road maintenance machinery and equipment — Basic types — Identification and description

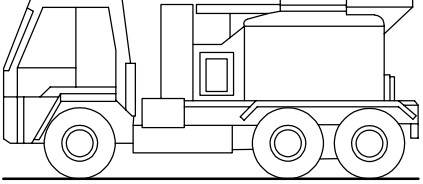
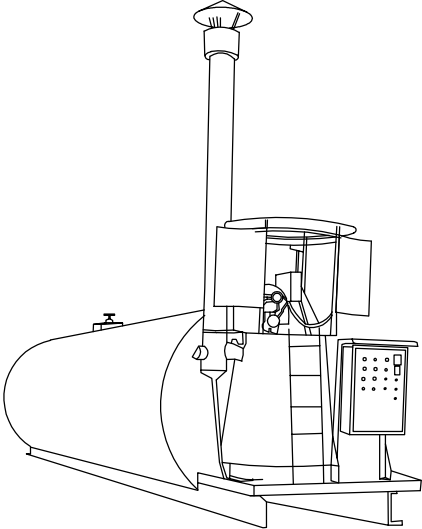
1 Scope

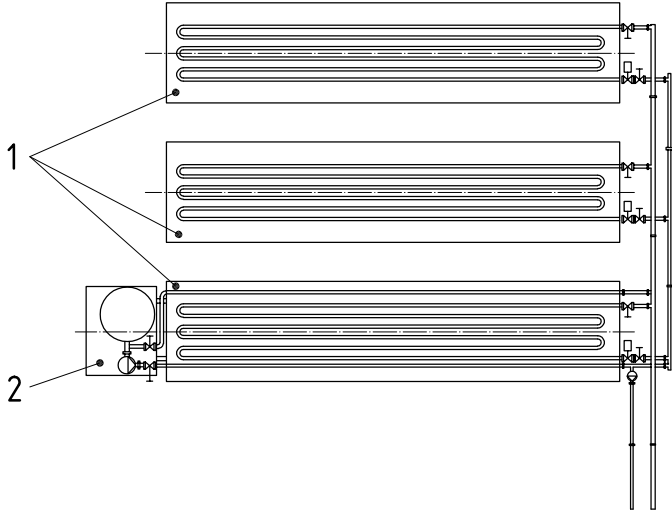
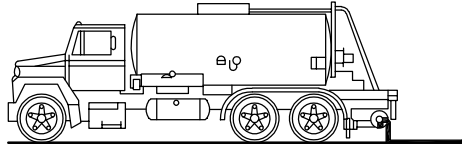
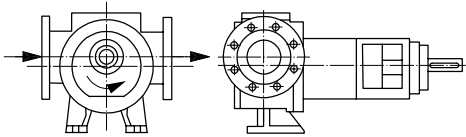
This International Standard identifies and describes machinery and equipment used in the construction and maintenance of traffic routes, roads, highways, runways, aprons, etc. It is applicable to those specialized machines/equipment intended for pavement construction and road maintenance. It does not define terms, and its figures represent a general view or outline.

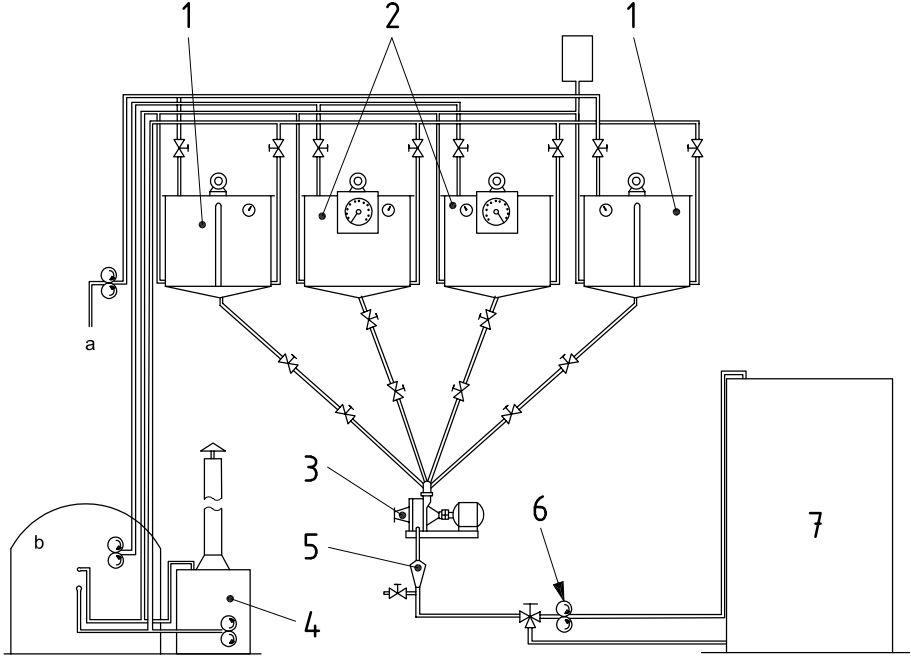
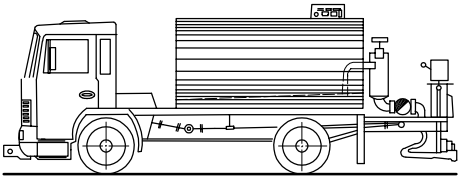
2 Machines and equipment for road construction and maintenance

