

# USER MANUAL



## Laboratory centrifuge **MPW-351e**

**Read before use!**

Serial number of the centrifuge: .....

For centrifuges with serial no (SN):                      from 10351e068622



This manual was prepared with special care. MPW MED. INSTRUMENTS may change the manual at any time and without notice because of improvements, typographical errors, or improvements to facilities

All rights reserved. No part of this User Manual may be modified, distributed, published, or reproduced without the prior permission of MPW MED. INSTRUMENTS.

You can find the current version of the user manual on our website under:










**www.mpw.pl DOWNLOAD** section (one should choose demanded language version of website).

# Contents

<b>1. Symbols used in the manual and on the device</b> .....	<b>5</b>
<b>2. Application</b> .....	<b>5</b>
<b>3. Technical data</b> .....	<b>6</b>
3.1. Environmental conditions .....	6
<b>4. Installation</b> .....	<b>7</b>
4.1. Content of the package .....	7
4.2. Location .....	7
4.3. Current protection .....	7
<b>5. Safety notes</b> .....	<b>8</b>
5.1. General remarks .....	8
5.2. Filling the rotor .....	8
5.2.1. <i>Angular rotors</i> .....	8
5.2.2. <i>Horizontal rotors</i> .....	8
5.2.3. <i>Filling tubes</i> .....	9
5.3. Safety hints .....	9
5.4. Operating conditions .....	10
5.5. Equipment life .....	11
5.6. Work safety .....	11
5.7. Unbalance .....	12
5.8. Emergency stop .....	12
5.9. Residual risk .....	12
<b>6. Operating</b> .....	<b>13</b>
6.1. Centrifuge overview .....	13
6.2. Centrifuge description .....	13
6.3. Construction .....	13
6.4. Name plate .....	14
6.5. Rotor and accessories installation .....	14
6.6. Setting and reading data .....	15
6.7. Controls .....	15
6.8. Safety devices .....	15
6.9. Increase in temperature .....	15
<b>7. Centrifuging</b> .....	<b>15</b>
7.1. Control panel .....	15
7.2. Switching the centrifuge ON .....	17
7.2.1. <i>Selection of the program</i> .....	17
7.2.2. <i>Start of the program</i> .....	17
7.2.3. <i>Emergency stop</i> .....	17
7.2.4. <i>End of the centrifuging</i> .....	17
7.2.5. <i>Programming</i> .....	17
7.2.6. <i>Version of the centrifuge</i> .....	17
7.3. Mathematical relations .....	17
7.3.1. <i>Nomograph of relationship - rotational speed/centrifuging radius/RCF (see Annexes)</i> .....	17
7.3.2. <i>Maximum load</i> .....	18
<b>8. Maintenance</b> .....	<b>18</b>
8.1. Cleaning of the centrifuge .....	18
8.2. Maintenance of centrifuge elements .....	18
8.3. Sterilization .....	19
8.3.1. <i>Autoclaving</i> .....	20
8.4. Chemical resistance .....	21
<b>9. Troubleshooting</b> .....	<b>22</b>
9.1. Emergency cover release .....	23
<b>10. Guarantee</b> .....	<b>23</b>
<b>11. Transport and storage</b> .....	<b>23</b>
11.1. Transport and storage conditions .....	23
<b>12. Disposal</b> .....	<b>24</b>
<b>13. Manufacturer's info</b> .....	<b>24</b>

<b>Distributor's info</b> .....	<b>24</b>
<b>14. Annexes</b> .....	<b>24</b>
A. Additional accessories	
B. Declaration of conformity (CE, ROHS 2)	
C. Declaration of decontamination (repair / return)	
D. Nomogram RPM / RCF	

## 1. Symbols used in the manual and on the device

Symbol	Explanation
	<b>WARNING!</b> Warning of potential injury or health risk
	<b>DANGER!</b> Risk of electric shock with potential for severe injury or death as a consequence
	<b>DANGER!</b> Biohazard with potential for risk to health or death as a consequence
	<b>DANGER!</b> Risk of explosion with potential for severe injury or death as a consequence
	Symbol identifying a medical device for in vitro diagnostic use
	CE mark
	Symbol informing about the method of disposal
	Please read the instruction manual before you start working with the device
	Manufacturer's data

## 2. Application

The MPW-351e centrifuge is a tabletop laboratory centrifuge for *in vitro* diagnostic (IVD) equipped with, used to separation of samples took from people's, animal's, and plant's components with different densities, to provide information about their biological state under the influence of the centrifugal force. Its construction ensures easy operation, safe work, and wide range of applications at laboratories engaged in routine medical analyses, biochemical research works etc. This centrifuge is not biotight and therefore during centrifugation of preparations requiring biotightness one has to use closed and sealed containers and rotors. In the centrifuge, it is prohibited to centrifuge caustic, inflammable and explosive preparations.

### 3. Technical data

<b>Manufacturer</b>	<b>"MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY, 46 Boremlowska Street, 04-347 Warsaw/Poland</b>					
<b>model</b>	MPW-351e					
<b>cat. no (REF)</b>	10351e/2-56 or 10351e/1-56					
<b>mains (L1+N+PE)</b>	230V	100V	110V	115V	120V	127V
	±10%	±5%				
<b>frequency</b>	50/60Hz					
<b>maximum power consumption</b>	380W					
<b>current protection</b>	T 4A	T 6,3A				
<b>Maximum capacity</b>	800ml					
<b>rotational speed range (RPM)</b>	100 ÷ 4500 rpm step 100 rpm					
<b>maximum acceleration (RCF)</b>	3305 x g					
<b>time range</b>	1 ÷ 99 min., step 1 min					
<b>short-term operation mode (SHORT)</b>	yes					
<b>electromagnetic compatibility</b>	according to EN 61326-2-6:2006					
<b>Degree of protection: (according to PN-IEC 34-5)</b>	IP20					
<b>dimensions:</b>						
<b>height (H)</b>	380 mm					
<b>width (W)</b>	430 mm					
<b>depth (D)</b>	540 mm					
<b>height with open lid (Hoc)</b>	768 mm					
<b>noise level</b>	≤ 56 dB					
<b>mass 230V</b>	approx. 40,3 kg					
<b>mass 100-127V</b>	approx. 43,8 kg					

#### 3.1. Environmental conditions

- The device may only be used indoors.
- The permissible ambient temperature is 2°C to 40°C.
- Maximum allowed relative humidity 80% at temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C.
- The mains voltage fluctuations must not exceed ± 10% of the nominal voltage.
- Maximum altitude 2,000 m above sea level.
- Overvoltage category II.
- Pollution degree 2.



## 4. Installation

Open the package. Remove the carton containing the equipment. Remove the centrifuge from the package. Keep the packaging and packaging material in case of service shipment.


### 4.1. Content of the package

type of accessories	capacity	cat. no (REF)
Laboratory centrifuge MPW-351e	1	10351e/2-56 or 10351e/1-56
petroleum jelly 20 ml	1	17201
Complete clamp	1	17664
Spanner for the rotor	1	17665
Spanner for emergency opening of the cover	1	17900
Fuses WTA T 4 A 250V (230V)	2	17861
Fuses WTA T 6,3 A 250V (120V)	2	17862
Power cord 230V	1	17866
Power cord 120V		17867
User manual	1	page 1

### 4.2. Location


	<ul style="list-style-type: none"> <li>▪ The device is heavy, lifting and carrying the centrifuge may lead to back injuries. There is risk of injury when lifting and carrying heavy loads.</li> <li>▪ The centrifuge should be lifted and transported with a sufficient number of helpers. Use a transport aid to transport the centrifuge.</li> <li>▪ The appliance should be lifted from the bottom near the feet and placed directly on the appropriate lab bench.</li> <li>▪ The centrifuge should be set so that access to the power switch is not difficult.</li> <li>▪ A safe installation site must be provided.</li> <li>▪ Do not place the centrifuge near heaters and avoid direct sunlight.</li> <li>▪ The table on which the centrifuge is placed should be stable and have a flat, levelled top.</li> <li>▪ Leave a distance of 30 cm around the centrifuge in order to maintain the ventilation zone, do not cover the ventilation openings (safety requirements in case of failure according to EN 61010-020).</li> <li>▪ The laboratory table should be cleaned before placing the centrifuge on it.</li> <li>▪ The given parameters of the centrifuge are maintained for the ambient temperature range given in the technical data table.</li> <li>▪ When changing the place from cold to warm, water vapor condensation will occur inside the centrifuge. It is important to allow sufficient time for drying before restarting the centrifuge (min. 4 hours).</li> <li>▪ The supply voltage must match the voltage specified on the rating plate. Laboratory centrifuges by MPW MED. INSTRUMENTS have a three-core connection cord with a plug resistant to dynamic loads.</li> <li>▪ The power socket must have a safety pin.</li> <li>▪ It is recommended to install an emergency switch located far from the centrifuge near the exit from the room or outside the room.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ <b>Before switching on, check whether the centrifuge is connected to power supply correctly. It is obligatory to use only power cord recommended by manufacturer.</b></li> </ul>

### 4.3. Current protection

	<p>Centrifuges MPW-351e are equipped with a current protection (melting fuse) located in the mains power socket on the rear wall of the centrifuge.</p>
---	---


## 5. Safety notes

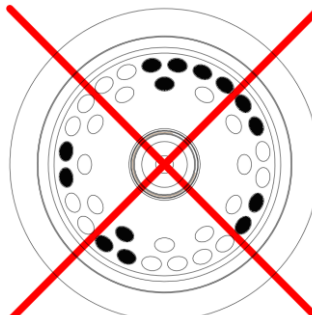

### 5.1. General remarks

	<ul style="list-style-type: none"><li>▪ The laboratory centrifuge may be operated only by qualified laboratory personnel after getting acquainted with the user's manual.</li><li>▪ <b>The operating instructions are part of the product.</b></li><li>▪ <b>The instruction manual should always be kept near the centrifuge.</b></li><li>▪ The centrifuge cannot be operated inconsistently with its purpose.</li><li>▪ <b>If the centrifuge is used in a manner inconsistent with the manufacturer's guidelines, the safety of the device operation may be impaired.</b></li></ul>
---	--

### 5.2. Filling the rotor

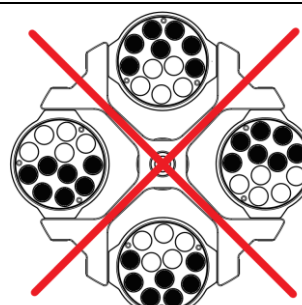
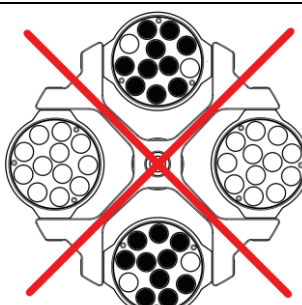
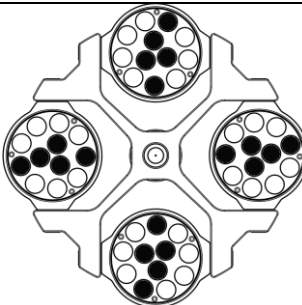
#### 5.2.1. Angular rotors

