Purchase Contract

(hereafter the "**Contract**")

1. CONTRACTUAL PARTIES

1.1 **Fyzikální ústav AV ČR, v. v. i.,**

with seat: Na Slovance 1999/2, 182 21 Praha 8, Czech Republic
represented by: RNDr. Michael Prouza, Ph.D., Director,
registered in the Register of public research institutions of the Ministry of Education, Youth and Sports of the Czech Republic.
ID No.: 68378271
Tax ID No.: CZ68378271

Bank: [redacted]
Account No. [redacted]

(hereinafter the "**Buyer**")

and

1.2 **3D Lab Sp. z o.o.,**

with seat: Farbiarska 63B, 02-862 Warsaw, Poland,
represented by: Jakub Rozpendowski and each of Board Members,
registered in the National Register of court (*Krajowy Rejestr Sądowy*).
ID No.: 0000572964 (KRS); 362401543 (REGON)
Tax ID No.: PL9512396922 (NIP)

Bank: [redacted]
Account No. [redacted]

(hereinafter the "**Seller**"),

(the Buyer and the Seller are hereinafter jointly referred to as the "**Parties**" and each of them individually as a "**Party**").

Institute of Physics of the Czech Academy of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

2. FUNDAMENTAL PROVISIONS

2.1 The Buyer is a public research institution whose primary activity is excellent scientific research in the area of physics, especially elementary particles physics, condensed systems, solid state matter, plasma and optics.

2.2 The Buyer wishes to acquire the subject of performance hereof in order to produce metal powders suitable as an input material for additive production by Selective Laser Melting.

2.3 The Seller was selected as the winner of a public procurement procedure announced by the Buyer in accordance with Act No. 134/2016 Coll., on Public Procurement, as amended (hereinafter the **"Act"**), for the public contract called **"Metal Powder Atomizer"** (hereinafter the "**Procurement Procedure**").

2.4 The documentation necessary for the execution of the subject of performance hereof consist of

2.4.1 Technical specifications of the subject of performance hereof attached as **Annex No. 1** hereto**.**

2.4.2 The Seller´s bid submitted within the Procurement Procedure in its parts which describe the subject of performance in technical detail (hereinafter the "**Sellers's Bid**"); the Sellers's Bid forms **Annex No. 2** to this Contract and is an integral part hereof.

In the event of a conflict between the Contract's Annexes, the technical specification / requirement of the higher level / quality shall prevail.

2.5 The Seller declares that he has all the professional prerequisites required for the supply of the subject of performance under this Contract, is authorised to supply the subject of performance and there exist no obstacles on the part of the Seller that would prevent him from supplying the subject of this Contract to the Buyer.

2.6 The Seller acknowledges that the Buyer considers him capable of providing performance under the Contract with such knowledge, diligence and care that is associated and expected of the Seller's profession, and that the Seller's potential performance lacking such professional care would give rise to corresponding liability on the Seller's part. The Seller is prohibited from misusing his qualities as the expert or his economic position in order to create or exploit dependency of the weaker Party or to establish an unjustified imbalance in the mutual rights and obligation of the Parties.

2.7 The Seller acknowledges that the Buyer is not in connection to the subject of this Contract an entrepreneur and also that the subject of this Contract is not related to any business activities of the Buyer.

2.8 The Seller acknowledges that the production and delivery of the subject of performance within the specified time and of the specified quality, as shown in Annexes No. 1 and 2 of this Contract (including invoicing), is essential for the Buyer.

2.9 The Parties declare that they shall maintain confidentiality with respect to all facts and information, which they learn in connection herewith and / or during performance hereunder, and whose disclosure could cause damage to either Party. Confidentiality provisions do not prejudice obligations arising from valid legislation.

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

3. SUBJECT-MATTER OF THE CONTRACT

3.1 The subject of this Contract is the obligation on the part of the Seller to deliver and transfer into the Buyer's ownership:

the **Metal Powder Atomizer**

(hereafter the **"Equipment"**)

and the Buyer undertakes to take delivery of the Equipment and to pay to the Seller the agreed upon price.

3.2 The following activities form an integral part of the performance to be provided by the Seller:

3.2.1 Formulation of conditions which are recommended to be met at the place of Buyer in order to install the Equipment;

3.2.2 Transport of the Equipment incl. all accessories specified in Annexes 1 and 2 of the Contract to the place of delivery, un-packaging and control thereof;

3.2.3 Installation of the Equipment and all components necessary to operate the Equipment including connection to installation infrastructure at the site;

3.2.4 Execution of the acceptance tests:

- Demonstration of the functionality of the plasma arc melting system for tool steel 1.2709. Verifying the particle size distribution for D50 and D90, as well as spherical shape of powder.

- Demonstration of the functionality of the induction melting system for material AlSi10Mg. Verifying the particle size distribution for D50 and D90, as well as spherical shape of powder.

- Demonstration of the functionality of the basic frequency configuration module for tool steel 1.2709. Verifying the particle size distribution for D50 and D90, as well as spherical shape of powder.

- Demonstration of the functionality of the higher frequency configuration module for tool steel 1.2709. Verifying the particle size distribution for D50 and D90, as well as spherical shape of powder.

- Demonstration of the functionality of the feeding system (in the case of more solutions, demonstration of the functionality of all of them).

- Demonstration of functionality of all types of sonotrode materials for different materials to atomize. Verifying the particle size distribution for D50 and D90, as well as spherical shape of powder.

Institute of Physics
of the Czech Academy
of Sciences

Na Slovance 1999/2
182 21 Prague 8
Czech Republic

Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

- Demonstration of the functionality of the software according to the technical specifications in Annex No. 1 hereto.

3.2.5 Delivery of detailed instructions and manuals for operation and maintenance, including list of spare parts, electrical connection schemes, etc. - all in Czech or English language, in electronic or hardcopy (printed) versions;

3.2.6 Training of operators at the site (at least two-day training of five operators);

3.2.7 Free-of-charge warranty service during the warranty term;

3.2.8 Provision of free technical support in the form of consultations, e.g. regarding fine tuning of the Equipment. The Seller shall provide the Buyer with this free support even after the warranty expires.

3.3 The subject of performance (Equipment) is specified in detail in Annexes No. 1 and No. 2 hereto.

3.4 The Seller shall be liable for the Equipment and related services to be in full compliance with this Contract, its Annexes and all valid legal regulation, technical and quality standards and that the Buyer will be able to use the Equipment for the defined purpose. In case of any conflict between applicable standards it is understood that the stricter standard or its part shall always apply.

3.5 The delivered Equipment and all its parts and accessories must be brand new and unused.

4. PERFORMANCE PERIOD

4.1 The Seller undertakes to manufacture and deliver the Equipment to the Buyer within **83 days** of the conclusion of the Contract.

4.2 The performance period shall be extended by a period during which the Seller could not perform due to obstacles on the part of the Buyer and / or obstacles beyond the control of both Parties.

5. PURCHASE PRICE, INVOICING, PAYMENTS

5.1 The purchase price is based on the Seller's submitted bid and amounts to **189 450.00 EUR** (in words: one hundred and eighty-nine thousand four hundred and fifty Euros) excluding VAT (hereinafter the **"Price"**). VAT shall be paid by the Buyer and settled in accordance with the valid Czech regulation.

5.2 The Price represents the maximum binding offer by the Seller and includes any and all performance provided by the Seller in connection with meeting the Buyer's requirements for the proper and complete delivery of the Equipment hereunder, as well as all costs that the Seller may incur in connection with the delivery, installation and testing of the Equipment upon handover, and including all other costs or expenses that may arise in connection with creation of an intellectual property and its protection.

5.3 The Parties agreed that the Seller shall be entitled to invoice the Price as follows:

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

5.3.1 The Seller is entitled to issue an advance invoice corresponding to 30 % of the Price excluding VAT after the conclusion of the Contract;

5.3.2 The Seller is entitled to invoice the Price after the handover protocol in accordance with Section 10.4 (hereinafter the **"Handover Protocol"**) will have been signed. In case the Equipment will be delivered with minor defects, the Price shall be invoiced after removal of these minor defects.

5.4 All invoices issued by the Seller must contain all information required by the applicable laws of the Czech Republic. Invoices issued by the Seller in accordance with this Contract shall contain in particular following information:

5.4.1 name and registered office of the Buyer,

5.4.2 tax identification number of the Buyer,

5.4.3 name and registered office of the Seller,

5.4.4 tax identification number of the Seller,

5.4.5 registration number of the tax document (invoice),

5.4.6 scope of the performance (including the reference to this Contract),

5.4.7 the date of the issue of the tax document (invoice),

5.4.8 the date of the conclusion of the Contract,

5.4.9 purchase Price,

5.4.10 registration number of this Contract, which the Buyer shall communicate to the Seller based on Seller's request before the issuance of the invoice

and must comply with the double taxation agreements, if applicable.

5.5 The Buyer prefers electronic invoicing, with the invoices being delivered to efaktury@fzu.cz. All issued invoices shall comply with any international double taxation agreements, if applicable.

5.6 Invoices shall be payable within thirty (30) days of the date of their delivery to the Buyer. Payment of the invoiced amount means the date of its remittance to the Seller's account.

5.7 If an invoice is not issued in conformity with the payment terms stipulated by the Contract or if it does not comply with the requirements stipulated by law, the Buyer shall be entitled to return the invoice to the Seller as incomplete, or incorrectly issued, for correction or issue of a new invoice, as appropriate, within five (5) business days of the date of its delivery to the Buyer. In such a case, the Buyer shall not be in delay with the payment of the Price or part thereof and the Seller shall issue a corrected invoice with a new and identical maturity period commencing on the date of delivery of the corrected or newly issued invoice to the Buyer.

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

5.8 The Buyer shall be entitled to unilaterally set off any of his payments against any receivables claimed by the Seller due to:

5.8.1 damages caused by the Seller,

5.8.2 contractual penalties.

5.9 The Seller shall not be entitled to set off any of his receivables against any part of the Buyer's receivable hereunder.

6. OWNERSHIP TITLE

The ownership right to the Equipment shall pass to the Buyer by delivery.

7. PLACE OF DELIVERY AND HANDOVER

The place of delivery and handover of the Equipment shall be the Room No. 0.22 in the Building "New Pavilion" at the premises of the Institute of Physics of the Czech Academy of Sciences at Na Slovance 1999/2, Praha 8, Czech Republic.

8. NOTIFICATION OF DELIVERY

The Seller shall notify the Buyer in writing of the exact date of delivery of the Equipment at least 15 days prior to such date, ensuring that the deadline for the performance hereunder is maintained.

9. COOPERATION OF THE PARTIES

The Seller undertakes to notify the Buyer of any obstacles on his part, which may negatively influence proper and timely delivery and/or handover of the Equipment.

10. DELIVERY, INSTALLATION, HANDOVER AND ACCEPTANCE

10.1 The Seller shall transport the Equipment at his own cost to the place of delivery and handover. If the shipment is intact, the Buyer shall issue delivery note for the Seller.