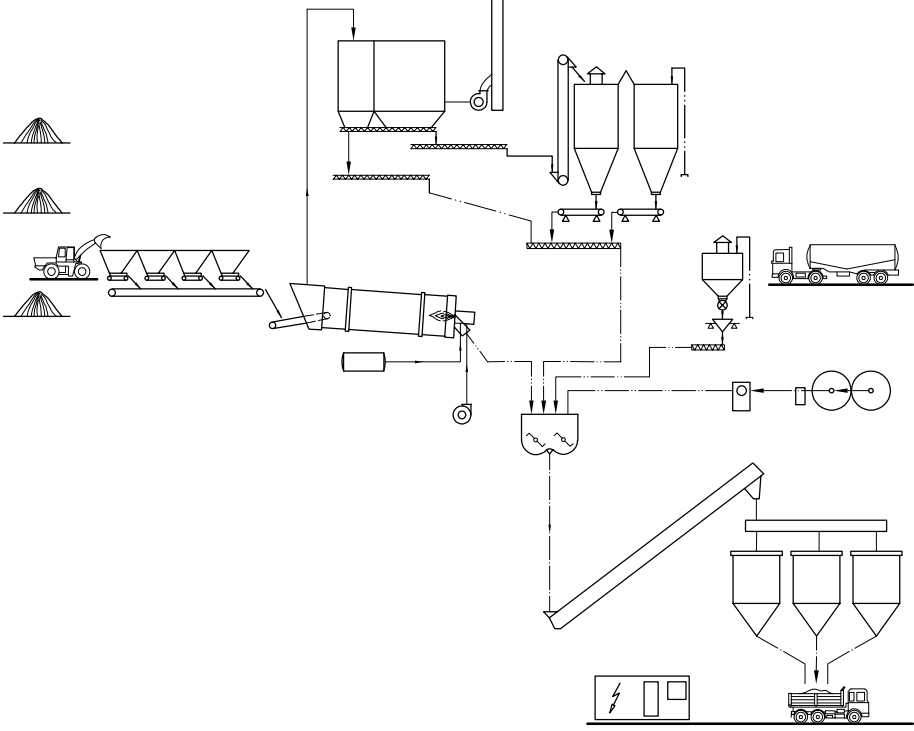
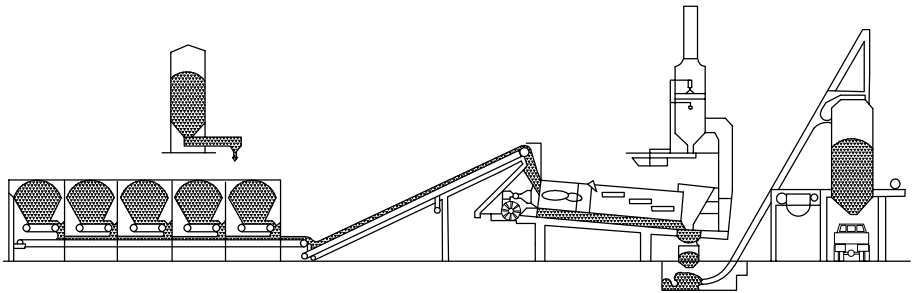
Term	Identification/Description	
<p>2.1 Soil stabilization machinery and equipment</p> <p>These are used to improve the mechanical and physical properties of natural soils.</p> <p>See Figures 1 to 7.</p>		
<p>2.1.1 powder binder spreader</p>	<p>mobile machine intended for steadily spreading filler, cement, lime, etc., to improve the mechanical and physical properties of the soil material</p> <p>NOTE 1 The spreaders are designed so that the output is controlled by travel speed and proportioning devices.</p> <p>NOTE 2 See ISO 15689.</p>	 <p>Figure 1 — Powder binder spreader</p>
<p>2.1.2 soil mix plant</p>	<p>set of equipment intended for mixing fillers and/or binders, e.g. cement, lime, foamed bitumen, asphalt emulsion, with natural soil in order to improve the mechanical and physical properties of the soil material</p> <p>NOTE See Figures 2 and 3.</p>	
<p>2.1.3 stationary soil mix plant</p>	<p>soil mix plant designed for stationary use</p>  <p>Figure 2 — Stationary soil mix plant</p>	
<p>2.1.4 portable soil mix plant</p>	<p>soil mix plant capable for relocation on wheeled chassis</p>  <p>Figure 3 — Portable soil mix plant</p>	

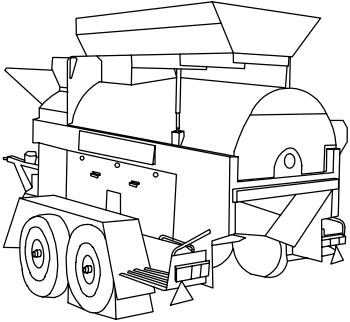
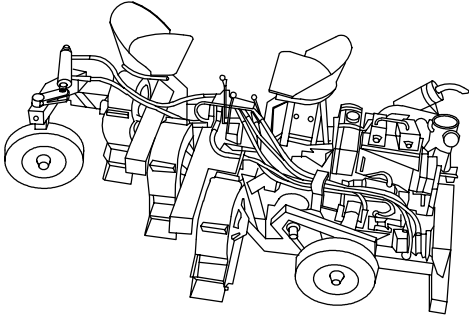
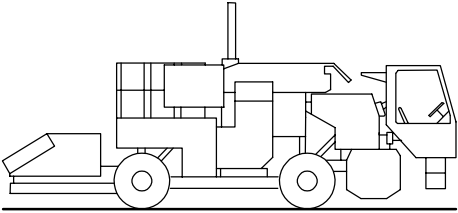
Term	Identification/Description	
<p>2.1.5 soil stabilizer</p>	<p>self-propelled machine, towed or transported, with the function of pulverizing, breaking up, aerating, homogenizing and/or loosening existing or imported materials or pavement materials and mixing it/them with one or more added materials (filler, cement, lime, etc.)</p> <p>NOTE 1 A main purpose of the soil stabilizer's use is to improve the mechanical and physical properties of the soil material by mixing it with binders (cement, lime, foamed bitumen, emulsions, etc.) or fillers.</p> <p>NOTE 2 See ISO 15688.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Figure 4 — Wheeled central soil stabilizer with horizontal rotor</p> </div> <div style="text-align: center;">  <p>Figure 5 — Crawler-based rear soil stabilizer with horizontal rotor</p> </div> </div>	
<p>2.1.6 water dispenser</p>	<p>water tank, mounted on truck, semi-trailer or trailer, containing built-in water-spraying unit equipped with spraying bar</p> <div style="text-align: center;">  <p>Figure 6 — Water dispenser</p> </div>	
<p>2.1.7 slurry mixer</p>	<p>mobile machine used to mix and proportion water and cement to a suspension which is directly injected into the mixing chamber of a soil stabilizer</p> <p>NOTE The slurry mixer is either pushed or towed by the soil stabilizer.</p> <div style="text-align: center;">  <p>Figure 7 — Slurry mixer</p> </div>	

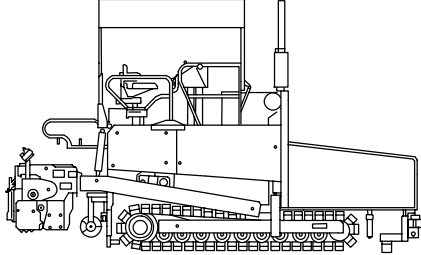
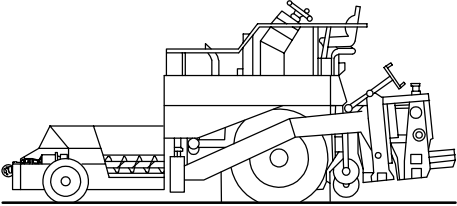
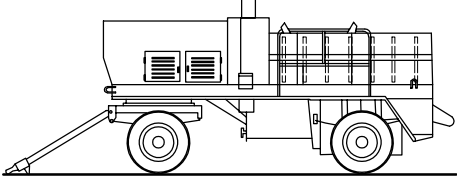
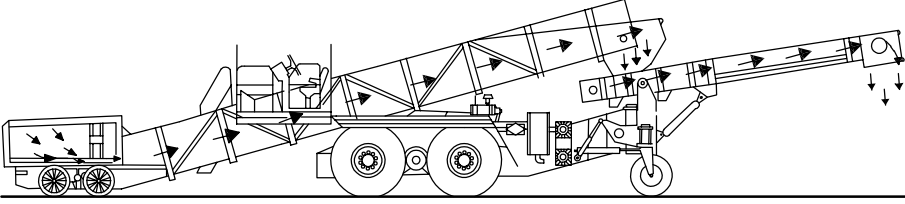
Term	Identification/Description	
<p>2.2 Machines and equipment for bituminous binders</p> <p>These are used for storing, keeping warm, melting, homogenizing, handling and/or spraying bituminous binders.</p> <p>See Figures 8 to 12.</p>		
<p>2.2.1 bituminous binders heater and smelter/asphalt cooker</p>	<p>stationary or mobile set of units intended for storing, melting, homogenizing, keeping warm and discharge bituminous binders</p> <p>NOTE The bituminous binders heater and smelter is composed of the following units:</p> <ul style="list-style-type: none"> — insulated tank; — oil or gas burner; — internal stirrer; — discharge unit in the form of gravity valve; — pressure tank or transfer pump. 	 <p>Figure 8 — Bituminous binders heater and smelter (mobile)</p>
<p>2.2.2 bituminous binders storage tank</p>	<p>stationary or trailer-mounted insulated tank, with heating unit, intended for storage of bituminous binders</p>  <p>Figure 9 — Bituminous binders storage tank</p>	