	<ul style="list-style-type: none"><li>▪ <b>Check that the rotor is properly seated and bolted to the motor axis.</b></li><li>▪ <b>Do not exceed the maximum rotor load (information is provided on the rotors).</b></li><li>▪ In order to ensure symmetrical loading, fill opposite openings of the rotor with inserts and test tubes of the same type and weight.</li></ul>
---	--




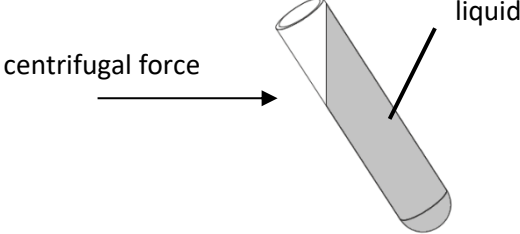
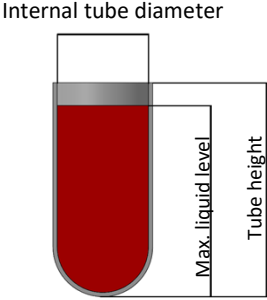
#### 5.2.2. Horizontal rotors

<ul style="list-style-type: none"><li>▪ <b>Check that the rotor is properly seated and bolted to the motor axis.</b></li><li>▪ <b>Do not exceed the maximum rotor load.</b></li><li>▪ To ensure symmetrical and even rotor load, fill opposite slots with containers / hangers of the same type and weight.</li><li>▪ <b>Horizontal rotors must be filled with a complete set of containers / hangers.</b></li><li>▪ Place test tubes symmetrically facing each other.</li><li>▪ Before starting centrifugation, check that all containers / hangers are properly hung and can swing freely.</li></ul> <p>Place empty test tubes in containers. Manually tilt the containers to the horizontal position, check that there are no collisions between the test tubes, containers / hangers and the rotor.</p>
---









### 5.2.3. Filling tubes





	<ul style="list-style-type: none"> <li>▪ <b>Tubes may only be filled outside the centrifuge.</b></li> <li>▪ Tubes may only be filled with the maximum amount of substance specified by the manufacturer.</li> <li>▪ The test tubes must be filled in such a way that the centrifuged substance does not run out of the vessel during centrifugation.</li> </ul> <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>▪ In case the tube manufacturer has not specified a maximum level, fill the tubes according to the formula:           <math display="block">\text{Max liquid level} &lt; \text{Tube height} - \frac{\text{Internal tube diameter}}{2}</math> <div style="text-align: center;">  </div> </li> </ul> <ul style="list-style-type: none"> <li>▪ For centrifugation in the centrifuge, only containers included in the list of equipment and centrifuge tubes, the diameter, length and strength of which are appropriate, should be used. The use of test tubes from other manufacturers should be agreed with MPW MED. INSTRUMENTS or its authorized representatives.</li> <li>▪ Pay attention to the quality and appropriate thickness of the walls of glass test tubes. <b>Glass tubes should be centrifuge tubes.</b></li> <li>▪ To prevent the centrifuge from being unbalanced, it is recommended to weigh the filled test tubes before inserting them into the rotor. When centrifuging in horizontal rotors, it is recommended to weigh the filled containers / hangers. This will allow to minimize the differences in mass between them, which will positively affect the suspension of the engine and the reduction of noise level during the operation of the centrifuge.</li> </ul>
---	--

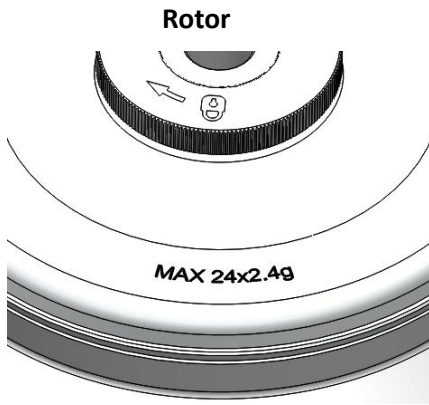

### 5.3. Safety hints

	<p><b>ROTORS MAINTENANCE</b></p> <ul style="list-style-type: none"> <li>▪ Lubricate the swing-out rotor journal pins.</li> <li>▪ Use only accessories in good condition.</li> <li>▪ Protect equipment against corrosion using accurate preventive maintenance.</li> </ul>
	<p><b>HS ACCESSORIES MAINTENANCE</b></p> <ul style="list-style-type: none"> <li>▪ Make sure that rubber O-rings are lightly coated with silicone grease. Use high vacuum grease, e.g., type „C” by LUBRINA.</li> </ul>

	<p><b>HAZARDOUS MATERIALS</b></p> <ul style="list-style-type: none"> <li>▪ Use infectious materials only in closed containers / rotors with a safety certificate.</li> <li>▪ It is not allowed to centrifuge toxic or infectious materials with damaged hermetic seal of the rotor or test-tube. Proper disinfection procedures should always be carried out, if hazardous substances have contaminated the centrifuge or its accessories.</li> </ul>
	<p><b>EXPLOSIVE AND COMBUSTIBLE MATERIALS</b></p> <ul style="list-style-type: none"> <li>▪ It is not allowed to centrifuge explosive and inflammable materials.</li> <li>▪ It is not allowed to centrifuge substances prone to reacting in result of supplying high energy during centrifugation.</li> <li>▪ The centrifuge cannot be operated in explosion-endangered areas.</li> <li>▪ It is not allowed to centrifuge materials capable of generating inflammable or explosive mixtures when subjected to air.</li> </ul>

#### 5.4. Operating conditions

	<p><b>START-UP</b></p> <ul style="list-style-type: none"> <li>▪ Prior to switching the centrifuge on, one shall carefully read all sections of this user manual in order to ensure smooth operation and avoid damages of this device or its accessories.</li> <li>▪ In order to protect the centrifuge against unbalance, fill in the test tubes up to the same weight.</li> </ul>
	<p><b>TRANSPORTATION</b></p> <ul style="list-style-type: none"> <li>▪ Centrifuge must not be transported with the rotor mounted on the shaft.</li> </ul>
	<p><b>GENERAL HINTS</b></p> <ul style="list-style-type: none"> <li>▪ One must use original rotors, tubes and spare parts only.</li> <li>▪ In case of faulty operation of the centrifuge one shall ask for assistance of service of MPW MED. INSTRUMENTS company or its authorized representatives.</li> <li>▪ It is not allowed to switch the centrifuge on if it is not installed properly or rotor is not fitted correctly.</li> </ul>
	<p><b>CENTRIFUGES SUBSTANCES</b></p> <ul style="list-style-type: none"> <li>▪ It is not allowed to exceed load limit set by the manufacturer. Rotors are intended for fluids of average homogeneous density equal to <b>1,2 g/cm<sup>3</sup></b> or smaller when centrifugation is carried out at maximum speed. When fluids of higher density shall be used, then it is necessary to change density of centrifuges sample in <b>PARAM/DENSITY</b> field.</li> <li>▪ Observe the limitation on the permissible mass specified on the rotor/ bucket (e.g., MAX 15g). If the designation is given on the rotor, it refers to the mass of the sample. If the designation is given on the bucket, it refers to the mass of the entire load, i.e., adapter+ tube + sample.</li> </ul> <p><b>Examples:</b></p>


		
	<p><b>2,4g</b> – maximal mass of tube content</p>	<p><b>290g</b> – maximal mass of elements inside bucket</p>



### 5.5. Equipment life

	<ul style="list-style-type: none"> <li>▪ Each spin cycle during which the rotor has accelerated and decelerated is considered a duty cycle, regardless of the speed and its duration.</li> <li>▪ Do not use the equipment after the allowable number of cycles or when the maximum service life has passed, whichever comes first.</li> </ul>
--	---

### 5.6. Work safety

The centrifuge should be inspected by an authorized service at least once a year (after the warranty period). The reason for more frequent inspection may be, for example, a corrosive environment. Tests should end with issuing a validation protocol, which specifies checking the technical condition of a laboratory centrifuge. It is recommended that you create a document that records all repairs and inspections. Both these documents should be kept in the place where the centrifuge is used.

	<p><b>INSPECTION PROCEDURES CARRIED OUT BY THE OPERATOR</b></p>
	<p>Operator has to pay special attention to the fact that the centrifuge parts of key importance due to safety reasons are not damaged. This remark is specifically important as for:</p> <ul style="list-style-type: none"> <li>▪ Centrifuge accessories and especially structural changes, corrosion, preliminary cracks, abrasion of metal parts.</li> <li>▪ Screw connections.</li> <li>▪ Inspection of seals of the buckets if such are used. Special attention must be paid to all of the rubber (seals) parts. In the case of damage or visible structural changes defective parts must be replaced for new immediately (Set of seals Cat. No. 18591 available from the manufacturer).</li> <li>▪ Control of execution of the guarantee yearly technical inspection of the centrifuge (after lapse of guarantee).</li> <li>▪ Only the manufacturer-specified buckets, included in the equipment list, as well as centrifuge tubes, which diameter, length and durability are suitable, should be used for spinning in this centrifuge. The use of equipment made by other manufacturers should be consulted with the manufacturer of the centrifuge.</li> <li>▪ It is not allowed to lift or shift the centrifuge during operation, and rest on it.</li> <li>▪ It is not allowed to stay in the safety zone within 30 cm distance around the centrifuge neither leave within this zone some things, e.g., glass vessels.</li> <li>▪ It is not allowed to put any objects on the centrifuge</li> </ul>


	<b>COVER OPENING</b>
	<ul style="list-style-type: none"> <li>▪ It is not allowed to open the cover manually in emergency procedure when rotor is still turning.</li> </ul>
	<b>ROTORS</b>
	<ul style="list-style-type: none"> <li>▪ It is not allowed to use the rotors, buckets and round carriers with signs of corrosion or other mechanical damage.</li> <li>▪ It is not allowed to centrifuge substances of high corrosive aggressiveness, which may damage the materials and reduce the mechanical properties of rotors, buckets and round carriers.</li> <li>▪ It is not allowed to centrifuge rotors with removed or loose covers.</li> </ul>

### 5.7. Unbalance

The centrifuge is provided with the rotor unbalance sensor and when it will be activated, centrifugation process will be stopped through fast braking and at the same time an error message will be displayed. Erasing the error message is possible by pressing any key (**BACK, STOP, COVER, SET** and **▲ ▼ ◀ ▶**) after stopping the rotor.

One must check if rotor was correctly loaded, close the cover and once more start the program. In order to protect the rotor against improper work, it has to be provided with identically filled buckets, carriers, test-tubes etc. for getting the best balance possible (see section “**Błąd! Nie można odnaleźć źródła odwołania.**”).