10.2 The Seller shall perform and document the installation of the Equipment and launch experimental tests in order to verify whether the Equipment is functional and meets the technical requirements of Annexes No. 1 and 2 hereof.

10.3 Handover procedure includes handover of any and all technical documentation pertaining to the Equipment, user manuals and certificate of compliance of the Equipment and all its parts and accessories with approved standards.

10.4 The handover procedure shall be completed by handover of the Equipment confirmed by the Handover Protocol containing specifications of all performed tests. The Handover Protocol shall contain the following mandatory information:

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

10.4.1 Information about the Seller, the Buyer and any subcontractors;

10.4.2 Description of the Equipment including description of all components, their hardware / software setups and serial / production numbers;

10.4.3 Description of executed tests according to Section 3.2.4 of the Contract: type of test, duration and achieved parameters;

10.4.4 List of technical documentation including the manuals;

10.4.5 Confirmation of the training, including a list of participants and information on its extent;

10.4.6 Eventually reservation of the Buyer regarding minor defects and / or unfinished work including the manner and deadline for their removal and

10.4.7 Date of signature of the Handover Protocol.

10.5 Handover of the Equipment does not release the Seller from liability for damage caused by its defects.

10.6 The Buyer shall not be obliged to accept Equipment, which would show defects (even those that do not - on their own or in connection with other defects - constitute an obstacle to the use of the Equipment). In this case, the Buyer shall issue a record containing the reason for his refusal to accept the Equipment.

10.7 Should the Buyer not exercise his right not to accept the Equipment with a defect, the Seller and the Buyer shall list all defects found in the Handover Protocol, including the manner and deadline for their removal. Should the Parties not be able to agree in the Handover Protocol on the deadline for removal of the defects, it shall be understood that all above shall be removed / rectified within 14 days from the handover of the Equipment.

11. REPRESENTATIVES, NOTICES

11.1 The Seller authorized the following representatives to communicate with the Buyer in all matters relating to the Equipment delivery and handover:

[redacted]

11.2 The Buyer authorized the following representatives to communicate with the Seller in all matters relating to the Equipment delivery and handover:

[redacted]

11.3 All notifications to be made between the Parties hereunder must be made out in writing and delivered to the other Party by hand (with confirmed receipt) or by registered post (to the Buyer's or Seller's

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

address), or in some other form of registered post or electronic delivery incorporating electronic signature (qualified certificate) to epodatelna@fzu.cz in case of the Buyer and to [redacted] in case of the Seller.

11.4 In all technical and expert matters (discussions on the Equipment testing, notification of the need to provide warranty or post-warranty service, technical assistance etc.) electronic communication between technical representatives of the Parties will be acceptable using e-mail addresses defined in Sections 11.1 and 11.2.

11.5 In all technical and expert matters (discussions on the Equipment testing and demonstration, notification of the need to provide warranty or post-warranty service, technical assistance etc.) electronic communication between representatives of the Parties will be acceptable using e-mail addresses defined in Sections 11.1 and 11.2.

12. TERMINATION

12.1 This Contract may be terminated early by agreement of the Parties or withdrawal from the Contract on the grounds stipulated by law or in the Contract.

12.2 The Buyer is entitled to withdraw from the Contract without any penalty from the Seller in any of the following events:

12.2.1 The Seller is in delay with the delivery of the Equipment longer than 2 weeks after the date pursuant to Section 4.1 hereof.

12.2.2 The technical parameters or other conditions set out in the technical specifications defined in Annexes 1 and 2 to this Contract and in the relevant applicable technical standards will not be met by the Equipment at handover.

12.2.3 Facts emerge bearing evidence that the Seller will not be able to deliver the Equipment.

12.2.4 The Seller has violated the obligations specified within the conditions of the Procurement Procedure, namely those in the field of

- labour law and/or regulations concerning employment, health and safety at work or
- environmental law.

12.3 The Seller is entitled to withdraw from the Contract in the event of the Buyer being in default with the payment for more than 2 months with the exception of the cases when the Buyer refused an invoice due to defect on the delivered Equipment or due to breach of the Contract by the Seller.

12.4 Withdrawal from the Contract becomes effective on the day the written notification to that effect is delivered to the other Party. The Party which had received performance from the other Party prior to such withdrawal shall duly return such performance.

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

13. INSURANCE

13.1 The Seller undertakes to insure the Equipment against all risks, in the amount of the Price of the for the entire period commencing when transport of the Equipment starts until duly deliver to the Buyer. In case of breach of this obligation, the Seller shall be liable to the Buyer for any damage that may arise.

13.2 The Seller is liable for the damage that he has caused. The Seller is also liable for damage caused by third parties undertaken to carry out performance or its part under this Contract.

14. WARRANTY TERMS

14.1 The Seller shall provide warranty for the quality of the Equipment for a period of **25 months**.

14.2 The warranty term shall commence on the day following the date of signing of the Handover Protocol pursuant to Section 10.4 hereof. The warranty does not cover consumable things.

14.3 Should the Buyer discover a defect, he shall notify the Seller to rectify such defect using the e-mail address: ato-support@3d-lab.pl. The Seller is obliged to notify the Buyer without delay about any change of this e-mail address. The Seller shall be obliged to review any warranty claim within 24 hours (within business days) from its receipt and to propose solution, unless agreed otherwise by the Parties.

14.4 During the warranty period, the Seller shall be obliged to rectify any claimed defects within 30 days from receipt of the Buyer's notification. In cases of unusual defects, the Seller shall be obliged to rectify the defect in the period corresponding to the nature of the defect and to define the deadline for the handover of the rectified Equipment.

14.5 During the warranty period, any and all costs associated with defect rectification / repair including transport and travel expenses of the Seller shall be always borne by the Seller.

14.6 The repaired Equipment shall be handed over by the Seller to the Buyer on the basis of a protocol confirming removal of the defect (hereinafter the "**Repair Protocol**"). If the Equipment is delivered duly repaired and defect-free, the Buyer will confirm the Repair Protocol.

14.7 The repaired portion of the Equipment shall be subject to a new warranty term in accordance with Section 14.1 which commences to run on the day following the date when the Repair Protocol was executed. However, the aggregate warranty period shall not exceed 36 months.

14.8 The Seller declares that he shall ensure paid post-warranty [out-of-warranty] service for the period of 7 years after the expiration of the warranty; the service terms shall be identical to those of Sections 14.3 and 14.4.

14.9 The Seller undertakes to provide the Buyer with updates of the software controlling the Equipment for the entire term of warranty service.

14.10 If the Equipment has defects, due to which it cannot be demonstrably used in full for more than 60 days (period of defects) during six or less consecutive months of the warranty period, the Seller is obliged to deliver new Equipment without defects within 90 days from the date on which the Buyer

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

sent a written notice, unless the Parties agree otherwise.

15. CONTRACTUAL PENALTIES

15.1 The Buyer shall have the right to a penalty in the amount of 0.1 % of the Price for each commenced day of delay with the performance pursuant to Section 4.1 hereof.

15.2 The Buyer shall have the right to a penalty in the amount of 0.05 % of the Price for each commenced day of delay with rectifying of defects claimed within the warranty period.

15.3 In case of default in payment of any due receivables (monetary debt) under the Contract, the defaulting Buyer or Seller (the debtor) shall be obliged to pay a contractual penalty in the amount of 0.1 % of the owed amount for each commenced day of delay with the payment.

15.4 Contractual penalties are payable within 30 days of notification demanding payment thereof.

15.5 Payment of the contractual penalty does not prejudice the rights of the Parties to claim damages.

15.6 Payment of the contractual penalty cannot be demanded if the breach of the contractual obligation causes force majeure. Circumstances related to the Covid-19 epidemic shall be considered as force majeure cases despite the fact the epidemic is already underway at the date of this Contract.

16. DISPUTES

Any and all disputes arising out of this Contract or the legal relationships connected with the Contract shall be resolved by the Parties by mutual negotiations. In the event that any dispute cannot be resolved by negotiations within sixty (60) days, the dispute shall be resolved by the competent court in the Czech Republic based on application of any of the Parties; the court having jurisdiction will be the court where the seat of the Buyer is located. Disputes shall be resolved exclusively by the law of the Czech Republic.

17. FINAL PROVISIONS

17.1 This Contract represents the entire agreement between the Buyer and the Seller. The relationships between the Parties not regulated in this Contract shall be governed by the Act No. 89/2012 Coll., the Civil Code, as amended (hereinafter the **"Civil Code"**).

17.2 In the event that any of the provisions of this Contract shall later be shown or determined to be invalid, ineffective or unenforceable, then such invalidity, ineffectiveness or unenforceability shall not cause invalidity, ineffectiveness or unenforceability of the Contract as a whole. In such event the Parties undertake without undue delay to subsequently clarify any such provision or replace after mutual agreement such invalid, ineffective or unenforceable provision of the Contract by a new provision, that, in the extent permitted by the laws and regulations of the Czech Republic, relates as closely as possible to the intentions of the Parties to the Contract at the time of creation hereof.

17.3 This Contract may be changed or supplemented solely by means of numbered amendments in writing,

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

furnished with the details of time and place and signed by duly authorised representatives of the Parties. The Parties expressly reject modifications to the Contract in any other manner.

17.4 The Parties expressly agree that the Contract as a whole, including all attachments and data on the Parties, subject-matter of the Contract, numerical designation of this Contract, the Price and the date of the Contract conclusion, will be published in accordance with Act No. 340/2015 Coll. on special conditions for the effectiveness of some contracts, publication of these contracts and Contract Register, as amended (hereinafter the "**CRA**"). The Parties hereby declare that all information contained in the Contract and its Annexes is not considered trade secrets under § 504 of the Civil Code and grant permission for their use and disclosure without setting any additional conditions.

17.5 The Parties agree that the Buyer shall ensure the publication of the Contract in the Contract Register in accordance with CRA.

17.6 This Contract becomes effective as of the day of its publication in the Contract Register.

17.7 The following Annexes form an integral part of the Contract:

Annex No. 1: Technical specification on the subject of performance

Annex No. 2: Technical description of the Equipment as presented in Seller's bid

Annex No. 3: Affidavit according to § 6 paragraph 4 of the Act No. 134/2016 Coll.

17.8 The Parties, manifesting their consent with the entire contents of this Contract, attach their signature hereunder.

In Prague on 18.05.2022	In Warsaw on 17.05.2022
For the Buyer:	For the Seller:
_____	_____
RNDr. Michael Prouza, Ph.D. Director	Jakub Rozpendowski Member of the Board of Directors

Institute of Physics
of the Czech Academy
of Sciences

Na Slovance 1999/2
182 21 Prague 8
Czech Republic

Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

Annex No. 1 - Technical specification on the subject of performance

Tab. 1 - The Equipment must meet the technical conditions and include components listed in this table.