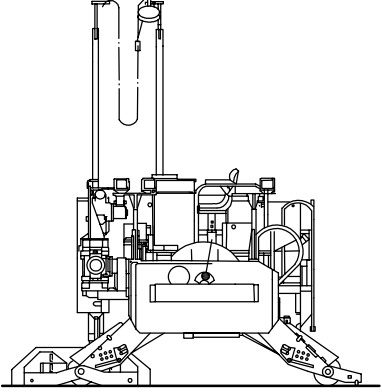
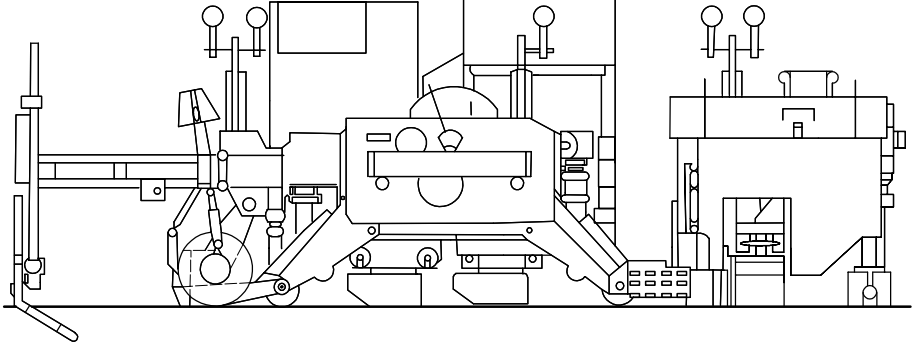
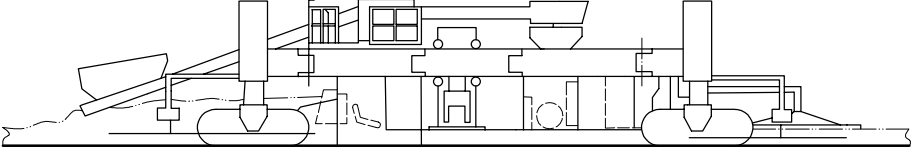
Term	Identification/Description	
<p>2.2.3 bitumen storage and heating plant</p>	<p>system consisting of a boiler and insulated horizontal or vertical metal tanks or underground concrete tanks intended for hot bitumen storage</p>  <p>Key</p> <ul style="list-style-type: none"> 1 tank with oil heating piping 2 oil heating boiler <p style="text-align: center;">Figure 10 — Bitumen storage and heating plant</p>	
<p>2.2.4 bituminous binders dispenser</p>	<p>insulated and heated tank, mounted on a truck, semi-trailer or trailer and equipped with a discharge unit in the form of a gravity valve or transfer pump</p>	 <p style="text-align: center;">Figure 11 — Bituminous binders dispenser</p>
<p>2.2.5 pump for hot bituminous binders</p>	<p>gear or vane pump with seal selected to the temperature of the bituminous binder to be delivered</p> <p>NOTE The pump can be used in a variety of different pieces of road building equipment, e.g. as a trailer-mounted pump with an attachment for joining the pump with tanks and spraying units, asphalt mixing plants and bituminous binder spreaders/sprayers.</p>  <p style="text-align: center;">Figure 12 — Pump for hot bituminous binders</p>	

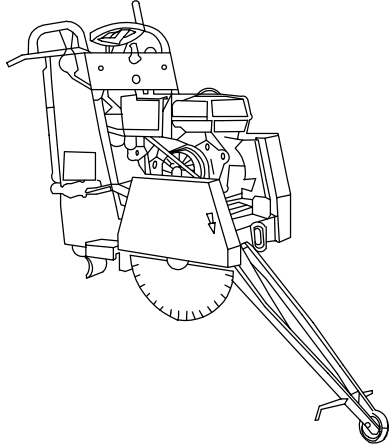
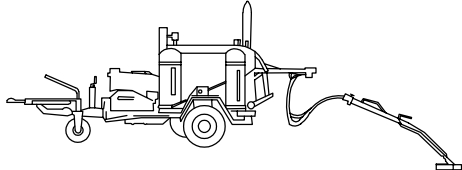
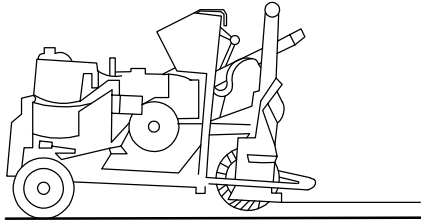
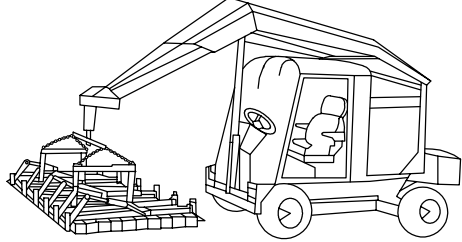
Term	Identification/Description	
<p>2.2.6 bituminous emulsions plant</p>	<p>assembly, either stationary or capable of relocation on a wheeled chassis, composed of water and bitumen metering tanks and a homogenizing system for bituminous emulsions production</p>  <p>Key</p> <ul style="list-style-type: none"> 1 tank for water metering 2 tank for bitumen metering 3 homogenizing unit 4 thermal oil central heating unit 5 funnel for emulsion control 6 emulsion transfer unit 7 emulsion storage tank(s) <p>a Water delivery. b Bitumen delivery.</p> <p style="text-align: center;">Figure 13 — Bituminous emulsions plant</p>	
<p>2.2.7 bituminous binders spreader/sprayer</p>	<p>mobile machine used to apply a film of binder on a pavement at a predetermined application rate</p> <p>NOTE 1 The particular types can be defined by associating the operation principle, the shape of the components, the type of binder, and by specifying the spreading performances.</p> <p>NOTE 2 See ISO 15643.</p>	 <p style="text-align: center;">Figure 14 — Bituminous emulsions spreader/sprayer</p>