Then close the cover and restart the program

	Unbalance causes noise and vibrations during operation, and adversely affects power transmission system (motor, shock absorbers). The better balance, the smoother will be the centrifuge operation and therefore longer life of usage of the driveline. Moreover, the ideal separation level is then obtained, as already separated constituents would not be moved up by vibration.
--	---

### 5.8. Emergency stop

In any moment of centrifuging, it is possible interrupt the process and fast stop the rotor. Single time pressing of the **STOP** key will make centrifuging stop with acceleration characteristics set in the program (after pressing the **SET** or **STOP** key, the device returns to the main screen). Pressing and holding it up to 1s will make the centrifuging stop with the strictest characteristic.

### 5.9. Residual risk

The centrifuge is built according to the state-of-the-art and the recognized safety regulations.

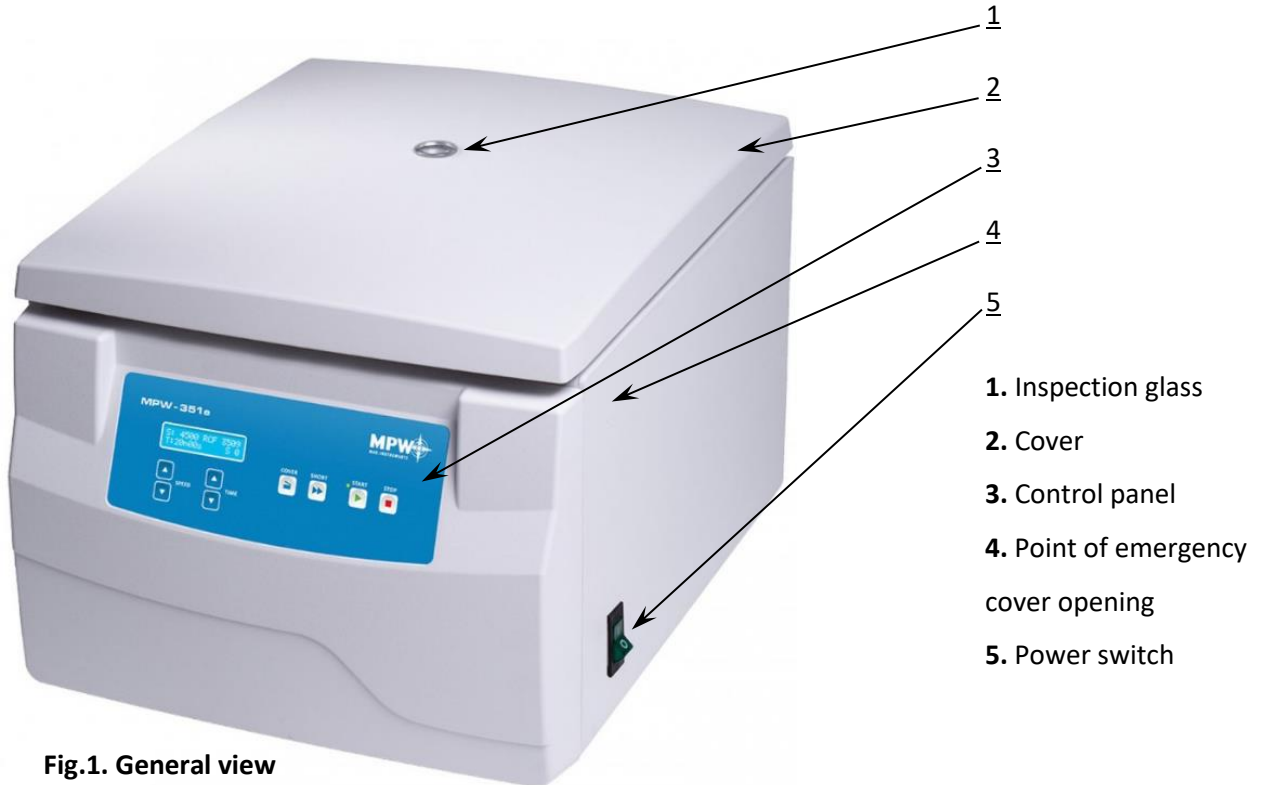
Nevertheless, still remain some level of residual risk due to improper operation and malfunctions. It is possible to decrease residual risk by strictly applying user manual conditions and correcting malfunction which could threaten safety, immediately

## 6. Operating

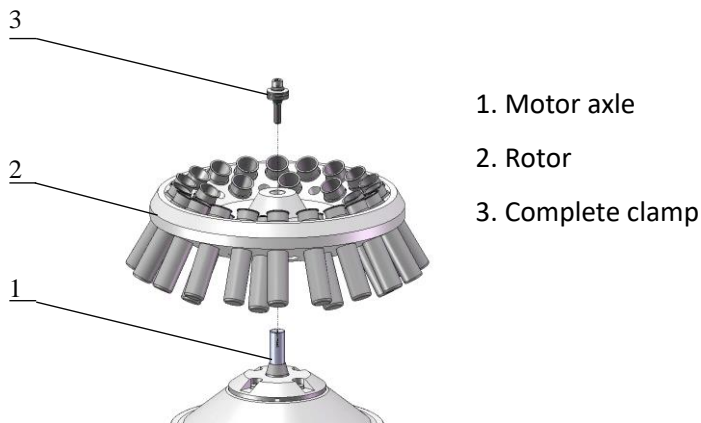
### 6.1. Centrifuge overview

New generation of MPW MED. INSTRUMENTS laboratory centrifuges is provided with state-of-the-art microprocessor control systems, very durable and quiet asynchronous brushless motors and accessories consistent with requirements of the present-day user.

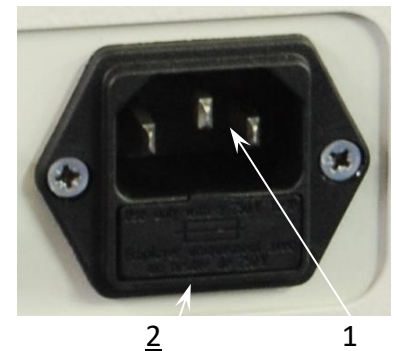
### 6.2. Centrifuge description



**Fig.1. General view**



**Fig.3. Assembly of angle rotor**



1. Plug-in socket
2. Fuse socket

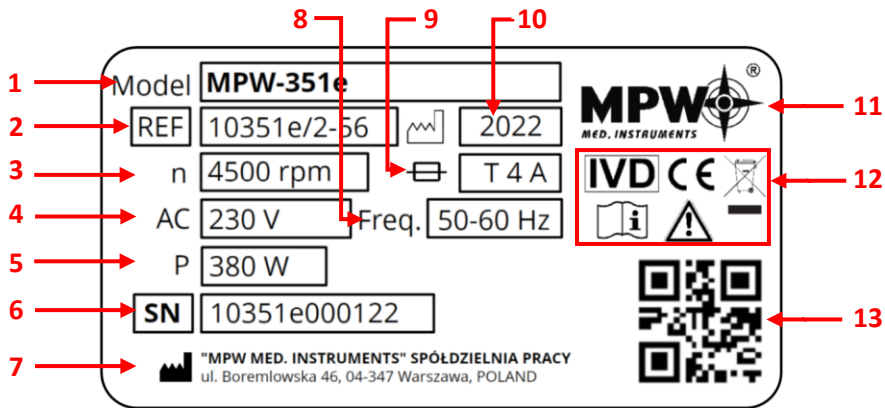
**Fig.2. Mains socket back of the centrifuge**

### 6.3. Construction

The centrifuge has rigid self-supporting structure. Housing was made of sheet aluminum, back made of steel sheet. Front and cover were made of ABS type plastic. Cover is fixed on steel axles of hinges and from the front it is locked with electromagnetic lock blocking possibility of opening during centrifugation. Rotation chamber casing was made of thick steel sheet. The rotation chamber is made of stainless-steel sheet.


## 6.4. Name plate


The data concerning the device should be read from the rating plate located on the rear wall of the centrifuge (the picture below is an example).



- |                              |  |
|------------------------------|--|
| 1 Centrifuge model           | 8 Rated frequency                                      |
| 2 Catalog number             | 9 Current protection                                   |
| 3 Maximum speed              | 10 Year of production                                  |
| 4 Rated voltage              | 11 Manufacturer's logo                                 |
| 5 Maximum rated power        | 12 Approval marks and symbols (explained in chapter 1) |
| 6 Serial number              | 13 QR code for serial number                           |
| 7 Manufacturer's information |  |

## 6.5. Rotor and accessories installation

	<ul style="list-style-type: none"> <li>▪ Connect the centrifuge to the power source (mains socket at the back of the centrifuge).</li> <li>▪ Turn on the centrifuge (switch on the side of the centrifuge).</li> <li>▪ Open the cover of the centrifuge by pressing the COVER key. Before installing the rotor, check that the centrifugation chamber is free from contamination, e.g., dust, glass splinters, liquid residues that must be removed.</li> <li>▪ Put the rotor on the motor axis by sliding it onto the cone as far as it will go (keeping the coaxially between the rotor and the motor axis).</li> <li>▪ Screw the clamp into the motor shaft (clockwise), then tighten it firmly with the rotor wrench.</li> <li>▪ Swinging rotors must be equipped with buckets in all seats.</li> <li>▪ Container suspension pins should be regularly lubricated with technical petroleum jelly.</li> <li>▪ In the case of rotors with a cover, they must not be used without the cover. Rotor caps must be screwed securely onto the rotor. The rotor and cover are marked with the same catalog number (REF) to eliminate the risk of incorrect selection when the user has several types of rotors. Rotor covers ensure lower rotor resistance, correct tube seating and airtight sealing.</li> <li>▪ Only containers suitable for the selected type of rotor should be used.</li> <li>▪ In order to increase the durability of the rotor and seals, it is recommended to lubricate the rotor pins used to suspend the containers, the undercuts for the pins in the containers, gaskets and threaded places with technical petroleum jelly.</li> <li>▪ In order to replace the rotor, remove the tubes and containers, loosen the rotor clamp with the provided wrench, counterclockwise, and then use both hands to grasp the rotor on opposite sides and remove it from the motor axis by pulling it upwards.</li> </ul>
---	--

	<p><b>It is recommended to equalize vessels loads as much as possible in order to ensure minimal vibrations during operation.</b></p>
---	---

## 6.6. Setting and reading data

The data input and reading system is a hermetically sealed keyboard with clearly accessible operating points. Easily readable indicators signaling performed operations make it easier for the operator to program and register parameters and the state of the device.

## 6.7. Controls

The microprocessor control unit of the centrifuge ensures broad possibilities of providing, realisation and reading of work parameters, that is:

- ➔ selection of rotational speed within 100 ÷ 4500 rpm at 100 rpm interval.
- ➔ setting centrifugation time within 0÷99 min range at 30 s interval.
- ➔ selection of **SHORT** – short duration operation to programmed speed through 10 minutes,

## 6.8. Safety devices

Apart from the above-described passive devices and safety measures there exist as well active devices and elements as follows.