No.	Description and minimum specification of the Equipment as defined by the Buyer	Description and specification of the Equipment offered by the Seller	Complies YES/NO
1	Plasma arc melting system (TIG system with minimum 200 A)	Automated melting system using a TIG source (plasma arc melting system). The ability to adjust the current intensity during the process in the range from 30A-200A (available upgrade to 250A). Atomization of high-melting metals with a melting point exceeding 3000 °C. The system is adapted to long-term operation without overloading the system thanks to an efficient cooling system. A welding source that allows for the generation of a stable electric arc in the area of which the shielding gas is ionized, and plasma is formed. The electrode is placed in an automated, sealed manipulator which enables its position to be controlled from the operator panel in three axes. Possibility of melting metals at variable frequency of electric arc intensity.	**YES**
2	Induction melting system (upper temperature limit at least 1300 °C)	The induction system allows the melting of materials with a given chemical composition. The input material can be used in the form of irregularly shaped bars with variable surface roughness. The system provides the ability to control the melting temperature and the rate of input material feeding to the ultrasonic system for atomization. The temperature limit is up to 2000 °C for irregularly shaped rods.	**YES**
3	Basic frequency configuration module (20 to 40 kHz)	The basic frequency configuration module equipped with the device is **35 kHz**. Using basic frequency system with 35 kHz, the powder is produced in the range of 20-120 µm characterized by a narrow distribution (most particles in range 30-60 µm).	**YES**
4	Higher frequency configuration module (40 to 60 kHz)	Additional higher frequency configuration module **52 kHz**. The frequency of the ultrasonic system directly affects the particles size produced during ultrasonic atomization. Using higher frequency system with 52 kHz, the powder is produced in the range of 20-90 µm characterized by a narrow distribution (most particles in range 20-50 µm).	**YES**
5	Feeding system for irregular shape of material (length from 50 to 100 mm and diameter from 2 to 10 mm)	Single Rod Feeding System (SRFS) with ability to work with specified parameters aligned with the requirements. Maximum length of the rods is 110 mm. The minimum	**YES**

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

		length (waste) is 10 mm. Input rod diameter: 1-10 mm, Brochure attached.	
6	Feeding system for cylindrical shape of material (diameter up to 10 mm and length of at least 300 mm)	Multi Rod Feeding System (MRFS) with ability to work with specified parameters aligned with the requirements. Input rod diameter: 4-10 mm. The maximum length is 1200 mm. Brochure attached.	**YES**
7	Feeding system for wire shape of material (diameter of the wire from 0,8 to 2,2 mm)	Wire Feeding System (WFS) with ability to work with specified parameters aligned with the requirements. Required diameter ranges from 0.8 mm to 2.2 mm.	**YES**
8	Multi rod feeding system (A system where at least 3 rods of cylindrical shape with minimum dimensions of at least 10 mm in diameter and 50 mm in length can be put one by one into a closed container with a length of at least 300 mm; rods are then applied one at a time with no need to stop the process or break atmosphere inside the Equipment's chamber)	Multi Rod Feeding System (MRFS) with ability to work with specified parameters aligned with the requirements. Possibility of feeding multiple rods during one atomization process. The system enables the atomization of any number of rods with a diameter of up to 10 mm and a total length not exceeding 1200 mm. The rods can be applied one at a time with no need to stop the process or break the atmosphere inside the process chamber. Brochure attached.	**YES**
9	Exhaust gas recirculation system (equipped with an air-locked filter that is also protected from oxygen and self-ignition)	The side-channel pump ensures the circulation of the protective gas in the system and enables powder transportation, its separation from dust in the cyclone and filtration of the protective gas. The filtration system consists of an air-locked main filter, located in a separate frame with a control box, coater, and safety filter. Filters are protected against oxygen and self-ignition. Additionally, the system is equipped with an integrated pump which allows the achievement of the optimal vacuum level for accelerating the filling of argon.	**YES**
10	Ultrasonic cleaner with min. chamber dimensions (1000x600x400) mm	We propose an additional ultrasonic cleaner. The device is compatible with the offered atomizer with the ability to work with specified parameters aligned with requirements. In our experience, this solution is dedicated to the quick cleaning of the necessary device's parts to avoid powder cross-contamination. The proposed Ultrasonic Cleaner has: - chamber dimensions (H x W x D): 1000 x 600 x 400 [mm]; - Water filling valve and drain valve. Specification attached.	**YES**
11	Chiller unit with a power of at least 10 000 W (water-air system)	We propose an additional cooling water device. It is compatible with the offered atomizer and aligned with the tender requirements. Water – Air System. 10 400 W power. Specification attached.	**YES**

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

12	Vibration sieving system	We propose a laboratory vibrating system with a set of sieves and accessories. Specification attached.	**YES**
13	Sonotrodes starter pack (min. amount of sonotrodes is 6 pcs)	Set of sonotrodes: 2 x Steel, 2 x Titanium, 2 x Tungsten (6 pcs. in total)	**YES**
14	Desired particle size distribution of the produced powder in the range of 20 to 120 µm	PSD (Particle Size Distribution) range covers expected range: 20-120 um. Examples of PSD charts attached.	**YES**
15	Desired sphericity (circularity) of the produced powder in the range of 0,8 to 1	Production of highly spherical powders. Sphericity is higher than 0,8. Material test charts attached.	**YES**

Tab. 2 – Data on "Production process automation"

Feature	YES/NO
The Equipment allows automatic (electronic) control of the atomization process (setting of atomization parameters).	**YES**
The Equipment allows automatic (electronic) feeding of material into the atomization process.	**YES**

Institute of Physics
of the Czech Academy
of Sciences
Na Slovance 1999/2
182 21 Prague 8
Czech Republic
Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

Annex No. 2

The Seller's bid in the extent it describes technical parameters of the Equipment

Institute of Physics
of the Czech Academy
of Sciences

Na Slovance 1999/2
182 21 Prague 8
Czech Republic

Tel.: +420 266 052 110
Email: info@fzu.cz
Web: www.fzu.cz

ATO LAB+

3D 3DLAB

LABORATORY METAL POWDER ATOMIZER

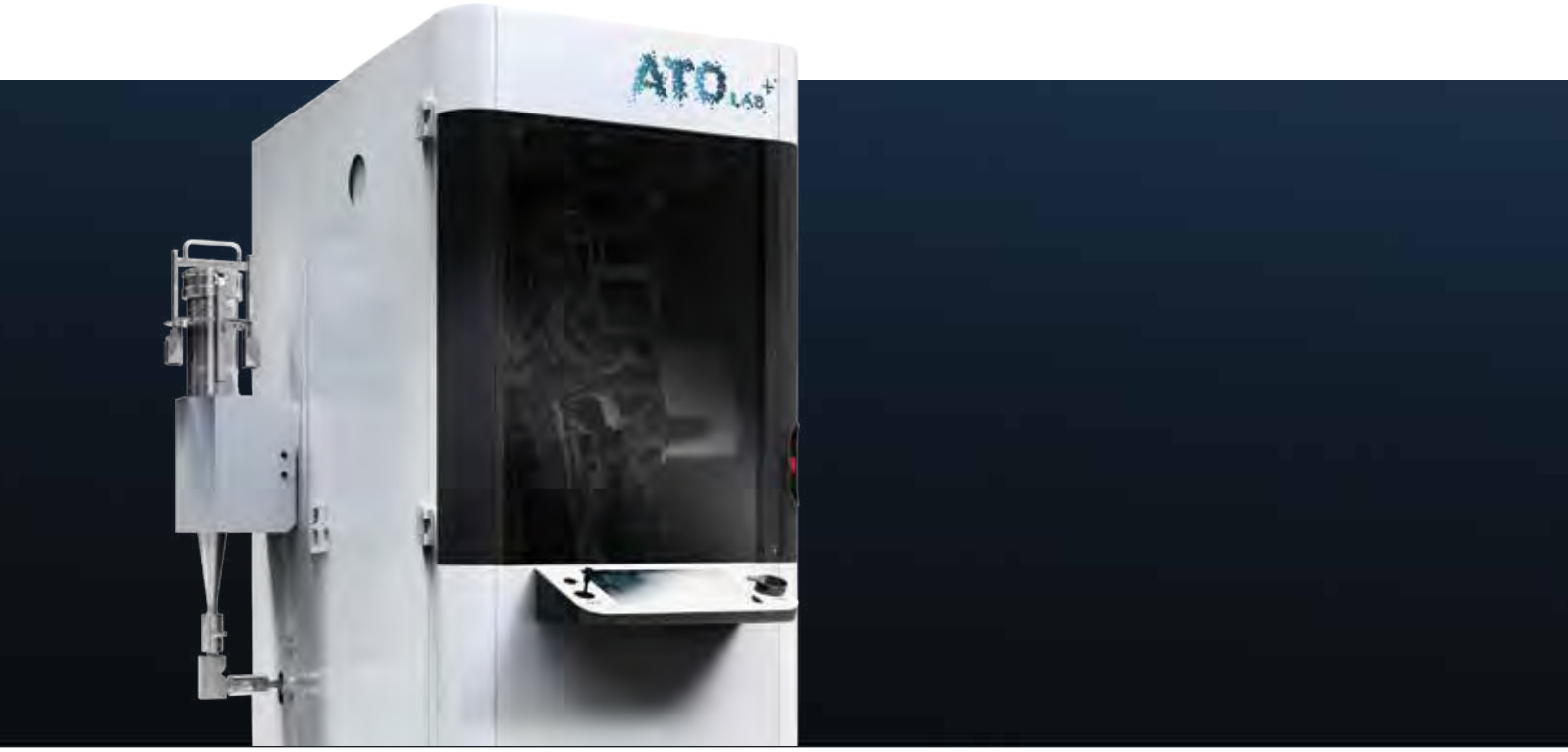
NECESSITY IS THE MOTHER OF INVENTION

GO BEYOND THE STATE OF THE ART

Open a new chapter in your research and development with ATO Lab plus. Design your alloy and quickly produce spherical metal powder with high flowability, which is perfect for your additive manufacturing and powder metallurgy needs.

DESIGNER POWDER METALLURGY SOLUTION

Our intensive R&D work was aimed at optimizing the laboratory-used atomization process and creating a device that enabled a successful production of both reactive and non-reactive powders on a smaller, yet still completely self–sufficient scale. We have developed stable procedures for metals and their alloys, such as: aluminum, titanium, stainless steel and lots more.

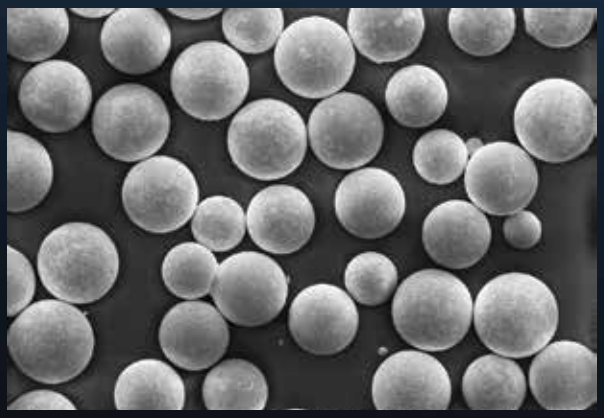


ATO Lab plus throughput reaches several hundred grams of metal powder per hour with a particle size from 20 to 120 µm, with optional subsequent procedures leading to the separation of desired powder fractions.