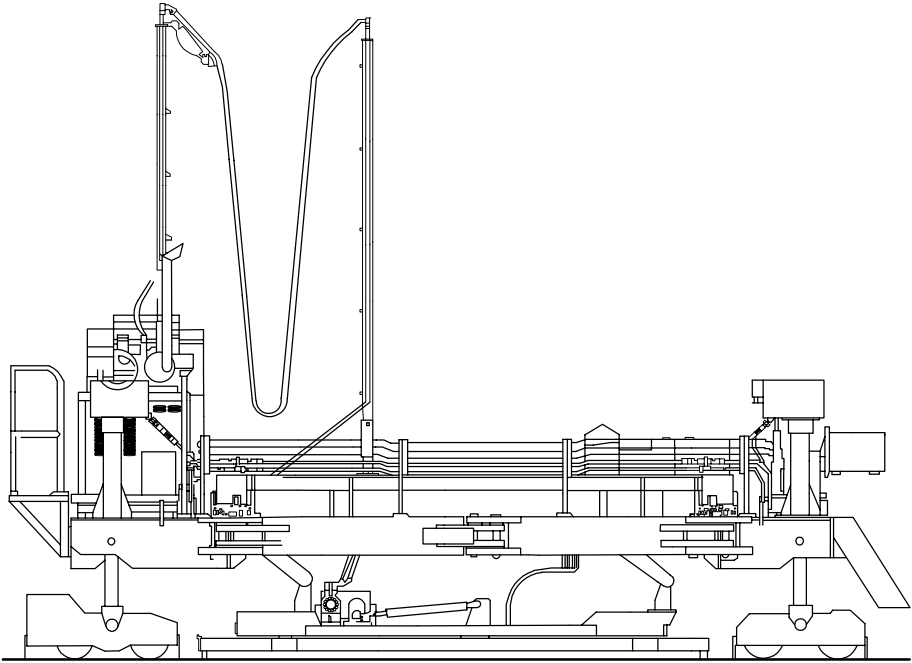
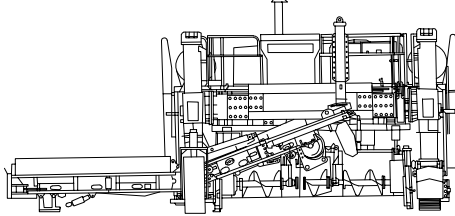
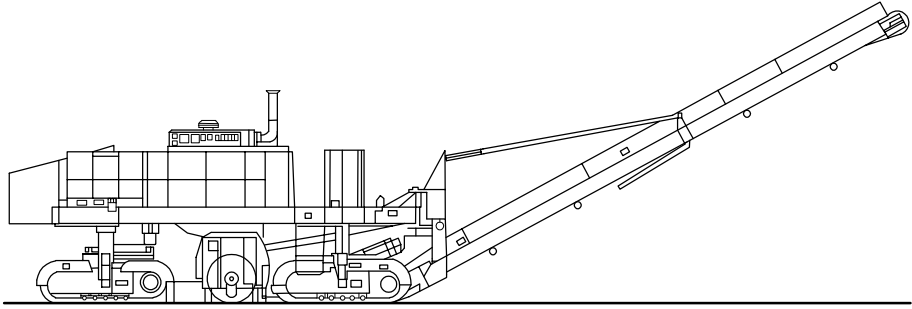
Term	Identification/Description
<p>2.3 Machines and equipment for asphalt mix production</p> <p>See Figures 15 to 16.</p>	
<p>2.3.1 asphalt mixing plant</p>	<p>set of equipment for asphalt mix production</p> <p>NOTE 1 According to its principle of production, there are two basic types of asphalt mixing plant: those for continuous and those for batch production.</p> <p>NOTE 2 See ISO 15642.</p>  <p style="text-align: center;">Figure 15 — Asphalt mixing plant</p>
<p>2.3.2 asphalt mixing plant with recycling capability</p>	<p>asphalt mixing plant with the use of reclaimed asphalt pavement (RAP) by the addition and/or modification of specialized equipment in the plant</p>  <p style="text-align: center;">Figure 16 — Asphalt mixing plant with recycling capability</p>

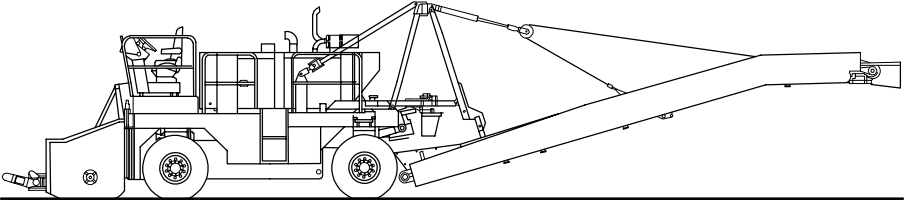
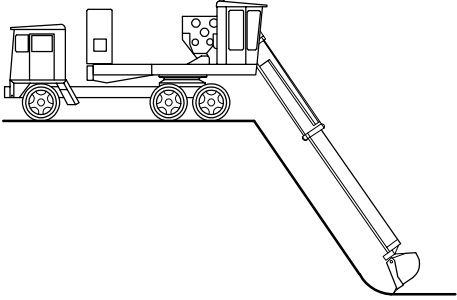
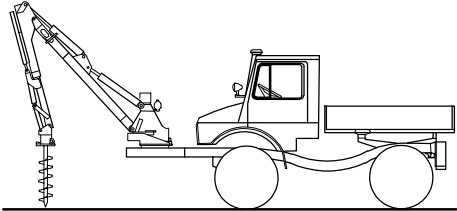
Term	Identification/Description	
<p>2.3.3 concrete asphalt melter and mixer</p>	<p>truck-mounted or towed machine composed of a melter for concrete asphalt pieces and a rotary horizontal axis mixer, intended for execution of small-sized concrete asphalt pavements</p>	 <p>Figure 17 — Concrete asphalt melter and mixer</p>
<p>2.4 Machines and equipment for concrete asphalt pavement construction</p> <p>These are used in the construction of concrete asphalt and mastic asphalt pavements. See Figures 19 to 23.</p>		
<p>2.4.1 blower for road bed cleaning</p>	<p>self-propelled machine for roadbed and pavement cleaning</p>	 <p>Figure 18 — Blower for road bed cleaning</p>
<p>2.4.2 chipping spreader</p>	<p>machine used to spread a layer of chippings on the pavement at a pre-determined rate</p> <p>NOTE 1 A chipping spreader can be defined by its operating principle into one of three types:</p> <ul style="list-style-type: none"> — transported; — self-propelled; — pushed by tipper truck. <p>NOTE 2 See ISO 15644.</p>	 <p>Figure 19 — Chipping spreader</p>

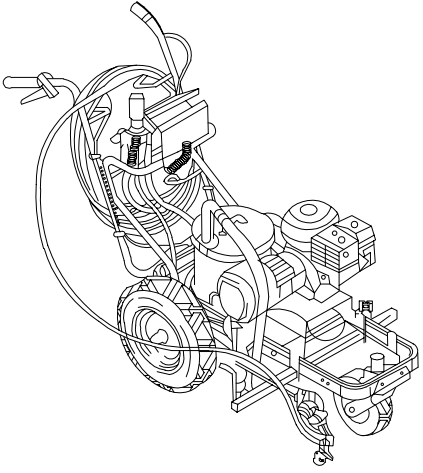
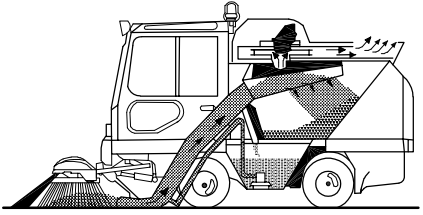
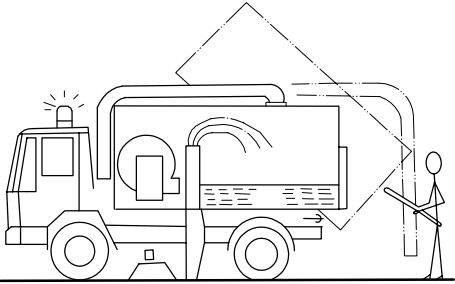
Term	Identification/Description	
2.4.3 asphalt paver/finisher	self-propelled, wheeled or crawler-mounted machine designed for receiving, conveying, distributing, profiling and compacting pavement asphalt mixes	 <p data-bbox="1011 584 1458 613">Figure 20 — Asphalt paver/finisher</p>
2.4.4 mastic asphalt paver	mobile machine designed for receiving, distributing and profiling flowable asphalt mixes	 <p data-bbox="1023 898 1449 927">Figure 21 — Mastic asphalt paver</p>
2.4.5 mastic asphalt transporting mixer	truck- or trailer-mounted machine consisting of a tank with horizontal or vertical mixer (agitating shaft and stirrer arms) for mastic asphalt with direct or indirect heating	 <p data-bbox="1059 1182 1410 1240">Figure 22 — Mastic asphalt transporting mixer</p>
2.4.6 material transfer machine/mobile conveyor device	machine intended for storing and conveying paving material to the asphalt paver from the truck	
		 <p data-bbox="592 1608 1390 1637">Figure 23 — material transfer machine/mobile conveyor device</p>