### ***Cover lock***

The centrifuge can be started only with properly closed cover (the dot “ • ” symbol will display), the cover can be opened only after stopping the rotor. In the case of emergency opening of the cover during operation, the centrifuge will be immediately switched-off and the rotor will brake till complete stopping. With opened cover (the **O** symbol will display) the drive is completely disconnected from the power, which makes it impossible to start the centrifuge.

### ***Unbalanced load checking system***

When loads of opposite buckets or carriers in rotors are unbalanced, the drive will be switched-off during acceleration or operation of the centrifuge – and the **U** sign will be displayed.

### ***Rest state inspection***

Opening of the centrifuge's cover is possible only with the rotor in the state of rest. This state is being checked by the microprocessor which recognizes and signals with **S** sign on the display the rest state prior to opening the cover.

### ***Motor temperature protection***

The motor has the temperature sensor for overheating protection.

If motor temperature exceeds admissible temperature drive will be switched off and **T** sign will be displayed. It is necessary in such case to switch off the power. After cooling down of motor and repeated including of power supply the **T** sign is disappear and if he isn't occurring further away overheating the centrifuge should work correctly.

## 6.9. Increase in temperature

In uncooled centrifuges, the temperature in the rotor chamber, rotor and sample can increase to above 40°C, based on the run time, g-force (rcf)/speed and ambient temperature.

## 7. Centrifuging

Power switching ON/OFF is carried out with master switch situated on the right-side wall of the centrifuge. All settings on the centrifuge are done by means of the control panel.

### 7.1. Control panel

The control panel placed on the front casing serves the purpose of controlling centrifuge operation.

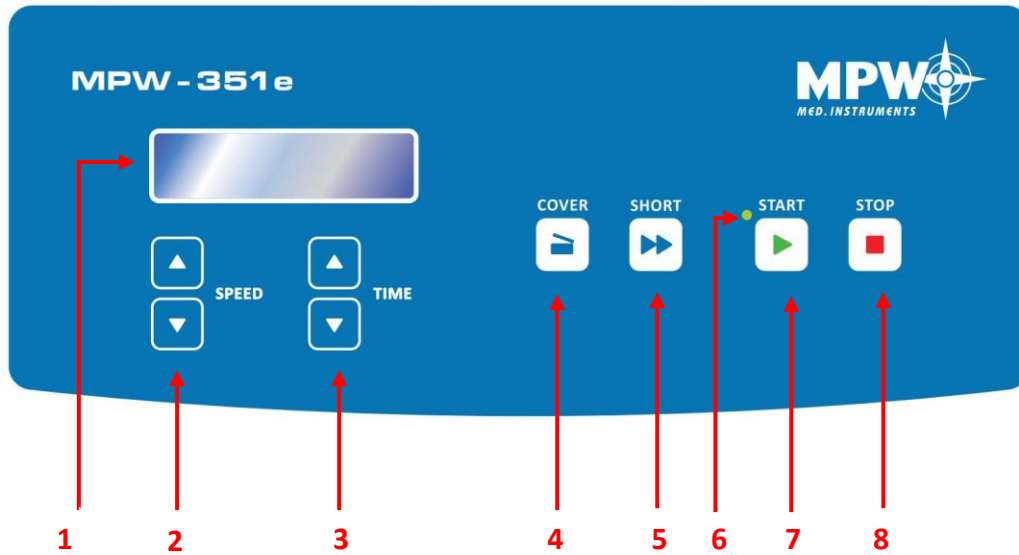





Fig.4. Control panel


- |                     |                      |
|---------------------|----------------------|
| 1 Display           | 5 <b>SHORT</b> key   |
| 2 <b>SPEED</b> keys | 6 <b>START</b> diode |
| 3 <b>TIME</b> keys  | 7 <b>START</b> key   |
| 4 <b>COVER</b> key  | 8 <b>STOP</b> key    |

- Function **START** key  serves for starting centrifugation program with parameters presented on display.


- Function **STOP** key  serves for:
  - interrupting centrifugation program in any program phase and breaking the rotor,
  - saving of preset **SPEED** and **TIME** centrifugation parameters

- Function **COVER** key  serves for opening of the cover

- Function **SHORT** key  serves for short duration operation

- **TIME** keys  serve for time programming

- **SPEED** keys  serve for speed programming

- **START** diode  is signaling the state of the rotor - blinking – rotor rotates, not illuminated – rotor does not rotate

- Display [1]



The upper part shows the parameters, the lower part contains messages of the centrifuge operation status.

**Upper display field**

**S:** 4 digits (rpm) **RCF** 4 digits (x g)

**Lower display field**

**T:** 4 digits (m/s) **S** (STOP) **O** (Opened cover) **U** (Unbalance),

**T** (overload of motor)



## 7.2. Switching the centrifuge ON

After switching power ON the control system calls recently implemented program and displays in relevant fields rotational speed, duration of centrifugation and cover opening status. Provided that rotor in the centrifuge is stopped, it is possible to open the cover by means of COVER key.

Stopped rotor status is displayed S sign in the display field. When this symbol is not already displayed, then one must wait till this rotor stops and the above-mentioned symbol appears.

### 7.2.1. Selection of the program

Control panel can save 1 program preset by the user. Program acceptance consists in pressing **STOP** key.

### 7.2.2. Start of the program

After acceptance of the program and checking if rotor was mounted, centrifuge can be started with pushing **START** key, provided that cover is closed.

### 7.2.3. Emergency stop

At any time during centrifuging, it is possible to interrupt the process and stop the rotor quickly with single pressing the **STOP** key.

### 7.2.4. End of the centrifuging

After ending the time of centrifuging set in the program, the rotor decelerates in accordance. At end of deceleration, rotational speed drops slower in order to ensure soft settling of rotor carriers. After stopping, sound signal is generated, **S** sign is displayed. After pressing **COVER** key, the cover opens and **O** sign is displayed.

### 7.2.5. Programming

Programming mode is activated with pressing **SPEED** and **TIME (+) (-)** keys after selection of parameters of the program which one would like to save or change. Acceptance of preset parameters is done by pressing **STOP** key. One can save one program only.

### 7.2.6. Version of the centrifuge

The information about the centrifuge type, program version and internet address are displaying at once after switching supply on for 2 seconds.

## 7.3. Mathematical relations

**RCF – relative centripetal force.**

**RCF** acceleration is the acceleration generated by the rotary motion of the rotor acting upon tested product and it can be calculated according to the formula:

$$\text{RCF} = 11,18 \times r \times (n/1000)^2$$

$$\text{RCF} \quad [x \text{ g}], \quad r \text{ [cm]}, \quad n \text{ [rpm]}$$

Depending on the distance of particles of the tested product from the axis of rotation, one can establish with use of the above formula the minimum RCF, average RCF or maximum RCF. On the basis of preset RCF value and given radius of the bottom of the bucket one can calculate with it the rotational speed to be set in the program of centrifuging. Selection of the time of sedimentation and the RCF value shall be carried out experimentally for any given product.

Once every 100 rpm, an electronic circuit automatically calculates and displays RCF value. In order to program required RCF value one shall use nomograph (Drawing No. 5) or change the rotational speed, matching displayed value to required acceleration value.

### 7.3.1. Nomograph of relationship - rotational speed/centrifuging radius/RCF (see Annexes)

### 7.3.2. Maximum load

In order to avoid overloading of the rotor one shall observe maximum load which is recorded on every rotor. Maximum permissible load is reached when all test-tubes are filled with the fluid with 1.2 g/cm<sup>3</sup> density.

If density of the centrifuged liquid is higher than 1.2 g/cm<sup>3</sup>, then test-tubes could be filled only partially or one shall limit operation speed of the centrifuge, which is being calculated from the formula:


$$n_{\text{perm}} = n_{\text{max}} * \sqrt{\frac{1,2}{\gamma}} ;$$

$$\gamma = \text{specific gravity} \left[ \frac{G}{\text{cm}^3} \right] ;$$


$n_{\text{max}}$  [maximum rotational speed - rpm]

## 8. Maintenance


### 8.1. Cleaning of the centrifuge

	<ul style="list-style-type: none"> <li>▪ Pull the mains plug before cleaning.</li> <li>▪ Before any cleaning or decontamination process other than that is recommended by the manufacturer, the user has to ask the manufacturer if the planned process does not damage the device</li> <li>▪ For cleaning, water with soap or other water-soluble <b>mild detergent</b> shall be used.</li> <li>▪ One should avoid corrosive and aggressive substances.</li> <li>▪ It is prohibited to use alkaline solutions, inflammable solvents or agents containing abrasive particles.</li> <li>▪ Do not lubricate the centrifuge motor shaft.</li> <li>▪ The unused centrifuge should have cover opened.</li> </ul> <p style="text-align: center;"><b>Once a week</b></p> <p>Using wiping cloth, remove condensate or residues of the products from the rotor chamber.</p> <p style="text-align: center;"><b>Once a month</b></p> <ul style="list-style-type: none"> <li>▪ Check the rotor clamping thread. In case of damage, replaced it.</li> <li>▪ Check the centrifuging chamber whether it is damaged. In case of damage, it cannot be longer put into operation. Notify authorized service workshop.</li> </ul>
---	--

### 8.2. Maintenance of centrifuge elements


	<ul style="list-style-type: none"> <li>▪ The rotor pins shall be always lubricated with petroleum jelly.</li> <li>▪ In this way, the uniform deflection of the buckets and quiet centrifuge operation is ensured.</li> </ul>
---	--

### Cleaning of the accessories

	<ul style="list-style-type: none"> <li>▪ In order to ensure safe operation, one shall carry out in <b>regular</b> way periodical maintenance of the accessories.</li> <li>▪ Rotors, buckets, and round carriers have to withstand high stresses originating from the centrifugal force. Chemical reactions as well as corrosion (combination of variable pressure and chemical reactions) can cause destruction of metals. Hard to observe surface cracks increase gradually and weaken material without visible symptoms.</li> <li>▪ In case of observation of surface damage, crevice, or other change, as well as the</li> </ul>
---	---

	<p>corrosion, the given part (rotor, bucket, etc.) shall be immediately replaced.</p> <ul style="list-style-type: none"> <li>▪ Clamping rotor, containers and reducer inserts must be cleaned regularly to prevent corrosion.</li> <li>▪ Cleaning of the accessories shall be carried out outside of the centrifuge <b>once every week</b> or still better after each use. For cleaning them one should use neutral agent of pH value 6÷8. It is forbidden to use alkaline agent of <b>pH &gt; 8</b>. Then, those parts shall be dried using soft fabric or in the chamber drier at ca. 50°C.</li> <li>▪ Angle rotor should be placed on a fabric with holes facing down, for effective drying.</li> <li>▪ Do not use bleach on plastic parts of the rotor.</li> <li>▪ In this way, the useful service life of the device is substantially increased and susceptibility to corrosion is diminished. Accurate maintenance increases the service life as well and protects against premature rotor failures.</li> <li>▪ Do not use bleach on plastic parts of the rotor.</li> <li>▪ According to laboratory standards, minimize the immersion time in each solution.</li> <li>▪ Especially prone to the corrosion are parts made of aluminium.</li> <li>▪ Corrosion and damages resulting from insufficient maintenance could not be subject of claims lodged against the manufacturer.</li> <li>▪ The unused rotor should have the lid removed.</li> </ul>
--	---