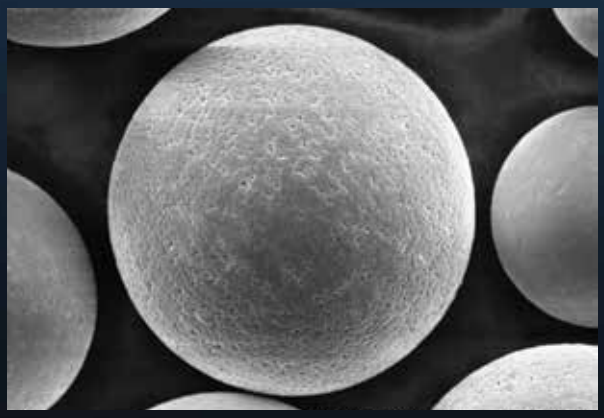
ATO LAB+

HIGH-END ATOMIZATION IN YOUR LABORATORY

ATO Lab plus has been designed by industry-oriented researchers aiming to overcome traditional atomization limitations. ATO Lab plus has a compact form, making it possible for comfortable usage even in a limited space. Along with its innovative technology and no requirements for sophisticated infrastructure, it ensures exceptionally low operating costs and a quick return on the investment.



Unsieved, raw ATO Lab plus powder, note the uniform size and spherical shape of the particles



A spherical IN718 powder particle produced in ATO Lab plus

NEXT GENERATION ATOMIZER

ATO Lab plus is a unique, compact machine for metal powders production, using a novel ultrasonic atomization technology. This breakthrough solution allows you to quickly produce metal powders with a high flowability and a narrow particle size distribution.

KEY FEATURES

- Highest quality powders
- Process flexibility
- No limitations in minimum powder quantity
- Wide range of alloys
- Cost-effective production
- Affordable price
- Scalable system structure

SOFTWARE

Software quality lies at the heart of every user experience. Our team is aware of it and that is why we have equipped ATO Lab plus with our dedicated, versatile and user-friendly software. The operator can execute the process using a conveniently placed touch screen. The purpose was to build a handy control system allowing for the independent adjustment of every process parameter, including the ultrasonic and melting units.

ATO LAB PLUS - ADDITIONAL CAPABILITIES

New, highly advanced version ATO Lab plus with a vacuum pump system for quick preparation of the right atmosphere and an extremely low oxygen level to achieve the best possible chemical purity of the materials.
Well sealed process chamber allows us to produce reactive metal powders and their alloys, such as: titanium or aluminum.

DEDICATED MODULES OF FEEDING SYSTEMS

ATO LAB PLUS allows to increase productivity.
It can be configured with one of several modules of feeding systems dedicated to different types of input materials:

- Single Rod Feeding System (SRFS)
- Multi Rod Feeding System (MRFS)
- Induction Melting Feeding System (IMFS)

AFFORDABLE PRICE

In comparison with currently available atomization units, ATO Lab plus has considerably lower media consumption. The cost-effective process is not only smooth and rapid, but also economical. Its compact size and unique technical solutions enabled 3D Lab to offer a highly competitive price for ATO Lab plus.

ATO POWDER CAN ALSO BE USED IN THE FOLLOWING AREAS:

- Brazing
- Powder spraying
- Filters and foams
- Conventional powder metallurgy
- Laser cladding
- Chemical synthesis
- Catalysis

DISCOVER THE BREAKTHROUGH IN POWDER PRODUCTION

SEE THE UNMATCHED PARTICLE QUALITY

Due to the ordered nature of the ultrasonic atomization process, the output powder has a very narrow particle size distribution that depends on the chosen ultrasound frequency.

TAKE YOUR PRODUCTION TO A NEXT STAGE

Focused power sources make it possible to overcome the material melting point limitation. ATO Lab plus can use even very brittle or soft input material, as various dedicated feeding system modules are available to suit any input material shape. Perfect for usage in small to medium-sized companies, new material development projects and research institutions.

WITH ATO IN YOUR LAB YOU WILL CHANGE THE WAY OF METAL POWDER PRODUCTION

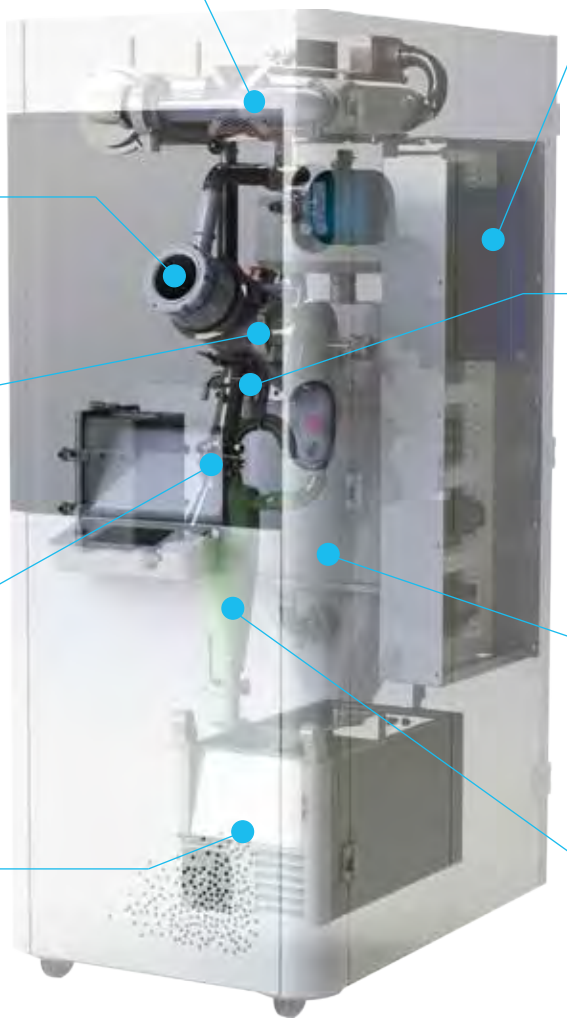
RECIRCULATION PUMP
gas-tight design keeps atmosphere oxygen-free during the process

PROCESS CHAMBER
designed to minimize powder left and keep compact size of the machine

TIG TORCH
welding arc is formed by an electrode and is maintained in a shielding gas covering

ULTRASONIC TRANSDUCER
the "vibration engine" brings energy necessary for melt atomization

TIG WELDING SOURCE
robust power supply guarantees stable process while efficient IGBT inverter minimize energy loss



ULTRASONIC GENERATOR
powers up the transducer, advanced control system allows for full process monitoring

SONOTRODE
the very heart of the machine, built with patent pending technology and state-of-the-art nanoalloys, provides unique process flexibility

FILTERS
designed to remove excessive fumes and allows to recirculate inert gas

CYCLONE
the element responsible for powder collection, it separates powder from inert gas

SPECIFICATION

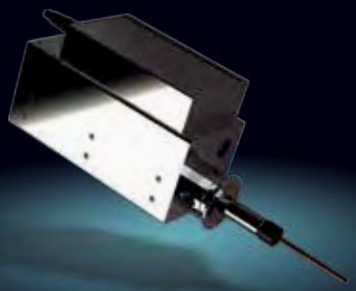
GENERAL INFORMATION	ATO Lab plus
process	metal powders production
technology	ultrasonic atomization
melting method	TIG / Induction
sonotrode type	half-wave nanoalloy sonotrode - patent pending
inert gas flushing method	vacuum pump
cooling method	liquid
processable materials	non-reactive & reactive alloys (e.g. Ti, Al, Zr-based alloys, intermetallics and refractory metals)
powder quality	high flowability, spherical particles shape, narrow PSD, low oxygen content
PSD (particle size distribution)	20-120 um
powder collecting system	cyclone
protective atmosphere preparation time	↓5 min.
input material	any shape*
certfication	CE

PARAMETERS	
ultrasonic frequency	35kHz (+ upgrade to higher frequency)
O2 level (delta)	↓ 150 ppm
system throughput	up to 0.3 l/h
machine weight (uncrated)	700 kg.
size (HxWxD)	1997 x 1070 x 1539 [mm]

REQUIREMENTS	
air supply	compressed air station
inert gas	Argon
power supply requirements / consumption	400V, 10 KVA / 3 phase
cleaning unit	ultrasonic cleaner
powder recycling system	sieving unit
water cooling	external chiller

* SRFS, MRFS, IMFS modules

SINGLE ROD FEEDING SYSTEM

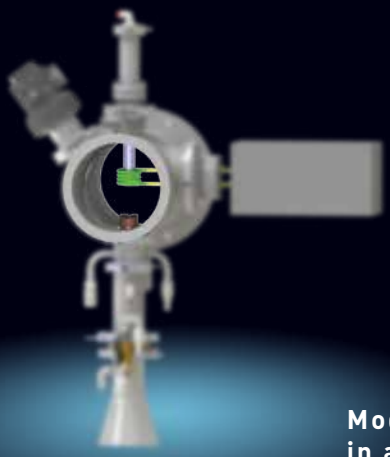


Module with the ability to atomize cast rods

MULTI ROD FEEDING SYSTEM

Module for multiple rod usage in a single process

INDUCTION MELTING FEEDING SYSTEM

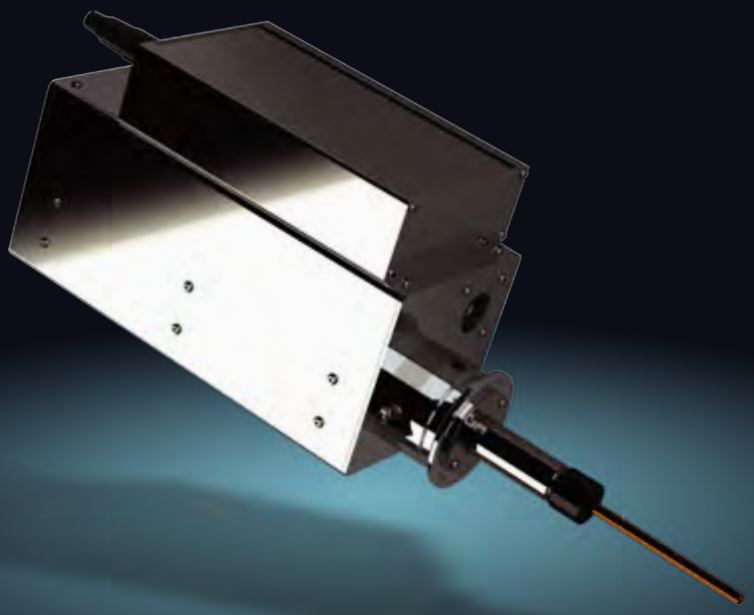


Module for atomizing materials in any shape

ATO TECHNOLOGY

3DLAB

SINGLE ROD FEEDING SYSTEM



OVERALL PRODUCT CHARACTERISTICS

Single Rod Feeding System is an optional equipment for units of the ATO Lab + series which are designed for atomization of metals using ultrasonic technology and can only be used for cooperation with this device.