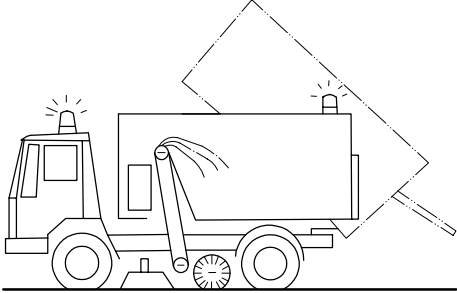
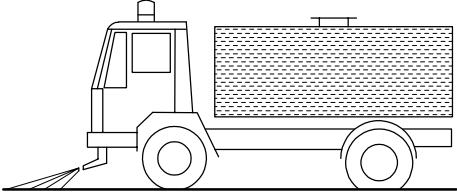
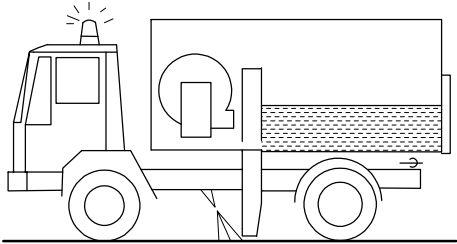
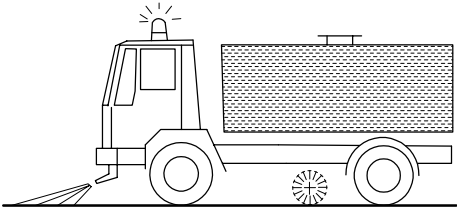
Term	Identification/Description	
<p>2.5 Machines and equipment for concrete pavement construction</p>		
<p>These are used in concrete pavement and auxiliary road construction.</p>		
<p>See Figures 25 to 35.</p>		
<p>2.5.1 concrete mix laying machine/concrete spreader</p>	<p>mobile or pedestrian-operated machine intended for distribution of the concrete mix placed by the dump trucks into the formwork fixed to the ground</p>	 <p>Figure 24 — Concrete mix laying machine/concrete spreader</p>
<p>2.5.2 concrete mix paver/concrete finisher</p>	<p>mobile machine intended for compaction and finishing (smoothing out) concrete mix inside the fixed formwork</p>  <p>Figure 25 — Concrete mix paver/concrete finisher</p>	
<p>2.5.3 slipform paver</p>	<p>mobile machine used for the purpose of applying layers of construction materials, such as concrete mix on surfaces, or for constructing profiled structures</p> <p>NOTE See ISO 16039.</p>	 <p>Figure 26 — Slipform paver</p>

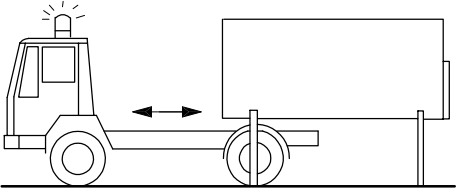
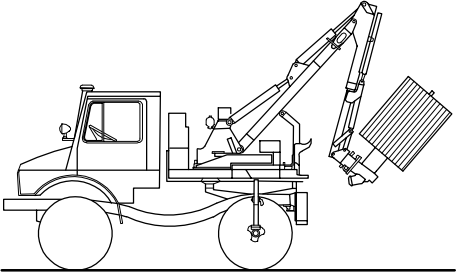
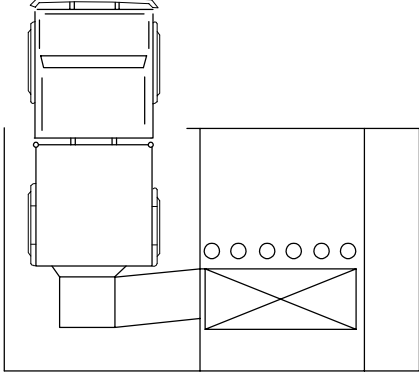
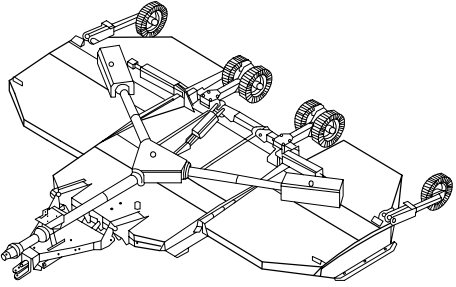
Term	Identification/Description	
<p>2.5.4 joint cutter</p>	<p>self-propelled, ride-on, or pedestrian-controlled machine intended for cutting out expansion joints in concrete asphalt, concrete and similar building materials</p>	 <p style="text-align: center;">Figure 27 — Joint cutter</p>
<p>2.5.5 joint sealing machine</p>	<p>mobile pedestrian-operated machine intended for blowing up dust from the expansions joints and filling them with a sealing compound</p>	 <p style="text-align: center;">Figure 28 — Joint sealing machine</p>
<p>2.5.6 edge tamping and cutting machine</p>	<p>machine intended for removal of projecting edges of extension joints by tamping or cutting</p>	 <p style="text-align: center;">Figure 29 — Edge tamping and cutting machine</p>
<p>2.5.7 paving stone laying machine paving block laying machine</p>	<p>self-propelled machine equipped with a jib and gripper for picking-up a prefabricated set of paving stones/blocks from the truck or existing windrow, conveying it and laying it down in its proper place in the pavement under construction</p> <p>NOTE It can also be equipped with attachments for aggregate and kerbstone laying.</p>	 <p style="text-align: center;">Figure 30 — Paving stone/block laying machine</p>