▪ **HS accessories maintenance.**

	<ul style="list-style-type: none"> <li>▪ Check the general condition of seals.</li> <li>▪ Make sure that rubber O-rings are lightly coated with silicone grease. Use high vacuum grease, e.g., type „C” by LUBRINA.</li> <li>▪ In order to maintain hermetic sealing, it is recommended to replace the sealing rings after each autoclaving.</li> <li>▪ Store hermetically sealed rotors and buckets with the lids removed.</li> </ul>
---	--

### 8.3. Sterilization

**Plastics - legend to abbreviations**

<b>PS</b>	polystyrene	<b>ECTFE</b>	ethylene/chlorotrifluoroethylene
<b>SAN</b>	styrene-acrylonitrile	<b>ETFE</b>	ethylene/tetrafluoroethylene
<b>PMMA</b>	polymethyl methacrylate	<b>PTFE</b>	polytetrafluoroethylene
<b>PC</b>	polycarbonate	<b>FEP</b>	tetrafluoroethylene/perfluoropropylene
<b>PVC</b>	polyvinyl chloride	<b>PFA</b>	tetrafluoroethylene/perfluoroalkylvinylether
<b>POM</b>	acetal polyoxymethylenel	<b>FKM</b>	fluorcarbon rubber
<b>PE-LD</b>	low density polyethylene	<b>EPDM</b>	ethylene propylene diene
<b>PE-HD</b>	high density polyethylene	<b>NR</b>	natural rubber
<b>PP</b>	polypropylene	<b>SI</b>	silicon rubber
<b>PMP</b>	polymethylpentene		

One can use all standard disinfectants. Centrifuges and devices are made of different materials, one should consider their variety.

	radiation $\beta$ radiation $\gamma$ 25 kGy	C <sub>2</sub> H <sub>4</sub> O (ethylene oxide)	formalin, ethanol
<b>PS</b>	●	○	●
<b>SAN</b>	○	●	●
<b>PMMA</b>	●	○	●
<b>PC</b>	●	●	●
<b>PVC</b>	○	●	●
<b>POM</b>	●	●	●

PE-LD	●	●	●
PE-HD	●	●	●
PP	●	●	●
PMP	●	●	●
ECTFE, ETFE	○	●	●
PTFE	○	●	●
FEP, PFA	○	●	●
FKM	○	●	●
EPDM	○	●	●
NR	○	●	●
SI	○	●	●

- may be used
- cannot be used

In the centrifuge, disinfectants and cleaning agents generally used in medical care should be used (e.g., Aerodesina-2000, Lysoformin 3000, Melseptol, Melsept SF, Sanepidex, Cutasept F).

### 8.3.1. Autoclaving

- Rotors, buckets, and round carriers can be sterilized in autoclave with temperature 121°C during 20 min (215 kPa), unless otherwise specified in the OPTIONAL ACCESSORY.
- During sterilization (autoclaved) by means of steam one should consider temperature resistance of individual materials.
- Deformation of the accessories (carriers or lids made of plastic) may occur during autoclaving.
- Do not autoclave disposable materials (e.g., tubes, cyto-container).
- The life of the accessory depends on the frequency of autoclaving and use.
- Autoclaving reduces lifespan of plastic components. They should be replaced if any signs of damage are visible, including a change in colour or shape or when leakage etc.
- Pressure in closed containers can cause plastic deformation or explosion.
- Prior to autoclaving the rotors and accessories, thoroughly wash and rinse with distilled water.
- Never exceed the permissible autoclaving temperature and time.
- If you want to keep the hermetic seals, replace the sealing rings after each autoclave.

### Chemical resistance of plastics

	autoclaving 121 °C, 20 min		autoclaving 121 °C, 20 min
PS	○	PMP	●
SAN	○	ECTFE, ETFE	●
PMMA	○	PTFE	●
PC	●	FEP, PFA	●
PVC	○ <sup>1)</sup>	FKM	●
POM	●	EPDM	●
PE-LD	○	NR	○
PE-HD	○	SI	●
PP	●		

- may be used
- cannot be used

1) Except PVC hoses which are resistant to the steam sterilization in the temperature 121°C.



## 8.4. Chemical resistance

### Chemical resistance of plastics

	aldehydes	cyclic alcohols	esters	ether	ketones	strong or concentrated acids	weak or diluted acids	oxidizing substances	cyclic hydrocarbons	ahs	haloid hydrocarbons	alkalis
PS	○	●	○	○	○	○/●	○/●	○	○	○	○	●
SAN	○	●	○	○	○	○	○/●	○	○	○	○	●
PMMA	○/●	●	○	○	○	○	○/●	○	○/●	○	○	○
PC	○/●	●	○	○	○	○	○/●	○	○/●	○	○	○
PVC	○	●	○	○	○	●	●	○	●	○	○	●
POM	○/●	●	○	●	●	○	○	○	●	●	●	●
PE-LD		●	●	●	○/●	●	●	○	●	●	●	●
PE-HD	●	●	○/●	○/●	○/●	●	●	○	●	○/●	○/●	●
PP	●	●	○/●	○/●	○/●	●	●	○	●	○/●	○/●	●
PMP	○/●	●	○/●		○/●	●	●	○	○/●	○	○	●
ECTFE	●	●	●	●	○	●	●	●	●	●	●	●
ETFE												
PTFE		●										
FEP	●		●	●	●	●	●	●	●	●	●	●
PFA												
FKM	●	○	○	○	○	○	●	○/●	○/●	○/●	○/●	○/●
EPDM	●	●	○/●	○	○/●	●	●	○/●	○	○	○	●
NR	○/●	●	○/●	○	○	○	○/●	○	○	○	○	●
SI	○/●	●	○/●	○	○	○	○/●	○	○	○	○	○/●
●	very good	Permanent action of the substance does not cause damage through 30 days. The material is able to be resistant through years										
○/●	good to limited	Continuous action of the substance causes insignificant and partly reversible damage through the period of 7-30 days (e.g., puffing up, softening, reduced mechanical durability, discolouring).										
○	limited	The material should not have the continuous contact with the substance. The immediate occurrence of damage is possible (e.g., the loss of mechanical durability, deformation, discolouring, bursting, dissolving).										

Rubber inserts shall be exactly cleaned or possibly replaced. Centrifuges and accessories are made of different materials.

Do not use bleach on plastic parts of the rotor.

	<b>DANGER!</b> MPW accessories are not biotight. For centrifuging infectious materials, it is necessary to use hermetically closed tubes meeting demands of biotightness, in order to prevent germs migration into the centrifuge and beyond it.
	User is responsible for proper disinfections of the centrifuge if some dangerous material was spilled inside or outside of the centrifuge. During the above mentioned works one must wear safety gloves.


## 9. Troubleshooting

Majority of faults could be removed by switching the centrifuge OFF and then ON. After switching the centrifuge ON, there shall be displayed parameters of the recently implemented program and sound signals comprising four successive tones shall be generated. In case of short-duration power failure the centrifuge terminates the cycle and displays PROGRAM ERROR code.

Please find below the most frequent faults and their repair methods.

<b>Lack of display and check sound:</b>	<b>Remedies:</b>
• <i>Is mains socket live?</i>	<i>Check mains socket fuse.</i>
• <i>Is supply cable plugged into mains?</i>	<i>Plugs supply cable correctly.</i>
• <i>Is input fuse good?</i>	<i>Replace input fuse (rated data on rating plate).</i>
• <i>Is master switch ON?</i>	<i>Switch ON power supply.</i>
• <i>The above was checked and still there is no display active and check sound audible</i>	<i>Call service.</i>
<b>Centrifuge does not start</b>	<b>Remedies</b>
<i>P sign is displayed</i>	<i>Call service</i>
<ul style="list-style-type: none"> <li>• <b>START</b> key pressing does not generate reaction or single tone only</li> <li>- Rotor stopping sign, (S) is not displayed yet</li> <li>- Cover opening sign (O) displayed</li> <li>- <b>START</b> diode is blinking:</li> </ul>	<ul style="list-style-type: none"> <li>- Wait till rotor stops and displaying the rotor stopping symbol(S)</li> <li>- Close cover. Dot sign “.” must displayed.</li> <li>- Centrifugation cycle in progress, press <b>STOP</b> key or wait till cycle ends.</li> </ul>
• <i>Indications are proof for cycle in progress and motor does not start</i>	<i>Switch power supply OFF/ON. If fault still persists call service.</i>
<b>Programming function not active</b>	<b>Remedies</b>
<i>It is impossible to record parameter values to memory; last recorded program cannot be recalled. Disturbances on displays possible too.</i>	<i>Call service.</i>
<b>Centrifuge starts but not accelerates</b>	<b>Remedies</b>
<i>E symbol displayed after stopping. Drive overload</i>	<i>Wait for 15 minutes and switch again after opening and closing the cover.</i>
<ul style="list-style-type: none"> <li>• After stopping <b>U</b> sign is displayed</li> <li>- Unequal rotor load</li> <li>- Inclined centrifuge</li> <li>- Faulty drive (mechanical damage)</li> <li>- Centrifuge was displaced during operation</li> </ul>	<ul style="list-style-type: none"> <li>- Centrifuge load shall be balanced</li> <li>- Centrifuge shall be leveled</li> <li>- Call service</li> <li>- Switch <b>ON</b> the centrifuge afresh after opening and closing the cover</li> </ul>
<b>It is not possible to open the cover.</b>	<b>Remedies</b>
• <i>Rotor stopping S sign not displayed yet, after pressing COVER key single tone is audible</i>	<i>Rotor is still rotating. Wait for stopping of the rotor and the square symbol displaying</i>
• <i>Nothing is displayed</i>	<i>Check the centrifuge power supply</i>
• <i>Rotor stopping sign S is displayed, but cover cannot be opened</i>	<i>Call service</i>
<b>Centrifuge stop the program and not start</b>	<b>Remedies</b>
• <i>T sign is displayed(motor overheating)</i>	<i>Switch off the centrifuge and wait for 20 minutes and switch on after opening and closing the cover.</i>
• <i>The centrifuge still not starts.</i>	<i>Call service</i>


## 9.1. Emergency cover release

	<p><b>EMERGENCY COVER RELEASE</b></p> <p><b>Attention!</b> <i>The cover may be opened in emergency only when the rotor is at rest. Before emergency opening the cover, switch off the mains power switch and disconnect the power cord. Wait 10 min and/or looking through the sight glass, make sure that the rotor is not rotating.</i></p> <p>To do this, insert the key for emergency cover opening into the lock on the right side of the housing, and then turn it clockwise until the lock is released and the cover is opened.</p> <p>The emergency opening of the cover can be used, for example, in the event of a power failure, failure of the control panel, etc.</p>
---	--


## 10. Guarantee

Manufacturer grants to the Buyer the guarantee on conditions specified in the Guarantee Certificate. Buyer forfeits the right to guarantee repair when using the device inconsistently with the User manual provisions, when damage results from the User's fault.