DESIGNATION

The purpose of the device is to enable atomization of materials in the form of a rod:

- Diameter from 1 to 10 mm. Diameter can vary along the length of the rod
- Maximum length of 110 mm

Feeder		Diameter [mm]	Max length [mm]	Waste [mm]	Permissible total radial runout [mm]
SRFS	Collet	1-10	110-(240)*	25	1
	Cartridge	4,6,8	110	10	0,5

*Length of a rod that can be mounted into the SRFS. It is possible to atomize 110 mm, then it has to be manually ejected.

SINGLE ROD FEEDING SYSTEM

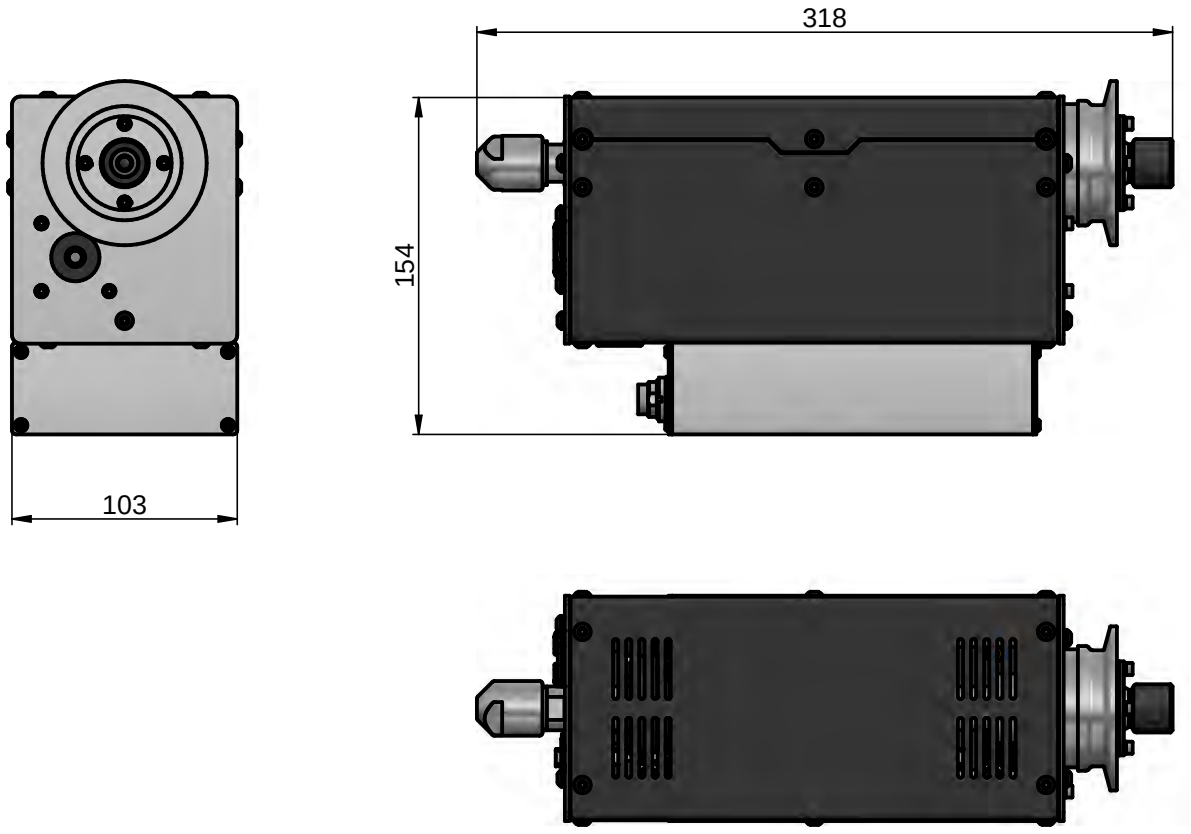


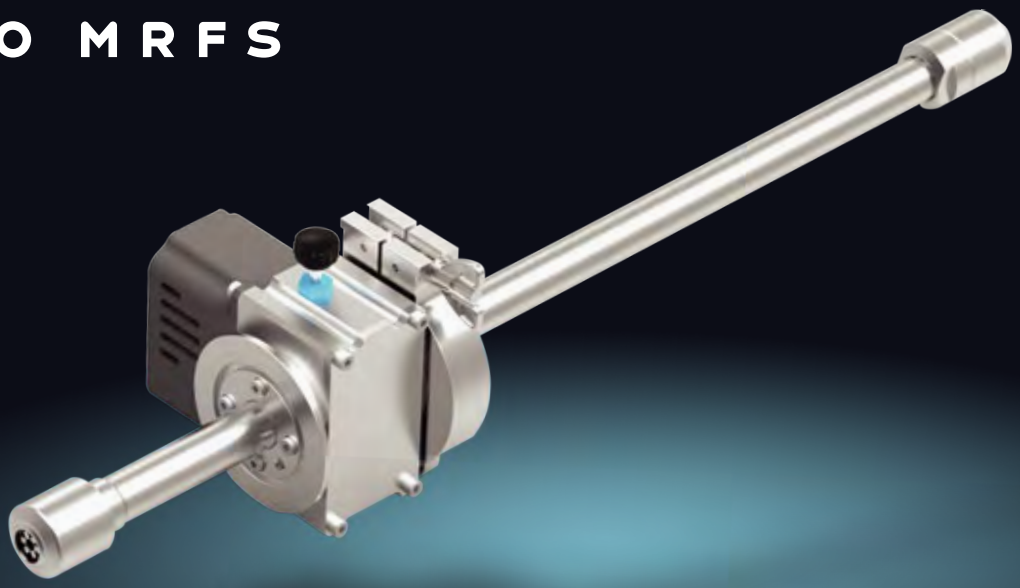
Fig. 1 Dimensions of the Single Rod Feeding System - SRFS [mm]

ATO TECHNOLOGY

3D 3DLAB

MULTI ROD FEEDING SYSTEM

ATO MRFS



OVERALL PRODUCT CHARACTERISTICS

Multi Rod Feeding System is an optional equipment for units of the ATO Lab + series which are designed for atomization of metals and metal alloys using ultrasonic technology.

DESIGNATION

The purpose of the device is to enable atomization of materials in the form of a round rod:

- Diameter 4-10 mm and with diameters close to nominal (with use of self-locking collets of sizes 4, 6, 8, 10)
- The maximum length of a single rod or the sum of sections of multiple rods cannot exceed 1200 mm when using an extended tube container

Feeder		Diameter [mm]	Max length (with APR)* [mm]	Waste (with APR) [mm]	Permissible total radial runout [mm]
MRFS	Standard Container	4,6,8,10	320(160)	170(15)	0,5
	Extended Container	4,6,8,10	1200(1040)	170(15)	

*Length of the feeder container. Any number of rods with a total length of less than indicated can be installed into the container.

APR - ADDITIONAL PUSH ROD

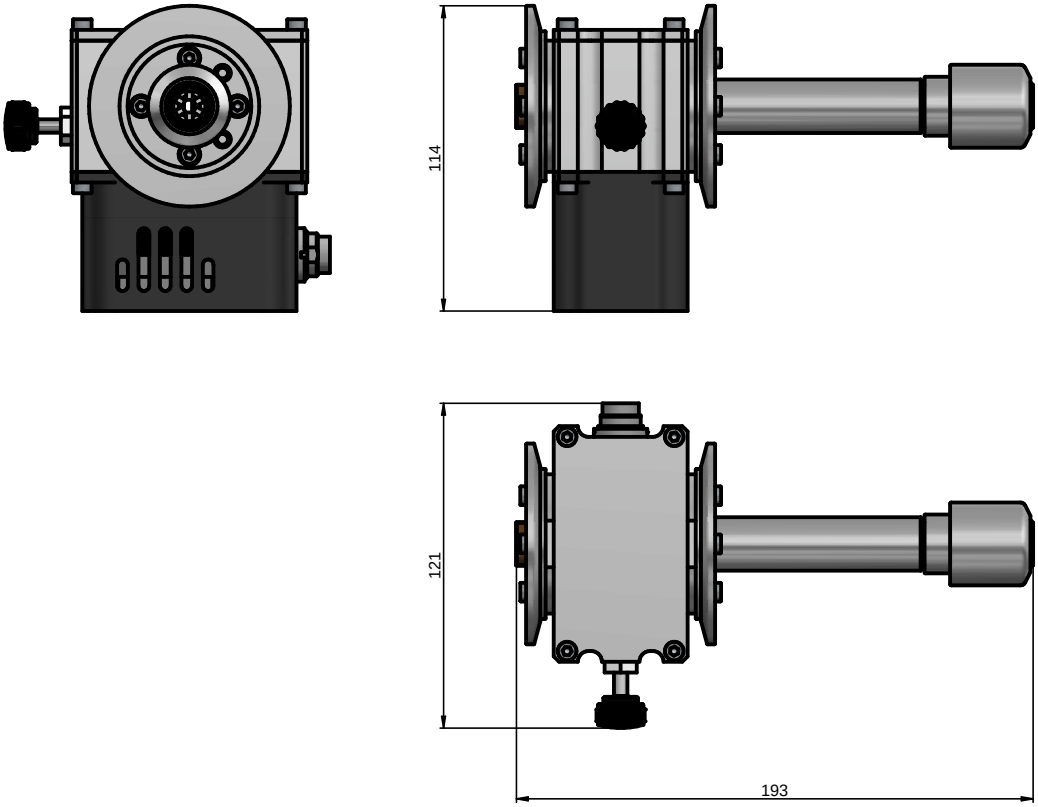


Fig. 1 Dimensions of the Multi Rod Feeding System - MRFS [mm]