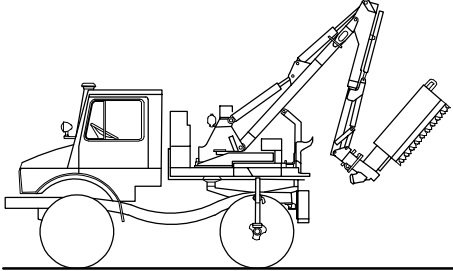
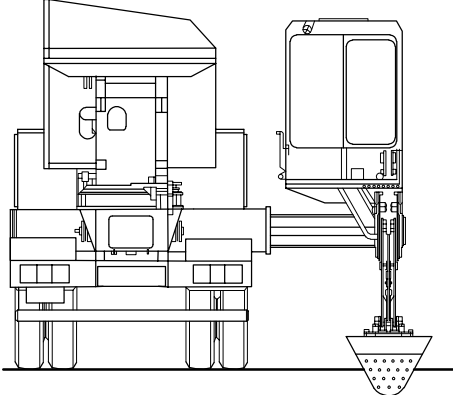
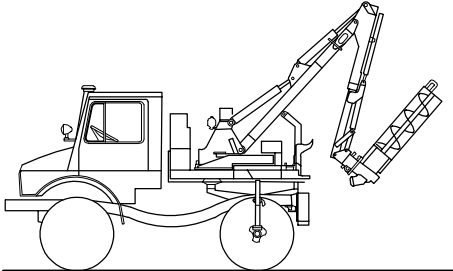
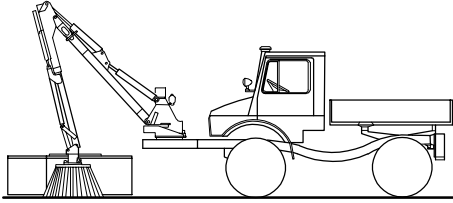
Term	Identification/Description	
<p>2.5.8 concrete leveller</p>	<p>mobile machine intended for levelling concrete mix compacted after spreading inside the fixed formwork</p>  <p style="text-align: center;">Figure 31 — Concrete leveller</p>	
<p>2.5.9 concrete mix placer/spreader</p>	<p>mobile machine used to receive concrete mix material from haul vehicles such as dump trucks, convey this material to the pavement sub-grade, and pre-spread it in front of a slipform paver at a specified uniform depth</p>	 <p style="text-align: center;">Figure 32 — Concrete mix placer/spreader</p>
<p>2.5.10 grade trimming machine</p>	<p>mobile machine with rotating cutter wheel used to accurately profile the sub-base of a roadway or airport pavement before the paving material is applied</p> <p>NOTE These machines typically have a conveyor for loading into trucks or windrowing the excess material.</p>  <p style="text-align: center;">Figure 33 — Grade trimming machine</p>	

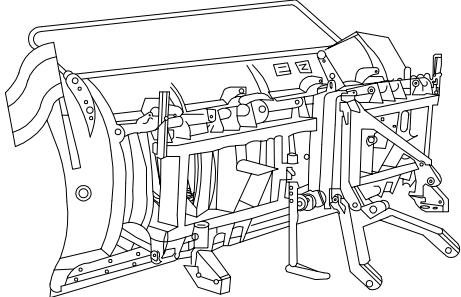
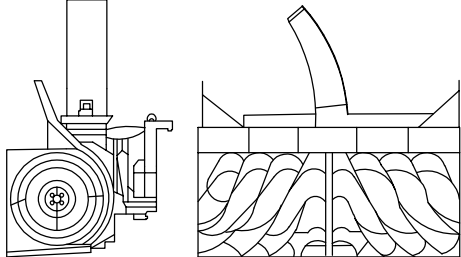
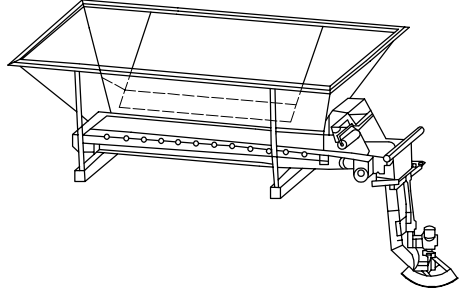
Term	Identification/Description	
2.5.11 concrete mix transfer machine	<p>mobile machine intended to receive concrete mix material from haul vehicles and then convey this material to concrete slipform paver</p>  <p style="text-align: center;">Figure 34 — Concrete mix transfer machine</p>	
<p>2.6 Machines and equipment for finishing road works</p> <p>These are intended for shaping slopes and for ground-boring and road-marking. See Figures 36 to 38.</p>		
2.6.1 slope-shaping machine	<p>self-propelled machine equipped with telescopic jib and trapezoid-form bucket used for shaping the slopes of embankments and ditches</p>	 <p style="text-align: center;">Figure 35 — Slope-shaping machine</p>
2.6.2 ground-boring machine post hole auger	<p>transferable or truck-mounted drilling unit intended for boring holes in the ground to fit vertical road signs, barriers, acoustic screens, etc.</p> <p>NOTE Road barrier posts are mostly embedded by pile driving machines specially designed for this purpose.</p>	 <p style="text-align: center;">Figure 36 — Ground-boring machine/post hole auger</p>

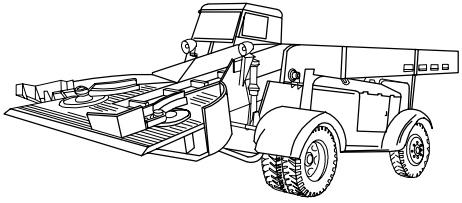
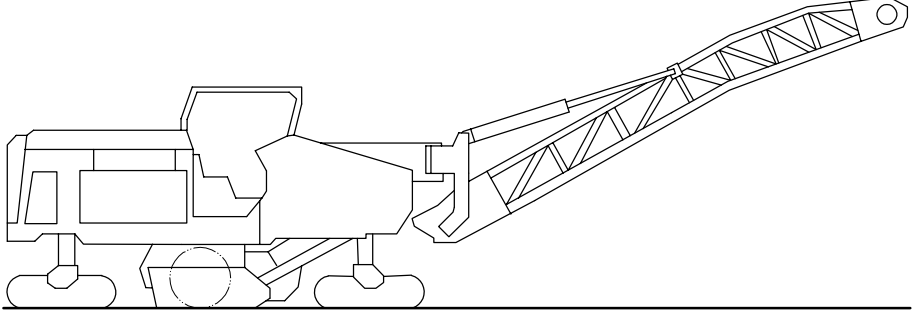
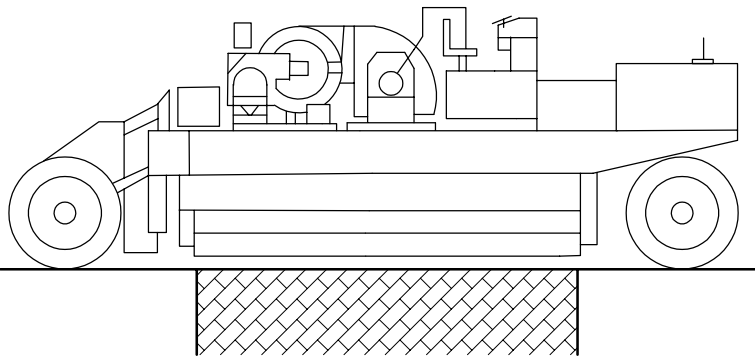
Term	Identification/Description	
<p>2.6.3 road-marking machine</p>	<p>self-propelled or pedestrian-operated machine for execution of horizontal road signs on pavements</p> <p>NOTE 1 It typically spreads plain traffic and reflective paints by means of spray gun.</p> <p>NOTE 2 It is also intended for execution of lines of structural materials, e.g. small-sized glass balls.</p>	 <p>Figure 37 — Road-marking machine</p>
<p>2.7 Road surface cleaning machines</p> <p>These mobile machines are used in the removal of sweepings, spoil and dust on traffic areas.</p> <p>See Figures 39 to 46.</p> <p>NOTE In order to fulfil the cleaning functions the machine is equipped with <i>sweep gear</i> — the collective term for all cleaning attachments such as brushes, brooms, pneumatic and/or mechanical conveyance equipment, and flushing and high-pressure washer equipment. The attachments are permanently fixed or demountable from a carrier vehicle or specially designed chassis.</p>		
<p>2.7.1 sweeper</p>	<p>self-propelled or truck-mounted set of units intended for cleaning traffic areas</p> <p>NOTE The working tools of the sweeper are brushes and a suction hose. A pick-up system —the means for conveying the sweepings into the hopper — may be pneumatic or mechanical.</p>	 <p>Figure 38 — Sweeper</p>
<p>2.7.2 sweeper with pneumatic pick-up</p>	<p>sweeper equipped with pneumatic pick-up system</p> <p>NOTE The working tools are located either in the front or centre part of the vehicle.</p>	 <p>Figure 39 — Sweeper with pneumatic pick-up</p>