Repairs should be carried out in authorized service workshops, granted with the MPW Certificate. The centrifuge shall be sent to repair after decontaminating disinfections. Information about authorized service workshops could be obtained from the Manufacturer.

	<ul style="list-style-type: none"> <li>▪ Guarantee period amounts to 24 months (unless otherwise specified in the purchase documents).</li> <li>▪ Guarantee conditions are described in guaranteed card.</li> <li>▪ The service life of the centrifuge specified by the manufacturer amounts to 10 years.</li> <li>▪ After 24 months from the start of the warranty period (date of purchase), a technical inspection of the centrifuge should be carried out (validation) by an authorized service of the manufacturer. Subsequent inspections should be carried out at annual intervals.</li> <li>▪ Maximum period of storage of not used centrifuge amounts to 1 year. After this period, a service authorized by manufacturer should carry out technical inspection of the centrifuge.</li> <li>▪ Manufacturer reserves the right to make technical changes in manufactured products.</li> </ul>
---	--


## 11. Transport and storage

	<p><b>CAUTION!</b> Due to the heavy weight of the device, lifting and carrying it may cause injury to the spine.</p>
<p>Store the device only in a closed and dry room.          Remove rotor from centrifuge before transport.          Lift and carry with the adequate number of people.          Use transport equipment.          Use the original packaging and transport protection for transport.</p>	

### 11.1. Transport and storage conditions

	Storage (in the package)	Storage (without the package)	Transport
Temperature	-25 ÷ +55 °C	-5 ÷ +45 °C	-25 ÷ +60 °C (general) -20 ÷ +55 °C (air)
Relative humidity	10 ÷ 75 %	10 ÷ 75 %	10 ÷ 75 %
Pressure	70 ÷ 106 kPa	70 ÷ 106 kPa	30 ÷ 106 kPa

## 12. Disposal

	<ul style="list-style-type: none"><li>▪ Dispose of the device in accordance with applicable regulations.</li><li>▪ Pursuant to Directive 2002/96 / EC.</li><li>▪ The device belongs to group 8 (medical equipment) and is classified under the category "business to business".</li><li>▪ The disposal regulations of the individual EU countries may differ. If in doubt, please contact the supplier of the device.</li></ul>
---	---

## 13. Manufacturer's info

"MPW MED. INSTRUMENTS" SPÓŁDZIELNIA PRACY

Boremlowska 46 Street

04-347 Warsaw

tel. (+48) 22 610 56 67 (sales department - POLAND)

(+48) 22 879 70 46 (sales department - outside POLAND)

(+48) 22 610 81 07 (service)

fax: (+48) 22 610 55 36

e-mail: [mpw@mpw.pl](mailto:mpw@mpw.pl)

website: [www.mpw.pl](http://www.mpw.pl)

000042924 - number of entries in the Waste Database

PL/CA01-01782 - identification number given by Office for Registration of Medicinal Products, Medical Devices and Biocidal Products.

## Distributor's info

**DISTRIBUTOR:**

--

## 14. Annexes



**A. Wyposażenie dodatkowe/Optional accessories****MPW-351e****WIRNIK / ROTOR****PARAMETRY WIRNIKA / ROTOR PARAMETERS****POJEMNIK/BUCKET****WKŁADKA / ADAPTER**[liczba probówek na wirnik/tubes per rotor] **PROBÓWKA / TUBE****11453****RPM 4500, RCF 2626, Rmax 116,  $\phi$  30****13080****14082**

[24] \* BD Vacutainer® (13 x 100 mm), (4-7 ml)

[24] \* Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)

[24] \* Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)

[24] 15054 6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt®  
6 ml tube with cap (11,5 x 92 mm), Sarstedt®[24] 15119 7 ml probówka szklana (12 x 100 mm)  
7 ml glass tube (12 x 100 mm)**bez wkładki/without adapter**

[24] \* BD Vacutainer® (16 x 100 mm), (2,5-11 ml)

[24] \* Greiner Vacuette® (16 x 100 mm), (7-9 ml)

[24] \* Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)

[24] \* Sarstedt S-Monovette® (16 x 92 mm), (9; 10 ml)

[24] 15046 14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt®  
14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®[24] 15048 15 ml Thermo Nalgene® (16 x 113 mm)  
15 ml Thermo Nalgene® (16 x 113 mm)[24] 15053 10 ml probówka z pokrywką (16 x 106 mm)  
10 ml tube with cap (16 x 106 mm)[24] 15118 10 ml probówka szklana (16 x 100 mm)  
10 ml glass tube (16 x 100 mm)[24] \* 15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm)  
15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)**RPM 4500, RCF 2468, Rmax 109,  $\phi$  30****13081****14082**

[24] \* BD Vacutainer® (13 x 75 mm), (1,6-5,3 ml)

[24] \* Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)

[24] \* Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)

[24] \* Sarstedt S-Monovette® (13 x 65 mm), (2,6; 2,9; 3,4; 3,8 ml)

[24] \* Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)

[24] 15120 5 ml probówka szklana (12 x 75 mm)  
5 ml glass tube (12 x 75 mm)**bez wkładki/without adapter**

[24] \* Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)

[24] \* 10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)

[24] 15121 10 ml probówka z dnem okrągłym i pokrywką (17 x 70 mm)  
10 ml tube, round bottom, with cap (17 x 70 mm)**11501****RPM 4500, RCF 3011, Rmax 133,  $\phi$  30****13080**

**A. Wyposażenie dodatkowe/Optional accessories****MPW-351e****14082**

- [30] \* BD Vacutainer® (13 x 100 mm), (4-7 ml)
- [30] \* Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)
- [30] \* Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
- [30] 15054 6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt®  
6 ml tube with cap (11,5 x 92 mm), Sarstedt®
- [30] 15119 7 ml probówka szklana (12 x 100 mm)  
7 ml glass tube (12 x 100 mm)

**bez wkładki/without adapter**

- [30] \* BD Vacutainer® (16 x 100 mm), (2,5-11 ml)
- [30] \* Greiner Vacuette® (16 x 100 mm), (7-9 ml)
- [30] \* Sarstedt S-Monovette® (16 x 92 mm), (9; 10 ml)
- [30] 15046 14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt®  
14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®
- [30] 15048 15 ml Thermo Nalgene® (16 x 113 mm)  
15 ml Thermo Nalgene® (16 x 113 mm)
- [30] 15053 10 ml probówka z pokrywką (16 x 106 mm)  
10 ml tube with cap (16 x 106 mm)
- [30] 15118 10 ml probówka szklana (16 x 100 mm)  
10 ml glass tube (16 x 100 mm)
- [30] \* 15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm)  
15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)

**RPM 4500, RCF 2875, Rmax 127,  $\alpha$  30****13081****14082**

- [30] \* BD Vacutainer® (13 x 75 mm), (1,6-5,3 ml)
- [30] \* Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)
- [30] \* Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)
- [30] \* Sarstedt S-Monovette® (13 x 65 mm), (2,6; 2,9; 3,4; 3,8 ml)
- [30] \* Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)
- [30] 15120 5 ml probówka szklana (12 x 75 mm)  
5 ml glass tube (12 x 75 mm)

**bez wkładki/without adapter**

- [30] \* Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
- [30] \* 10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
- [30] 15121 10 ml probówka z dnem okrągłym i pokrywką (17 x 70 mm)  
10 ml tube, round bottom, with cap (17 x 70 mm)

**11743****RPM 4500, RCF 2717, Rmax 120,  $\alpha$  30****13329****14255**

- [12] \* Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
- [12] 15119 7 ml probówka szklana (12 x 100 mm)  
7 ml glass tube (12 x 100 mm)

**14256**

- [12] 15046 14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt®  
14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®
- [12] 15048 15 ml Thermo Nalgene® (16 x 113 mm)  
15 ml Thermo Nalgene® (16 x 113 mm)
- [12] 15053 10 ml probówka z pokrywką (16 x 106 mm)  
10 ml tube with cap (16 x 106 mm)
- [12] 15118 10 ml probówka szklana (16 x 100 mm)  
10 ml glass tube (16 x 100 mm)

**bez wkładki/without adapter**

- [12] 15055 30 ml probówka z pokrywką (25,4 x 103,2 mm)  
30 ml tube with cap (25,4 x 103,2 mm)

**12285****RPM 4500, RCF 2626, Rmax 116,  $\alpha$  90**

<b>A. Wyposażenie dodatkowe/Optional accessories</b>	
<b>MPW-351e</b>	
<b>13286</b>	
<b>bez wkładki/without adapter</b>	
[8]	15102 płytka titracyjna MTP 28,8ml (86x128x15/17,5 mm) microtiter plate MTP 28,8 ml (86 x 128 x 15/17,5 mm)
[2]	* płytka titracyjna DWP 96/2000µl (127,8x85,5x44,1 mm) deepwell plate DWP 96/2000µl (127,8 x 85,5 x 44,1 mm)
<b>12436</b>	
<b>RPM 4500, RCF 3600, Rmax 159, ɸ 90</b>	
<b>13437</b>	
<b>14072</b>	
[4]	15116 50 ml probówka szklana (35 x 100 mm) 50 ml glass tube (35 x 100 mm)
<b>14106</b>	
[28]	* Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)
[28]	* Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)
[28]	* BD Vacutainer® (13 x 100 mm), (4-7 ml)
[28]	* Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)
[28]	* Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
[28]	* Sarstedt S-Monovette® (13 x 90 mm), (4,9; 5,6 ml)
[28]	15120 5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm)
[28]	15419 5 ml probówka z korkiem (12 x 85 mm), Sarstedt® 5 ml tube with cap (12 x 85 mm), Sarstedt®
[28]	15054 6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt® 6 ml tube with cap (11,5 x 92 mm), Sarstedt®
[28]	15119 7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
<b>14108</b>	
[28]	* Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[28]	* BD Vacutainer® (16 x 100 mm), (2,5-11 ml)
[28]	* Greiner Vacuette® (16 x 100 mm), (7-9 ml)
[28]	* Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)
[28]	* 10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
[28]	15048 15 ml Thermo Nalgene® (16 x 113 mm) 15 ml Thermo Nalgene® (16 x 113 mm)
[28]	15053 10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
[28]	15118 10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm)
<b>14109</b>	
[28]	* BD Vacutainer® (13 x 75 mm), (1,6-5,3 ml)
[28]	* Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)
[28]	* Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)
[28]	* Sarstedt S-Monovette® (13 x 65 mm), (2,6; 2,9; 3,4; 3,8 ml)
[28]	* Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)
[28]	* BD Vacutainer® (13 x 100 mm), (4-7 ml)
[28]	* Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)
[28]	* Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
[28]	* Sarstedt S-Monovette® (13 x 90 mm), (4,9; 5,6 ml)
[28]	15120 5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm)
[28]	15419 5 ml probówka z korkiem (12 x 85 mm), Sarstedt® 5 ml tube with cap (12 x 85 mm), Sarstedt®
[28]	15054 6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt® 6 ml tube with cap (11,5 x 92 mm), Sarstedt®
[28]	15119 7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
<b>14110</b>	
[28]	* BD Vacutainer® (16 x 100 mm), (2,5-11 ml)
[28]	* Greiner Vacuette® (16 x 100 mm), (7-9 ml)
[28]	* 10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
[28]	15048 15 ml Thermo Nalgene® (16 x 113 mm) 15 ml Thermo Nalgene® (16 x 113 mm)