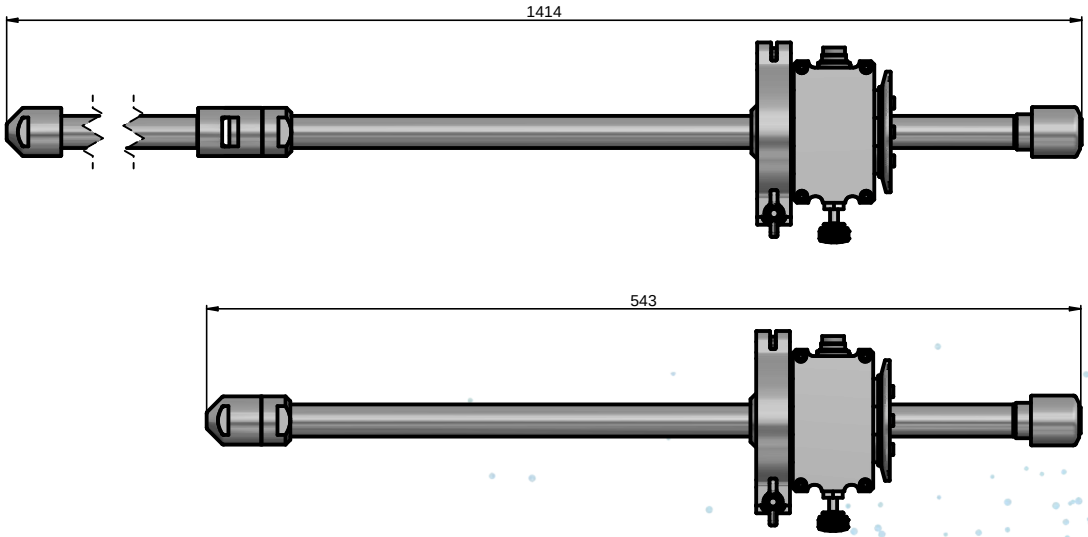


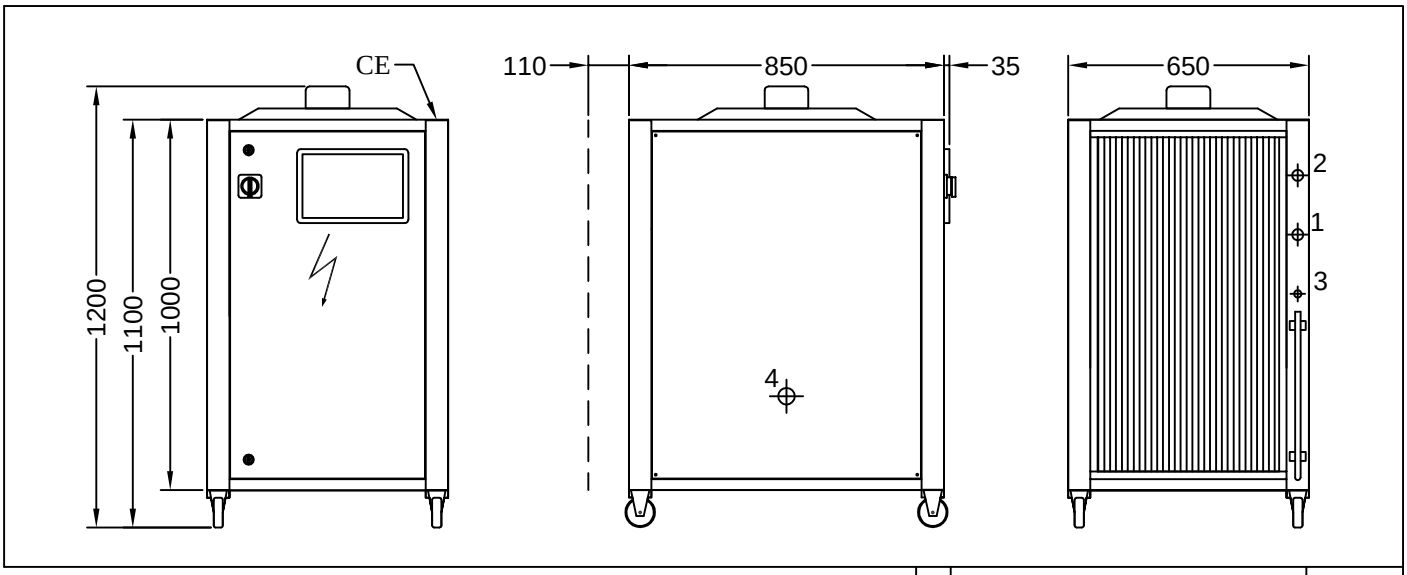
Fig. 2 Dimensions of the Multi Rod Feeding System with the Extended Tube Container [mm]

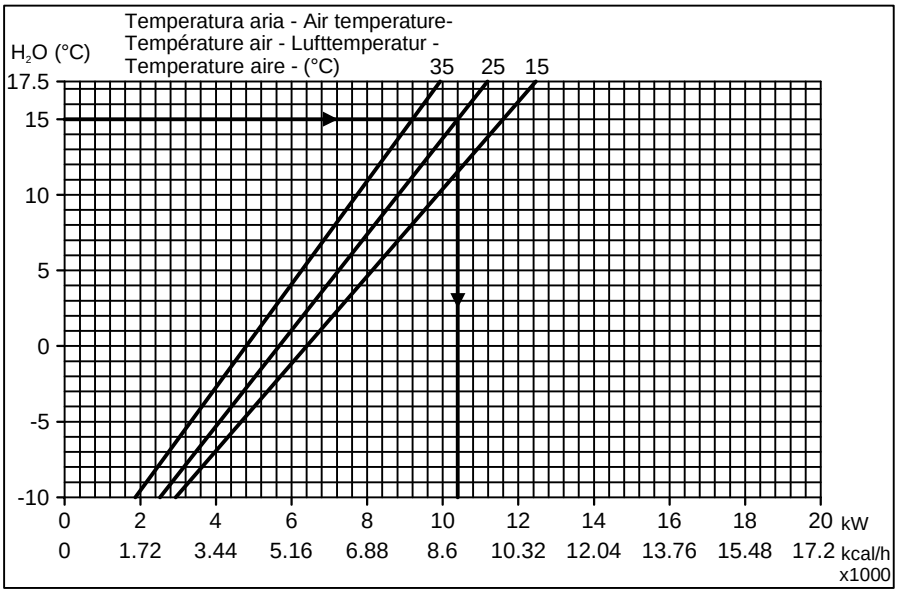
Industrial Frigo

GR2A 11

Resa frigorifera nominale Nominal cooling capacity Puissance frigorifique nominale Nennkühlleistung Capacidad enfriamiento nominal		Efficienza Duty Efficacité Leistungsfähigkeit Rendimiento	Potenza compressori Compressors power Puissance compresseurs Kompressoren Leistung Potencia compresores			Potenza pompa Pump power Puissance pompe Pumpenleistung Potencia bomba	Portata pompa Pump flow Débit pompe Pumpe Durchflußmenge Caudal bomba			Prevalenza pompa Pump pressure Pression pompe Pumpendruck Presión bomba		
				nom.	max.			l/min			bar	
kW	kcal/h	kW/kW	n°	kW ass.	kW inst.	kW ass./inst.	min.	nom.	max.	max.	nom.	min.
10,4	8.900	5	1x	2,1	3,6	0,6/0,75	16	30	100	3,35	3,2	2,4

Potenza ventilatori Fans power Puissance ventilateurs Vent. Durchflußmenge Caudal ventiladores		Portata ventilatori Fan flow rate Débit ventilateur Tragfähigkeit der Ventilator Caudal ventilador	Rumorosità Noise Bruit Geräusch Ruido		Serbatoio Tank Cuve Behälter Tanque	Peso a vuoto Net weight Poids net Leergewicht Peso en vacio	Dimensioni imballo Packaging dimensions Dimensions emballage Verpackungsabmessungen Dimensiones embalaje	Peso imballo Packaging weight Poids emballage Verpackungsgewicht Peso embalaje
			UNI 7712 dB(A)					
n°	kW ass./inst.	m³/h	1m	10m	litri	kg	mm	kg
1x	0,7/0,8	7.800	71	51	35	160	1250x850x1400h	60





1	Mandata - Delivery - Refoulement Vorlauf - Empuje	Ø1"
2	Ritorno - Return - Retour - Rücklauf - Retorno	Ø1"
3	Riempimento - Fill up- Chargement Befüllung - Llenado	Ø1/2"
4	Entrata glicole - Glycol inlet - Entrée glycol - Glykolzufluss - Entrada de glycol	Ø3/4"
	Troppo pieno - Overflow- Trop-plein- Überlauf - Rebosadero	

Potenza elettrica totale Total electric power Puissance electrique tot. Gesamtstromstärke Potencia electrica total		
	ass.	3,5 kW
	inst.	5,0 kW

Corrente Max Max. Current Courant max. Max. Spannung Corriente máx.	
	A
	10

Magnetotermico Magnetothermic Switch Interr. Magnétothermique Magnetothermis. Schalter Interr. Magnetotérmico	
	A
	16

Carica Gas R407C R407C Refrigerant Fill-up Charge gaz R407C Befüllung mit R407C Gas Carga gas R407C	
	kg
	2

380/400/415V - 3 - 50Hz	
28.02.12	P160003.07

9.1.4 HRS090-W∗-40∗

Table 9-4 Specifications[HRS090-W∗-40∗]

Model				HRS090-W∗-40∗
Cooling method				Water-cooled refrigerated type
Refrigerant				R410A (HFC)
Quantity of refrigerant			kg	1.15
Control method				PIDcontrol
Ambient temperature[*1]			°C	5 to 45
Circulating fluid system	Circulating fluid[*2]			Tap water, Ethylene glycol aqueous solution 15%, Deionized water
	Operating temperature range[*1]		°C	5 to 35
	Cooling capacity 50/60Hz [*3]		kW	9.0 / 10.5
	Heating capacity[*4]		kW	1.7 / 2.2
	Temperature stability[*5]		°C	±0.5
	Pump capacity	Rated flow rate 50/60Hz (Outlet) [*6]	L/min	29 / 45
		Maximum flow rate 50/60Hz	L/min	55 / 68
		Maximum lifting height	m	50
	Minimum operating flow rate 50/60Hz [*7]		L/min	29 / 45
	Tank capacity		L	18
	Circulating fluid outlet, circulating fluid return port			Rc1 (Symbol F: G1, Symbol N: NPT1)
	Drain port			Rc1/4 (Symbol F: G1/4, Symbol N: NPT1/4)
	Wetted material			Stainless, Cupper(Heat exchanger brazing), Brass, Bronze, PTFE, FKM, EPDM, PVC, NBR, POM, PE, PP, Carbon, Ceramic
Facility water system	Temperature range		°C	5 to 40
	Pressure range		MPa	0.3 to 0.5
	Required flow 50/60Hz		L/min	25 / 25
	Facility water pressure differential		MPa	More than 0.3
	Facility water inlet, outlet port			Rc1/2 (Symbol F: G1/2, Symbol N: NPT1/2)
	Wetted material			Stainless, Cupper(Heat exchanger's brazing), Bronze, Brass PTFE, NBR, EPDM
Electric system	Power supply			AC380-415V 50/60Hz 3phase Allowable voltage fluctuation ±10% (No continuous voltage fluctuation)
	Earth leakage breaker(Standard)	Rated current	A	20
		Sensitivity	mA	30
	Rated operating current 50/60Hz [*5]		A	6.4 / 6.7
	Rated power consumption 50/60Hz[*5]		kW (kVA)	3.4 / 4.2 (4.4 / 4.7)
Sound level (Front 1m / Height 1m)[*5]			dB(A)	65
Accessory				Alarm cord list label 2pc.(English 1pc./Japanese 1pc.), Operation manual 2pc. (English 1pc./Japanese 1pc.), Y strainer (40 meshes) 25A, Barrel nipple 25A Anchor brackets 2pcs.(including M10 bolts 4pcs.)[*8]
Weight (dry condition)			kg	Approx.124
Compliance standard	CE Marking	EMC directive		2004/108/EC
		Machinery directive		2006/42/EC

∗1 Use 15% ethylene glycol aqueous solution if operating in a place where the circulating fluid temp. or ambient temperature is lower than 10 °C. Please discharge the facility water from the facility water circuit when there is a risk of freezing.
∗2 Use fluid in condition below as the circulating fluid.
Tap water: Standard of The Japan Refregeration And Air Conditioning Industry Association (JRA GL-02-1994)
15% ethylene glycol aqueous solution: diluted by tap water in condition above without any additives such as antiseptics.
Deionized water: Conductivity 1μS/cm and higher (electrical resistivity 1MΩ･cm and lower)
∗3 (1)Facility water temp.: 32 °C, (2)Circulating fluid : Tap water, (3)Circulating fluid temp.: 20 °C, (4)Circulating fluid flow rate : Rated flow rate, (5)Power supply: AC400V
∗4 (1)Facility water temp.: 32 °C, (2)Circulating fluid : Tap water, (3) Circulating fluid flow rate : Rated flow rate, (4)Power supply: AC400V
∗5 (1) Facility water temp .: 32 °C, (2)Circulating fluid : Tap water, (3)Circulating fluid temp.: 20 °C, (4)Heat load : Same as the cooling capacity, (5)Circulating fluid flow rate: Rated flow rate, (6)Power : AC400V, (7)External piping length: Minimum
∗6 When circulating fluid outlet port pressure = 0.5MPa.
∗7 Fluid flow rate to maintain the cooling capacity and to keep the circulating fluid outlet port puressure to 0.5MPa or less. If the actual flow rate is lower than this, please install a bypass piping.
∗8 The anchor brackets (including M10 bolts) are used for fixation with the skid when this product is packed. The anchor bolts are not attached.