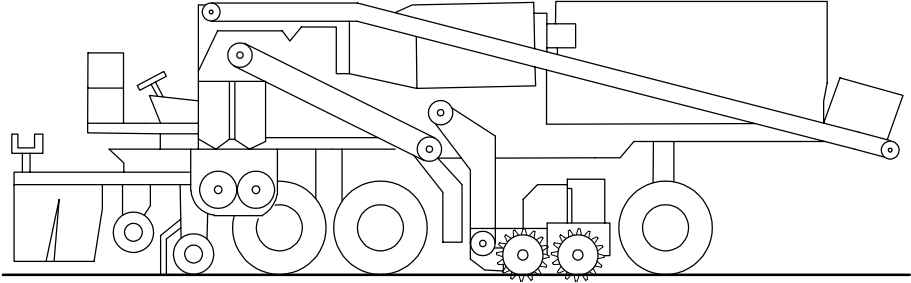
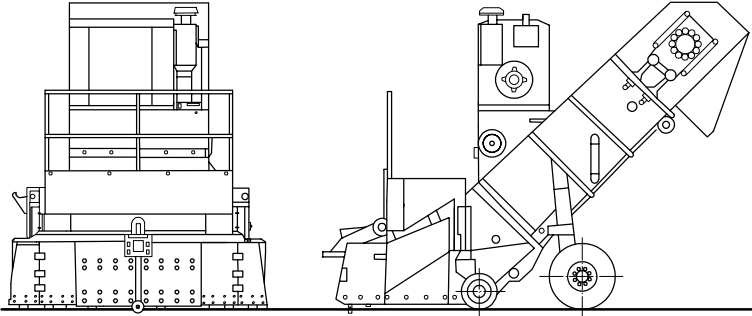
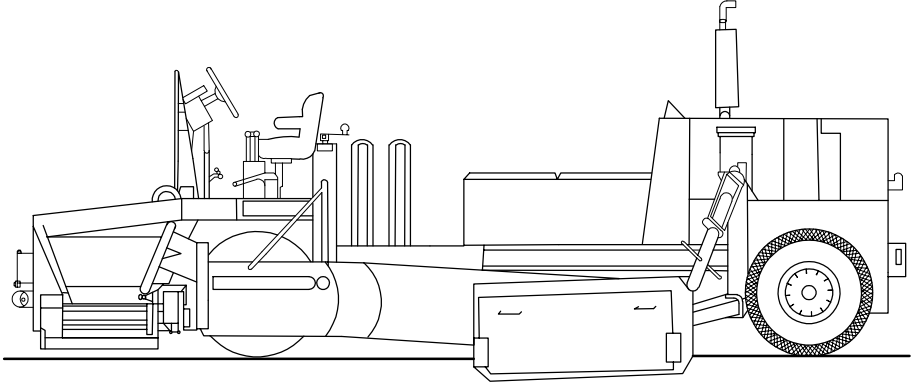
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<p>2.7.3 sweeper with mechanical pick-up</p>	<p>sweeper equipped with mechanical pick-up system in form of a horizontal axis cylindrical brush or the mentioned brush and conveyor</p>	 <p>Figure 40 — Sweeper with mechanical pick-up</p>
<p>2.7.4 flusher/washer</p>	<p>truck-mounted water tank with spraying unit designed for road and auxiliary road equipment cleaning</p> <p>NOTE The machine's spraying nozzles are typically situated such that the jet of water is played to the front and both sides of the sprinkler. It can also be equipped with a spraying lance intended for cleaning highway equipment (delineators traffic signs, tunnel walls, etc.).</p>	 <p>Figure 41 — Flusher/washer</p>
<p>2.7.5 high-pressure washer with pneumatic pick-up</p>	<p>Truck-mounted water tank with high-pressure water and suction systems in which water jet nozzles and suction hose are located in the centre part of a chassis</p>	 <p>Figure 42 — High-pressure washer with pneumatic pick-up</p>
<p>2.7.6 scrubber</p>	<p>self-propelled machine intended for sweeping earth/rubble spoil and sticks by means of water jets and horizontal-axis cylindrical brush</p>	 <p>Figure 43 — Scrubber</p>

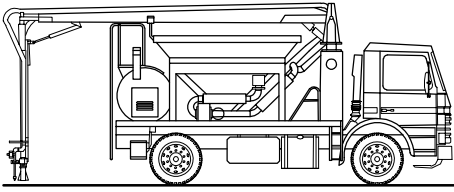
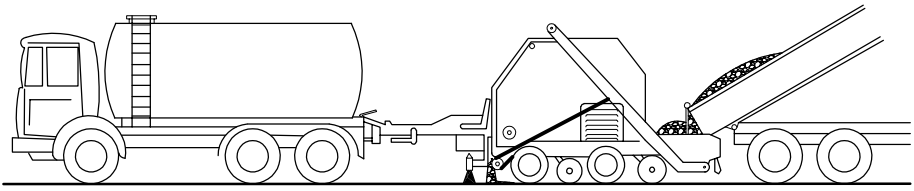
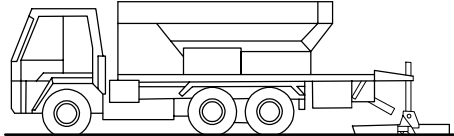
Term	Identification/Description	
<p>2.7.7 demountable bodywork</p>	<p>hopper for the storage of sweepings, provided with adjustable support legs and adapted for location on a truck</p>	 <p>Figure 44 — Demountable bodywork</p>
<p>2.7.8 cleansing machine</p>	<p>machine used for cleansing highway equipment, e.g. delineators, traffic signs tunnel walls</p> <p>NOTE The cleansing machine is equipped with different attachments for particular cleansing tasks i.e. delineators, traffic, sign and tunnel walls cleaning.</p>	 <p>Figure 45 — Cleansing machine</p>
<p>2.8 Machines and equipment for removal of undesired vegetation</p>		
<p>These are truck-mounted or towed attachments. See Figures 47 to 52.</p>		
<p>2.8.1 mulching machine</p>	<p>truck-mounted attachment intended for reducing and/or shredding vegetation, working parallel and close to the ground</p>	 <p>Figure 46 — Mulching machine</p>
<p>2.8.2 mowing machine</p>	<p>machine for cutting vegetation, working in direction of motion substantially parallel and close to ground</p>	 <p>Figure 47 — Mowing machine</p>