**A. Wyposażenie dodatkowe/Optional accessories****MPW-351e**

[28]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
[28]	15118	10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm)
[28]	15046	14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt® 14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®
<b>14113</b>		
[4]	15051	50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm) 50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm)
[4]	*	50 ml probówka z dnem stożkowym z zakrętką (30 x 117 mm), Falcon®; [15052] 50ml (30 x 117mm) 50 ml tube, conical bottom, with cap (30 x 117 mm), Falcon®; [15052] 50ml Sarstedt® (30 x 117 mm)
[4]	*	50 ml probówka z dnem stożkowym bez rantu (30 x 115 mm), Greiner® 50 ml tube, conical bottom, without skirt (30 x 115 mm), Greiner®
<b>14197</b>		
[4]	15115	100 ml probówka szklana (44 x 100 mm) 100 ml glass tube (44 x 100 mm)
[4]	15040	100 ml probówka z pokrywką (45,2 x 103,7 mm) 100 ml tube with cap (45,2 x 103,7 mm)
<b>14441</b>		
[48]	15119	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
<b>14446</b>		
[48]	*	Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
[48]	*	Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)
[48]	15054	6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt® 6 ml tube with cap (11,5 x 92 mm), Sarstedt®
[48]	15119	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
[48]	15120	5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm)
[48]	15419	5 ml probówka z korkiem (12 x 85 mm), Sarstedt® 5 ml tube with cap (12 x 85 mm), Sarstedt®
<b>14447</b>		
[48]	15016	Sarstedt S-Monovette® (8 x 66 mm), (1,1; 1,2; 1,4 ml) Sarstedt S-Monovette® (8 x 66 mm), (1,1; 1,2; 1,4 ml)
<b>14449</b>		
[16]	*	BD Vacutainer® (16 x 100 mm), (2,5-11 ml)
[16]	*	Sarstedt S-Monovette® (16 x 92 mm), (9; 10 ml)
[16]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
[16]	*	13 ml probówka (ø16x100mm), Sarstedt® nr 62.515.006 13 ml tube (ø16 x 100 mm), Sarstedt® no. 62.515.006
<b>14450</b>		
[32]	*	2-1,5 ml probówka (10,8x41,8 mm), Eppendorf®; [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml (10,8x40,5 mm) 2-1,5 ml tube (10,8x41,8 mm), Eppendorf®; [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml (10,8x40,5 mm)
<b>bez wkładki/without adapter</b>		
[4]	15440	200 ml butelka płaskodenna (56 x 112 mm), Herolab® nr 25 33 73 200 ml bottle, flat bottom (56 x 112 mm), Herolab® no. 25 33 73
<b>14111 NIE AUTOKLAWOWAĆ/DO NOT AUTOCLAVE</b>		
[20]	*	Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[20]	*	10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
[20]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
[20]	15118	10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm)
[20]	*	13 ml probówka (ø16x100mm), Sarstedt® nr 62.515.006 13 ml tube (ø16 x 100 mm), Sarstedt® no. 62.515.006
<b>13042</b>		
<b>14043</b>		
[4]	15119	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
[4]	15120	5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm)
<b>14089</b>		
[8]	*	15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm) 15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)
<b>bez wkładki/without adapter</b>		
[8]	*	50 ml probówka z dnem stożkowym z zakrętką (30 x 117 mm), Falcon®; [15052] 50ml (30 x 117mm) 50 ml tube, conical bottom, with cap (30 x 117 mm), Falcon®; [15052] 50ml Sarstedt® (30 x 117 mm)

**A. Wyposażenie dodatkowe/Optional accessories****MPW-351e**

[8] \* 50 ml probówka z dnem stożkowym bez rantu (30 x 115 mm), Greiner®  
50 ml tube, conical bottom, without skirt (30 x 115 mm), Greiner®

**13044****bez wkładki/without adapter**

[16] \* BD Vacutainer® (16 x 100 mm), (2,5-11 ml)

[16] \* Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)

[16] \* Sarstedt S-Monovette® (16 x 92 mm), (9; 10 ml)

[16] 15053 10 ml probówka z pokrywką (16 x 106 mm)

10 ml tube with cap (16 x 106 mm)

[16] 15118 10 ml probówka szklana (16 x 100 mm)

10 ml glass tube (16 x 100 mm)

[16] \* 13 ml probówka (ø16x100mm), Sarstedt® nr 62.515.006

13 ml tube (ø16 x 100 mm), Sarstedt® no. 62.515.006

[16] \* 15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm)

15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)

**13045****14043**

[4] \* Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)

[4] 15119 7 ml probówka szklana (12 x 100 mm)

7 ml glass tube (12 x 100 mm)

[4] 15120 5 ml probówka szklana (12 x 75 mm)

5 ml glass tube (12 x 75 mm)

**14089**

[4] \* 15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm)

15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)

**bez wkładki/without adapter**

[4] \* 50 ml probówka z dnem stożkowym z zakrętką (30 x 117 mm), Falcon®; [15052] 50ml (30 x 117mm)

50 ml tube, conical bottom, with cap (30 x 117 mm), Falcon®; [15052] 50ml Sarstedt® (30 x 117 mm)

[4] \* 50 ml probówka z dnem stożkowym bez rantu (30 x 115 mm), Greiner®

50 ml tube, conical bottom, without skirt (30 x 115 mm), Greiner®

**13593****14024**

[4] \* 15 ml probówka z dnem stożkowym z zakrętką (17 x 120 mm), Falcon®; [15050], 15ml (17 x 120 mm)

15 ml tube, conical bottom, with cap (17 x 120 mm), Falcon®; [15050] 15ml Sarstedt®(17 x 120 mm)

**14181**

[20] \* Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)

[20] \* Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)

[20] 15054 6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt®

6 ml tube with cap (11,5 x 92 mm), Sarstedt®

[20] 15119 7 ml probówka szklana (12 x 100 mm)

7 ml glass tube (12 x 100 mm)

[20] 15120 5 ml probówka szklana (12 x 75 mm)

5 ml glass tube (12 x 75 mm)

[20] 15419 5 ml probówka z korkiem (12 x 85 mm), Sarstedt®

5 ml tube with cap (12 x 85 mm), Sarstedt®

**14186**

[16] \* BD Vacutainer® (13 x 75 mm), (1,6-5,3 ml)

[16] \* BD Vacutainer® (13 x 100 mm), (4-7 ml)

[16] \* Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)

[16] \* Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)

[16] \* Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)

[16] \* Sarstedt S-Monovette® (13 x 65 mm), (2,6; 2,9; 3,4; 3,8 ml)

[16] \* Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)

[16] \* Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)

[16] \* Sarstedt S-Monovette® (13 x 90 mm), (4,9; 5,6 ml)

[16] 15054 6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt®

6 ml tube with cap (11,5 x 92 mm), Sarstedt®

[16] 15119 7 ml probówka szklana (12 x 100 mm)

7 ml glass tube (12 x 100 mm)

[16] 15120 5 ml probówka szklana (12 x 75 mm)

5 ml glass tube (12 x 75 mm)

[16] 15419 5 ml probówka z korkiem (12 x 85 mm), Sarstedt®

5 ml tube with cap (12 x 85 mm), Sarstedt®

**14187**

[16] \* BD Vacutainer® (16 x 100 mm), (2,5-11 ml)

[16] \* Greiner Vacuette® (16 x 100 mm), (7-9 ml)

**A. Wyposażenie dodatkowe/Optional accessories****MPW-351e**

[16]	*	Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)
[16]	*	Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[16]	*	10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
[16]	15048	15 ml Thermo Nalgene® (16 x 113 mm) 15 ml Thermo Nalgene® (16 x 113 mm)
[16]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
[16]	15118	10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm)
[16]	15046	14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt® 14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®
<b>14188</b>		
[4]	15115	100 ml probówka szklana (44 x 100 mm) 100 ml glass tube (44 x 100 mm)
[4]	15040	100 ml probówka z pokrywką (45,2 x 103,7 mm) 100 ml tube with cap (45,2 x 103,7 mm)
<b>14194</b>		
[12]	*	2-1,5 ml probówka (10,8x41,8 mm), Eppendorf®; [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml (10,8x40,5 mm) 2-1,5 ml tube (10,8x41,8 mm), Eppendorf®; [15011], 2 ml (10,8x41,8 mm); [15128], 1,5ml (10,8x40,5 mm)
<b>14226</b>		
[4]	*	50 ml probówka z dnem stożkowym z rantem (30 x 115 mm), Greiner® 50 ml tube, conical bottom, skirted (30 x 115 mm), Greiner®
<b>14189+14188</b>		
[4]	15051	50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm) 50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm)
[4]	*	50 ml probówka z dnem stożkowym z zakrętką (30 x 117 mm), Falcon®; [15052] 50ml (30 x 117mm) 50 ml tube, conical bottom, with cap (30 x 117 mm), Falcon®; [15052] 50ml Sarstedt® (30 x 117 mm)
[4]	*	50 ml probówka z dnem stożkowym bez rantu (30 x 115 mm), Greiner® 50 ml tube, conical bottom, without skirt (30 x 115 mm), Greiner®
<b>14190+14188</b>		
[4]	15055	30 ml probówka z pokrywką (25,4 x 103,2 mm) 30 ml tube with cap (25,4 x 103,2 mm)
[4]	15117	25 ml probówka szklana (25 x 100 mm) 25 ml glass tube (25 x 100 mm)
<b>14192+14188</b>		
[4]	15116	50 ml probówka szklana (35 x 100 mm) 50 ml glass tube (35 x 100 mm)
<b>13438+17111</b>		
<b>14072</b>		
[4]	15116	50 ml probówka szklana (35 x 100 mm) 50 ml glass tube (35 x 100 mm)
<b>14106</b>		
[28]	*	Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)
[28]	*	Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)
[28]	*	BD Vacutainer® (13 x 100 mm), (4-7 ml)
[28]	*	Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)
[28]	*	Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
[28]	*	Sarstedt S-Monovette® (13 x 90 mm), (4,9; 5,6 ml)
[28]	15120	5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm)
[28]	15419	5 ml probówka z korkiem (12 x 85 mm), Sarstedt® 5 ml tube with cap (12 x 85 mm), Sarstedt®
[28]	15054	6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt® 6 ml tube with cap (11,5 x 92 mm), Sarstedt®
[28]	15119	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
<b>14108</b>		
[28]	*	Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[28]	*	BD Vacutainer® (16 x 100 mm), (2,5-11 ml)
[28]	*	Greiner Vacuette® (16 x 100 mm), (7-9 ml)
[28]	*	Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)
[28]	*	10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
[28]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
[28]	15118	10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm)
<b>14109</b>		
[28]	*	BD Vacutainer® (13 x 75 mm), (1,6-5,3 ml)
[28]	*	Greiner Vacuette® (13 x 75 mm), (1-4,5 ml)