ULTRASONIC CLEANER U-200N

ULTRASONIC CLEANER U-200N	
Tank capacity	240 l
Tank dimension (length x width x depth)	1000 x 600 x 400 mm
Weight	about 200 kg
Generator power	2 kW
Heater power	8 kW
Supply	3x400V
Max heater temperature	80°C
Level sensor	YES
Working frequency	21,5 kHz
Basket (1 pc.)	YES
Drain valve	YES
Water filling valve (manuals)	YES
Preparation for filtration	YES
Time and temperature control	manuals
Washing detergent (5% concentrate with water)	YES – 20 kgs
Lid	YES
Construction	Stainless steel 304

Firma Morek MULTISERW

Your Partner! Your Advisor!

TEST SIEVES AND SHAKERS

www.multiserw-morek.pl

morek@multiserw-morek.pl

History

MULTISERW-Morek is a manufacturer of inspection and measurement equipment to test the properties of road building materials, as well as moulding and core sands. The company is based in Marcyporęba, Małopolska Province, Poland.
All the leading road-building and metal-casting companies in Poland rely on MULTISERW-Morek equipment. Operating in its current form since 5 December 1998, the company continues the business of MULTISERW partnership. The manufacturing business in the control and measurement industry has its origins in the Foundry Research Institute in Cracow – then state-owned enterprise "WADAP" Wadowice – where both founders of MULTISERW s.c. used to be employed. Due to the economic transition in Poland the state-owned organisation was closed down in 1990. Then, an opportunity arose to carry on WADAP's activity. When MULTISERW s.c. was established on 12 September 1991, nobody could even imagine how big it would grow. The initial business idea was only to provide maintenance service for WADAP equipment. But in the course of time, the demands of the market proved to extend much beyond minor repair and approval of the test equipment. As the need for new equipment increased, cooperation agreements were made with the Cracow-based Foundry Research Institute and Academy of Mining and Metallurgy. Those institutions provide scientific support for the company's activity.

Quality

Owing to the hard work and consistent efforts of all our staff, MULTISERW-Morek may boast many awards, diplomas or medals from major international fairs. MULTISERW-Morek's latest achievement is the GRAND PRIX of GEOLOGIA 2012 International Fairs, Warsaw, for the Electrical Density Gauge (EDG).
Notably, MULTISERW-Morek, small-sized as it is, counts among the few business of its kind in Poland. Requirements imposed by the modern industry and possibilities of using the latest achievements of measurement technology encourage further development and improvements of the manufacturing process. MULTISERW-Morek's testing equipment is used both at industrial laboratories and at research centres. Our devices are marked by high quality as confirmed by their users. To ensure top quality of our products, we have put in place the Quality Management Systems ISO 9001 and ISO 14001. Mission statement and Integrated Management System policy are available at www.multiserw-morek.pl


CERTYFIKAT

Intertek

Moody International Certification GmbH niniejszym zaświadcza, że przedsiębiorstwo

MULTISERW-MOREK
Jan Morek
Marcyporęba 36
34-114 Brzeźnica
Polska

wprowadziło zasady Systemu Zarządzania Jakością zgodnie z normą

EN ISO 9001:2008

Zakres certyfikacji

Projektowanie i produkcja aparatury laboratoryjnej dla budownictwa drogowego i kubaturowego oraz odlewnictwa, do analiz składu ziarnowego materiałów sypkich i pylastych. Serwis samochodowy.


CERTYFIKAT

Intertek

Moody International Certification GmbH niniejszym zaświadcza, że przedsiębiorstwo

MULTISERW-MOREK
Jan Morek
Marcyporęba 36
34-114 Brzeźnica
Polska

wprowadziło zasady Systemu Zarządzania Środowiskowego zgodnie z normą

EN ISO 14001:2004

Zakres certyfikacji

Projektowanie i produkcja aparatury laboratoryjnej dla budownictwa drogowego i kubaturowego oraz odlewnictwa, do analiz składu ziarnowego materiałów sypkich i pylastych. Serwis samochodowy.

Maintenance service

MULTISERW-Morek adheres to the rule: "Responsibility is our top priority. We never leave our Customers alone with their problems". Each customer remains important for us even after the equipment is sold and installed at their lab. Therefore, we provide our maintenance services both in-house and at the customer's site, all across Poland, EU and beyond.
Our staff of engineers and technicians offer professional support in solving technical issues. Their skills are enhanced through extensive maintenance training provided by equipment manufacturers and software developers. Constant improvement is a priority for each member of our customer service team. Owing to our skilled staff and technical capacity, we are prepared to deliver a full range of maintenance service for the equipment we sell. To ensure a fast repair and maintain the continuity of operation, we keep a large resource of replacement parts and substitute devices. **Our maintenance service is tailored to customers' expectations!**

Test sieves

MULTISERW-Morek is a leading manufacturer of analytic sieves used in quality control labs worldwide. All sieves are manufactured to national and international specifications, hold declaration of conformity and individual serial numbers to ensure full traceability.

Analytical sieves are inspected in accordance with the procedures listed in Clause 5.2 of PN-ISO 3310. Each sieve is manufactured in line with the most stringent quality assurance procedures using high-end materials. Woven mesh is checked during the manufacturing process by optical projection or highly sophisticated computer scanning techniques.

Precise measurement of the sieve aperture and the sieve frame dimensions ensures that our exacting standards are met and only then do we issue the declaration of conformity.

As a test sieve manufacturer, MULTISERW-Morek also provides compliance assessment and PCA calibration services (ILAC-MRA) confirming compliance of our sieves with the PN-ISO 3310-1 and PN-ISO 3310-2 standards.

MULTISERW-Morek manufactures a wide range of test sieves. Our offer embraces both precise woven wire and perforated plate sieves to supply the needs of many industries.

These are available with diameters of 100 (on request), 200, 300 and 400 mm. The sieve aperture sizes range from 125 mm to 0.020 mm for square holes and from 125 mm to 1 mm for round holes. Our sieves may be supplied in plastic frames (only for the diameter of 200 mm) or in stainless Ak alloy. All of them are manufactured to the highest standards to ensure high quality and testing accuracy.

Available accessories include sieve lids for dry and wet sieving application, receivers for wet and dry sieving, plastic or stainless Ak alloy frames, ultrasonic cleaners to wash test sieves, sample dividers and many other accessories useful for sieving analysis.