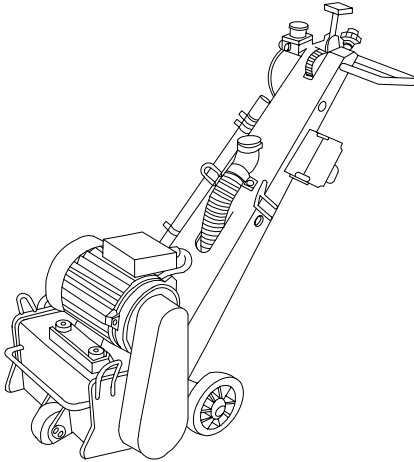
Term	Identification/Description	
<p>2.8.3 hedge-cutting machine</p>	<p>truck-mounted attachment for cutting hedges and clearing spaces of vegetation</p>	 <p>Figure 48 — Hedge-cutting machine</p>
<p>2.8.4 ditch maintenance machine</p>	<p>truck-mounted machine, equipped with a jib-mounted attachment, used for keeping ditches clear</p>	 <p>Figure 49 — Ditch maintenance machine</p>
<p>2.8.5 verge cutter</p>	<p>truck-mounted machine equipment with a jib-mounted attachment used for removing growth on verges</p> <p>NOTE There are a variety of verge cutter designs, including</p> <ul style="list-style-type: none"> — the cutter shown in Figure 51, used for execution cutting activity only, — the cutter equipped with belt conveyor for transporting cut material to a tipping truck, and — the cutter with pneumatic installation for transfer of cut material to a towed trailer. 	 <p>Figure 50 — Verge cutter</p>
<p>2.8.6 weeding machine</p>	<p>machine for mechanical removal of undesired vegetation on paver surfaces using rotating brushes</p>	 <p>Figure 51 — Weeding machine</p>

Term	Identification/Description	
<p>2.9 Machines and equipment for road winter maintenance</p> <p>See Figures 53 to 56.</p>		
<p>2.9.1 snow-plough blade</p>	<p>truck-mounted attachment for clearing traffic areas of snow, ice or slush by pushing them aside</p> <p>NOTE Depending on the plough blade design, two types of attachment are possible: for pushing out snow and ice to one side of the road, and for pushing out snow and ice to both sides of the road.</p>	 <p>Figure 52 — Snow-plough blade</p>
<p>2.9.2 snow-clearing machine with rotating tool(s) snow blower</p>	<p>truck-mounted attachment with which snow can be removed from traffic areas by rotating devices accelerated and ejected by blower means (rotary plough tools and blower tools)</p> <p>NOTE The attachment's design allows for snow-clearing machines with the following rotating tools:</p> <ul style="list-style-type: none"> — with rotary snow plough; — with rotary snow blower (two blower tools and three pre-cutting tools); — with rotary snow blower (single blower tool and two worm tools); — with plough and blower (rotary plough tool and blower tool). 	 <p>Figure 53 — Snow-clearing machine/snow blower with rotating tool(s)</p>
<p>2.9.3 sand and de-icing material spreader</p>	<p>self-propelled, towed or truck-mounted set of units intended for steadily spreading sand or de-icing compounds on the entire (whole-width) traffic area in order to maintain or improve the skid resistance of the pavement</p> <p>NOTE There are two types of spreader — with worm conveyor, and with belt conveyor.</p>	 <p>Figure 54 — Spreader of sand and de-icing materials</p>

Term	Identification/Description	
<p>2.9.4 snow loader</p>	<p>self-propelled or towed machine intended to pick up snow from windrows created along the roadside by snow-removing machines</p>	 <p style="text-align: center;">Figure 55 — Snow loader</p>
<p>2.10 Machines and equipment for road repairs</p> <p>These are intended for the repair of pavement surface damage. See Figures 57 to 65.</p>		
<p>2.10.1 road milling machine road planer</p>	<p>mobile road construction machine used to mill materials from paved surfaces</p> <p>NOTE See ISO 15645.</p>	 <p style="text-align: center;">Figure 56 — Road milling machine/road planer</p>
<p>2.10.2 road heater</p>	<p>self-propelled machine intended for heating of asphalt pavement for the purpose of its later milling</p>  <p style="text-align: center;">Figure 57 — Road heater</p>	

Term	Identification/Description
<p>2.10.3 hot in-place recycling machine</p>	<p>self-propelled machine, intended for repaving with the use of reclaimed asphalt pavement (RAP), composed of asphalt mix conveyor, milling unit, rejuvenator unit and re-heating unit</p>  <p style="text-align: center;">Figure 58 — Hot in-place recycling machine</p>
<p>2.10.4 windrow elevator device</p>	<p>machine intended for picking up paving material from an existing windrow and conveying it to the paver</p> <p>NOTE A windrow is a continuous pile laid out in front of the machine.</p>  <p style="text-align: center;">Figure 59 — Windrow elevator device</p>
<p>2.10.5 road widener-device</p>	<p>mobile machine with transverse conveyor for conveying paving material to the side of the road and then levelling it with a blade or screed</p>  <p style="text-align: center;">Figure 60 — Road widener-device</p>

Term	Identification/Description	
<p>2.10.6 road repair patcher</p>	<p>truck-mounted set of units for quick repair of pavement damage</p> <p>NOTE 1 It is typically used to</p> <ul style="list-style-type: none"> — clean the hole with compressed air, — tack bitumen or emulsion to the hole's surface, — fill and compact, by mean of compressed air, the hole with combined bitumen (or emulsion) and aggregate mix, and — cover repairs with a dry aggregate layer. <p>NOTE 2 For more substantial road repairs, the surfacing reformer (see 3.10.7) is used as well.</p>	 <p>Figure 61 — Road repair patcher</p>
<p>2.10.7 combination bitumen and aggregate spreader/surfacing reformer</p>	 <p>Key</p> <ol style="list-style-type: none"> 1 bitumen tank 2 chippings spreader 3 roller 4 bitumen spray bar <p>Figure 62 — Combination spreader for bitumen and aggregate/surfacing reformer</p>	
<p>2.10.8 slurry seal machine/cold micro-asphalt laying machine</p>	<p>machine intended for applying a thin layer of cold micro-asphalt on the asphalt pavement with the aim of improvement of its physical properties</p> <p>NOTE Cold micro-asphalt is prepared in the machine by mixing a binder with fine aggregates approximately up to 1,5 mm.</p>	 <p>Figure 63 — Slurry seal machine/cold micro-asphalt laying machine</p>

Term	Identification/Description	
<p>2.10.9 joint and crack milling machine</p>	<p>machine intended for milling of joints and cracks</p> <p>NOTE Pavement milling machines equipped with mills selected according to the type of pavement to be processed are used for joint and crack milling, and can be pedestrian-operated or equipped with power travel units. Internal combustion engines and electric motors are used for the machine's drive.</p>	 <p>Figure 64 — Joint and crack milling machine</p>
<p>2.10.10 road surface roughening machine</p>	<p>machine intended for roughening pavement surfaces</p> <p>NOTE Pavement milling machines with correspondingly selected mills are typically used for roughening.</p>	
<p>2.10.11 road marking removal machine</p>	<p>machine intended for removal of horizontal painted signs on pavements</p> <p>NOTE Pavement milling machines are typically used for this operation and, in some cases, propane-butane burners and water jet machines are used as well.</p>	

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