\* probówka niedostępna w ofercie MPW lub dostępny odpowiednik (np:[15050]), patrz kolumna z prawej  
tube is not offered by MPW or equivalent is available (e.g. [15050]), see column on the right

**A. Wyposażenie dodatkowe/Optional accessories****MPW-351e**

[28]	*	Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)
[28]	*	Sarstedt S-Monovette® (13 x 65 mm), (2,6; 2,9; 3,4; 3,8 ml)
[28]	*	Sarstedt S-Monovette® (13 x 75 mm), (2,7; 3; 4,3 ml)
[28]	*	BD Vacutainer® (13 x 100 mm), (4-7 ml)
[28]	*	Greiner Vacuette® (13 x 100 mm), (3,5-6 ml)
[28]	*	Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
[28]	*	Sarstedt S-Monovette® (13 x 90 mm), (4,9; 5,6 ml)
[28]	15120	5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm)
[28]	15419	5 ml probówka z korkiem (12 x 85 mm), Sarstedt® 5 ml tube with cap (12 x 85 mm), Sarstedt®
[28]	15054	6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt® 6 ml tube with cap (11,5 x 92 mm), Sarstedt®
[28]	15119	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
<b>14110</b>		
[28]	*	Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[28]	*	BD Vacutainer® (16 x 100 mm), (2,5-11 ml)
[28]	*	Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)
[28]	*	10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
[28]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
[28]	15118	10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm)
[28]	15046	14 ml probówka z pokrywką (16,8 x 113,7 mm), Sarstedt® 14 ml tube with cap (16,8 x 113,7 mm), Sarstedt®
<b>14113</b>		
[4]	15051	50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm) 50 ml Thermo Nalgene® Oak Ridge (28,8 x 106,7 mm)
[4]	*	50 ml probówka z dnem stożkowym z zakrętką (30 x 117 mm), Falcon®; [15052] 50ml (30 x 117mm) 50 ml tube, conical bottom, with cap (30 x 117 mm), Falcon®; [15052] 50ml Sarstedt® (30 x 117 mm)
[4]	*	50 ml probówka z dnem stożkowym bez rantu (30 x 115 mm), Greiner® 50 ml tube, conical bottom, without skirt (30 x 115 mm), Greiner®
<b>14197</b>		
[4]	15115	100 ml probówka szklana (44 x 100 mm) 100 ml glass tube (44 x 100 mm)
[4]	15040	100 ml probówka z pokrywką (45,2 x 103,7 mm) 100 ml tube with cap (45,2 x 103,7 mm)
<b>14441</b>		
[48]	15119	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
<b>14446</b>		
[48]	*	Sarstedt S-Monovette® (11 x 92 mm), (4,5; 5 ml)
[48]	*	Sarstedt S-Monovette® (11 x 66 mm), (1,6; 2; 2,7; 3; 3,1 ml)
[48]	15054	6 ml probówka z pokrywką (11,5 x 92 mm), Sarstedt® 6 ml tube with cap (11,5 x 92 mm), Sarstedt®
[48]	15119	7 ml probówka szklana (12 x 100 mm) 7 ml glass tube (12 x 100 mm)
[48]	15120	5 ml probówka szklana (12 x 75 mm) 5 ml glass tube (12 x 75 mm)
[48]	15419	5 ml probówka z korkiem (12 x 85 mm), Sarstedt® 5 ml tube with cap (12 x 85 mm), Sarstedt®
<b>14447</b>		
[48]	15016	Sarstedt S-Monovette® (8 x 66 mm), (1,1; 1,2; 1,4 ml) Sarstedt S-Monovette® (8 x 66 mm), (1,1; 1,2; 1,4 ml)
<b>14449</b>		
[16]	*	Sarstedt S-Monovette® (15 x 92 mm), (7,5; 8,2; 8,5 ml)
[16]	*	Sarstedt S-Monovette® (16 x 92 mm), (9; 10 ml)
[16]	*	Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[16]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)
<b>bez wkładki/without adapter</b>		
[4]	15440	200 ml butelka płaskodenna (56 x 112 mm), Herolab® nr 25 33 73 200 ml bottle, flat bottom (56 x 112 mm), Herolab® no. 25 33 73
<b>14111 NIE AUTOKLAWOWAĆ/DO NOT AUTOCLAVE</b>		
[20]	*	Sarstedt S-Monovette® (15 x 75 mm), (4; 4,3; 5,5 ml)
[20]	*	10 ml Thermo Nalgene® Oak Ridge (16 x 81,5 mm)
[20]	15053	10 ml probówka z pokrywką (16 x 106 mm) 10 ml tube with cap (16 x 106 mm)

**A. Wyposażenie dodatkowe/Optional accessories****MPW-351e**

[20]	15118	10 ml probówka szklana (16 x 100 mm) 10 ml glass tube (16 x 100 mm)
[20]	*	13 ml probówka (Ø16x100mm), Sarstedt® nr 62.515.006 13 ml tube (Ø16 x 100 mm), Sarstedt® no. 62.515.006

**Suma końcowa**



## DECLARATION OF CONFORMITY

Product name: **Laboratory centrifuge  
MPW-351e**

Product type: **Laboratory centrifuge**

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Product classification on the basis of the Directive 98/79/EC: **Non classified to list A or B and not for self-testing.**

**Product complies with the requirements:**

• **Directive 98/79/EC (IVD), including the requirements of harmonized standards:**

EN 15223-1:2016

EN ISO 18113-3:2011

EN 13612:2002

EN 61326-2-6:2006

EN 13612:2002/AC:2002

EN 61010-2-101:2002

EN 13975:2003

EN 62304:2006

EN ISO 14971:2012

EN 62304:2006/AC:2008

EN ISO 18113-1:2011

EN 62366:2008

• **selected harmonized standards of Directive 2014/35/UE (LVD):**

EN 61010-1:2010

EN 61010-2-020:2006

EN 61010-1:2010/A1:2019

EN 61010-1:2010/A1:2019/AC:2019-04

• **Directive 2014/30/UE (EMC)**

• **Directive 2011/65/UE (RoHS 2)**

Z-ca PREZESA ZARZĄDU

Wojciech Anisiewicz

PREZES ZARZĄDU

mgr Łukasz Satański

**"MPW MED. INSTRUMENTS"  
SPÓŁDZIELNIA PRACY**

Warsaw, 46 Boremlowska Street

*applies Quality Management System in line with*

*PN-EN ISO 9001:2015, PN-EN ISO 13485:2016*



Warsaw, 2021.08.26

no. 10.351e.05.en

# DECLARATION OF DECONTAMINATION

(repair)

In order to protect our employees please fill out the declaration of decontamination completely before sending centrifuge to the manufacturer (repair).

**1. Device:**

– type: .....

– serial No.: .....

**2. Description of decontamination**

(see user manual)

.....

.....

.....

.....

**3. Decontamination carried out by:**

name: .....

**4. Date and signature:**

.....

# DECLARATION OF DECONTAMINATION

(return)

In order to protect our employees please fill out the declaration of decontamination completely before sending centrifuge to the manufacturer (return).

**1. Device:**

– type: .....

– serial No.: .....

**2. Description of decontamination**

(see user manual)

.....

.....

.....

.....

**3. Decontamination carried out by:**

name: .....

**4. Date and signature:**

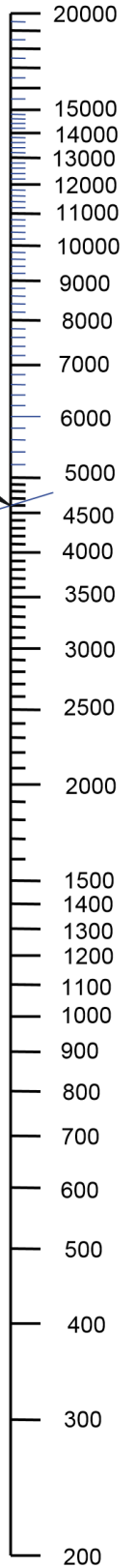
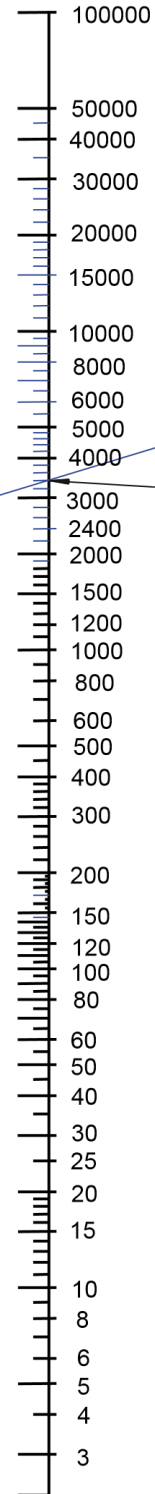
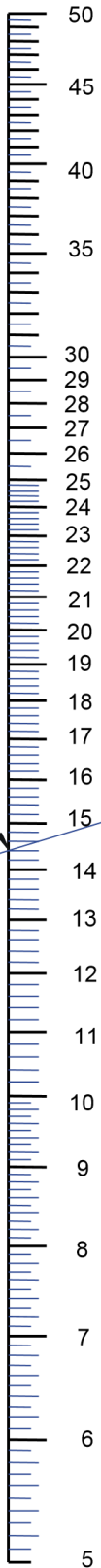
.....

# NOMOGRAM

Centrifuging radius [cm]

R.C.F. (x "g")  
multiple of  
gravitational  
acceleration

[r.p.m.]



Formula used for calculation of this nomogram :

$$R.C.F. = 11,18 * r * (n/1000)^2$$

where :

- R.C.F. - multiple of gravitational acceleration
- r - centrifuging radius (cm)
- n - rotational speed (r.p.m.)
- g - gravitational acceleration

Example of making use  
of the nomogram:

A=14,4 cm  
B=4600 r.p.m.  
C=3400 x g

$$n = 1000 * \sqrt{\frac{RCF}{(11,18 * r)}}$$

$$r = \frac{RCF}{\left[ 11,18 * \left( \frac{n}{1000} \right)^2 \right]}$$

A

B

C