Sieve dimension tables




Stainless wire cloth sieves PN-ISO 3310-1 / ASTM E11 compliant								
Aperture size	Ø200 mm x 25 mm	Ø200 mm x 25 mm	Ø200 mm x 25 mm	Ø200 mm x 50 mm	Ø200 mm x 50 mm	Ø200 mm x 50 mm	Ø300 mm x 50 mm	Ø400 mm x 60 mm
----------	Plastic frame	Ak alloy frame	Ak HB* alloy frame	Plastic frame	Ak alloy frame	Ak HB* alloy frame	Ak alloy frame	Ak alloy frame
3,55 mm	2s-3/3,55/25	2s-3/AL/3,55/25	199,5/3,55/25	2s-3/3,55/50	2s-3/AL/3,55/50	199,5/3,55/50	3s-3/3,55/50	4s-3/3,55/50
3.35 mm (No. 6)	2s-3/3,35/25	2s-3/AL/3,35/25	199,5/3,35/25	2s-3/3,35/50	2s-3/AL/3,35/50	199,5/3,35/50	3s-3/3,35/50	4s-3/3,35/50
3.15 mm	2s-3/3,15/25	2s-3/AL/3,15/25	199,5/3,15/25	2s-3/3,15/50	2s-3/AL/3,15/50	199,5/3,15/50	3s-3/3,15/50	4s-3/3,15/50
3.00 mm**	2s-3/3,00/25	2s-3/AL/3,00/25	199,5/3,00/25	2s-3/3,00/50	2s-3/AL/3,00/50	199,5/3,00/50	3s-3/3,00/50	4s-3/3,00/50
2.8 mm (No. 7)	2s-3/2,80/25	2s-3/AL/2,80/25	199,5/2,80/25	2s-3/2,80/50	2s-3/AL/2,80/50	199,5/2,80/50	3s-3/2,80/50	4s-3/2,80/50
2.5 mm	2s-3/2,50/25	2s-3/AL/2,50/25	199,5/2,50/25	2s-3/2,50/50	2s-3/AL/2,50/50	199,5/2,50/50	3s-3/2,50/50	4s-3/2,50/50
2.36 mm (No.8)	2s-3/2,36/25	2s-3/AL/2,36/25	199,5/2,36/25	2s-3/2,36/50	2s-3/AL/2,36/50	199,5/2,36/50	3s-3/2,36/50	4s-3/2,36/50
2.24 mm	2s-3/2,24/25	2s-3/AL/2,24/25	199,5/2,24/25	2s-3/2,24/50	2s-3/AL/2,24/50	199,5/2,24/50	3s-3/2,24/50	4s-3/2,24/50
2 mm (No.10)	2s-3/2,00/25	2s-3/AL/2,00/25	199,5/2,00/25	2s-3/2,00/50	2s-3/AL/2,00/50	199,5/2,00/50	3s-3/2,00/50	4s-3/2,00/50
1.80 mm	2s-3/1,80/25	2s-3/AL/1,80/25	199,5/1,80/25	2s-3/1,80/50	2s-3/AL/1,80/50	199,5/1,80/50	3s-3/1,80/50	4s-3/1,80/50
1.7 mm (No. 12)	2s-3/1,70/25	2s-3/AL/1,70/25	199,5/1,70/25	2s-3/1,70/50	2s-3/AL/1,70/50	199,5/1,70/50	3s-3/1,70/50	4s-3/1,70/50
1.6 mm	2s-3/1,60/25	2s-3/AL/1,60/25	199,5/1,60/25	2s-3/1,60/50	2s-3/AL/1,60/50	199,5/1,60/50	3s-3/1,60/50	4s-3/1,60/50
1.4 mm (No. 14)	2s-3/1,50/25	2s-3/AL/1,50/25	199,5/1,50/25	2s-3/1,50/50	2s-3/AL/1,50/50	199,5/1,50/50	3s-3/1,50/50	4s-3/1,50/50
1.25 mm	2s-3/1,25/25	2s-3/AL/1,25/25	199,5/1,25/25	2s-3/1,25/50	2s-3/AL/1,25/50	199,5/1,25/50	3s-3/1,25/50	4s-3/1,25/50
1.18 mm (No.16)	2s-3/1,18/25	2s-3/AL/1,18/25	199,5/1,18/25	2s-3/1,18/50	2s-3/AL/1,18/50	199,5/1,18/50	3s-3/1,18/50	4s-3/1,18/50
1 mm (No. 18)	2s-3/1,00/25	2s-3/AL/1,00/25	199,5/1,00/25	2s-3/1,00/50	2s-3/AL/1,00/50	199,5/1,00/50	3s-3/1,00/50	4s-3/1,00/50
900 µm	2s-2/0,900/25	2s-2/AL/0,900/25	199,5/0,900/25	2s-2/0,900/50	2s-2/AL/0,900/50	199,5/0,900/50	3s-2/0,900/50	4s-2/0,900/50
850 µm (No. 20)	2s-2/0,850/25	2s-2/AL/0,850/25	199,5/0,850/25	2s-2/0,850/50	2s-2/AL/0,850/50	199,5/0,850/50	3s-2/0,850/50	4s-2/0,850/50
800 µm	2s-2/0,800/25	2s-2/AL/0,800/25	199,5/0,800/25	2s-2/0,800/50	2s-2/AL/0,800/50	199,5/0,800/50	3s-2/0,800/50	4s-2/0,800/50
710 µm (No. 25)	2s-2/0,710/25	2s-2/AL/0,710/25	199,5/0,710/25	2s-2/0,710/50	2s-2/AL/0,710/50	199,5/0,710/50	3s-2/0,710/50	4s-2/0,710/50
630 µm	2s-2/0,630/25	2s-2/AL/0,630/25	199,5/0,630/25	2s-2/0,630/50	2s-2/AL/0,630/50	199,5/0,630/50	3s-2/0,630/50	4s-2/0,630/50
600 µm (No. 30)	2s-2/0,600/25	2s-2/AL/0,600/25	199,5/0,600/25	2s-2/0,600/50	2s-2/AL/0,600/50	199,5/0,600/50	3s-2/0,600/50	4s-2/0,600/50
500 µm (No. 35)	2s-2/0,500/25	2s-2/AL/0,500/25	199,5/0,500/25	2s-2/0,500/50	2s-2/AL/0,500/50	199,5/0,500/50	3s-2/0,500/50	4s-2/0,500/50
425 µm (No. 40)	2s-2/0,425/25	2s-2/AL/0,425/25	199,5/0,425/25	2s-2/0,425/50	2s-2/AL/0,425/50	199,5/0,425/50	3s-2/0,425/50	4s-2/0,425/50
400 µm	2s-2/0,400/25	2s-2/AL/0,400/25	199,5/0,400/25	2s-2/0,400/50	2s-2/AL/0,400/50	199,5/0,400/50	3s-2/0,400/50	4s-2/0,400/50
355 µm (No. 45)	2s-2/0,355/25	2s-2/AL/0,355/25	199,5/0,355/25	2s-2/0,355/50	2s-2/AL/0,355/50	199,5/0,355/50	3s-2/0,355/50	4s-2/0,355/50
315 µm	2s-2/0,325/25	2s-2/AL/0,325/25	199,5/0,325/25	2s-2/0,325/50	2s-2/AL/0,325/50	199,5/0,325/50	3s-2/0,325/50	4s-2/0,325/50
300 µm (No. 50)	2s-2/0,300/25	2s-2/AL/0,300/25	199,5/0,300/25	2s-2/0,300/50	2s-2/AL/0,300/50	199,5/0,300/50	3s-2/0,300/50	4s-2/0,300/50
250 µm (No. 60)	2s-2/0,250/25	2s-2/AL/0,250/25	199,5/0,250/25	2s-2/0,250/50	2s-2/AL/0,250/50	199,5/0,250/50	3s-2/0,250/50	4s-2/0,250/50
212 µm (No. 70)	2s-2/0,212/25	2s-2/AL/0,212/25	199,5/0,212/25	2s-2/0,212/50	2s-2/AL/0,212/50	199,5/0,212/50	3s-2/0,212/50	4s-2/0,212/50
200 µm	2s-2/0,200/25	2s-2/AL/0,200/25	199,5/0,200/25	2s-2/0,200/50	2s-2/AL/0,200/50	199,5/0,200/50	3s-2/0,200/50	4s-2/0,200/50
180 µm (No. 80)	2s-2/0,180/25	2s-2/AL/0,180/25	199,5/0,180/25	2s-2/0,180/50	2s-2/AL/0,180/50	199,5/0,180/50	3s-2/0,180/50	4s-2/0,180/50
160 µm	2s-2/0,160/25	2s-2/AL/0,160/25	199,5/0,160/25	2s-2/0,160/50	2s-2/AL/0,160/50	199,5/0,160/50	3s-2/0,160/50	4s-2/0,160/50
150 µm (No. 100)	2s-2/0,150/25	2s-2/AL/0,150/25	199,5/0,150/25	2s-2/0,150/50	2s-2/AL/0,150/50	199,5/0,150/50	3s-2/0,150/50	4s-2/0,150/50
125 µm (No. 120)	2s-2/0,125/25	2s-2/AL/0,125/25	199,5/0,125/25	2s-2/0,125/50	2s-2/AL/0,125/50	199,5/0,125/50	3s-2/0,125/50	4s-2/0,125/50
106 µm (No. 140)	2s-2/0,106/25	2s-2/AL/0,106/25	199,5/0,106/25	2s-2/0,106/50	2s-2/AL/0,106/50	199,5/0,106/50	3s-2/0,106/50	4s-2/0,106/50
100 µm	2s-2/0,100/25	2s-2/AL/0,100/25	199,5/0,100/25	2s-2/0,100/50	2s-2/AL/0,100/50	199,5/0,100/50	3s-2/0,100/50	4s-2/0,100/50
90 µm (No. 170)	2s-2/0,090/25	2s-2/AL/0,090/25	199,5/0,090/25	2s-2/0,090/50	2s-2/AL/0,090/50	199,5/0,090/50	3s-2/0,090/50	4s-2/0,090/50
80 µm	2s-2/0,080/25	2s-2/AL/0,080/25	199,5/0,080/25	2s-2/0,080/50	2s-2/AL/0,080/50	199,5/0,080/50	3s-2/0,080/50	4s-2/0,080/50
75 µm (No. 200)	2s-1/0,075/25	2s-1/AL/0,075/25	199,5/0,075/25	2s-1/0,075/50	2s-1/AL/0,075/50	199,5/0,075/50	3s-1/0,075/50	4s-1/0,075/50
63 µm (No. 230)	2s-1/0,063/25	2s-1/AL/0,063/25	199,5/0,063/25	2s-1/0,063/50	2s-1/AL/0,063/50	199,5/0,063/50	3s-1/0,063/50	4s-1/0,063/50
53 µm (No. 270)	2s-1/0,053/25	2s-1/AL/0,053/25	199,5/0,053/25	2s-1/0,053/50	2s-1/AL/0,053/50	199,5/0,053/50	3s-1/0,053/50	4s-1/0,053/50
50 µm	2s-1/0,050/25	2s-1/AL/0,050/25	199,5/0,050/25	2s-1/0,050/50	2s-1/AL/0,050/50	199,5/0,050/50	3s-1/0,050/50	4s-1/0,050/50
45 µm (No. 325)	2s-1/0,045/25	2s-1/AL/0,045/25	199,5/0,045/25	2s-1/0,045/50	2s-1/AL/0,045/50	199,5/0,045/50	3s-1/0,045/50	4s-1/0,045/50
40 µm	2s-1/0,040/25	2s-1/AL/0,040/25	199,5/0,040/25	2s-1/0,040/50	2s-1/AL/0,040/50	199,5/0,040/50	3s-1/0,040/50	4s-1/0,040/50
38 µm (No. 400)	2s-0/0,038/25	2s-0/AL/0,038/25	199,5/0,038/25	2s-0/0,038/50	2s-0/AL/0,038/50	199,5/0,038/50	3s-0/0,038/50	4s-0/0,038/50
32 µm	2s-0/0,032/25	2s-0/AL/0,032/25	199,5/0,032/25	2s-0/0,032/50	2s-0/AL/0,032/50	199,5/0,032/50	3s-0/0,032/50	4s-0/0,032/50
25 µm	2s-0/0,025/25	2s-0/AL/0,025/25	199,5/0,025/25	2s-0/0,025/50	2s-0/AL/0,025/50	199,5/0,025/50	3s-0/0,025/50	4s-0/0,025/50
20 µm	2s-0/0,020/25	2s-0/AL/0,020/25	199,5/0,020/25	2s-0/0,020/50	2s-0/AL/0,020/50	199,5/0,020/50	3s-0/0,020/50	4s-0/0,020/50

* sieve diameter compatible with sieves of other manufacturers: Retsch, Fritsch, Haver&Boecker
** compliant with Polish technical standard

Test sieves with a stainless perforated plate PN-ISO 3310-2 / ASTM E11 compliant

Aperture size	Ø200 mm x 25 mm	Ø200 mm x 25 mm	Ø200 mm x 25 mm	Ø200 mm x 50 mm	Ø200 mm x 50 mm	Ø200 mm x 50 mm	Ø300 mm x 50 mm	Ø400 mm x 60 mm
----------	Plastic frame	Ak alloy frame	Ak HB* alloy frame	Plastic frame	Ak alloy frame	Ak HB* alloy frame	Ak alloy frame	Ak alloy frame
125 mm	2s-4/125,0/25	2s-4/AL/125,0/25	199,5/125,0/25	2s-4/125,0/50	2s-4/AL/125,0/50	199,5/125,0/50	3s-4/125,0/50	4s-4/125,0/50
106 mm	2s-4/106,0/25	2s-4/AL/106,0/25	199,5/106,0/25	2s-4/106,0/50	2s-4/AL/106,0/50	199,5/106,0/50	3s-4/106,0/50	4s-4/106,0/50
100 mm (4")	2s-4/100,0/25	2s-4/AL/100,0/25	199,5/100,0/25	2s-4/100,0/50	2s-4/AL/100,0/50	199,5/100,0/50	3s-4/100,0/50	4s-4/100,0/50
90 mm (3-½")	2s-4/90,00/25	2s-4/AL/90,00/25	199,5/90,00/25	2s-4/90,00/50	2s-4/AL/90,00/50	199,5/90,00/50	3s-4/90,00/50	4s-4/90,00/50
80 mm	2s-4/80,00/25	2s-4/AL/80,00/25	199,5/80,00/25	2s-4/80,00/50	2s-4/AL/80,00/50	199,5/80,00/50	3s-4/80,00/50	4s-4/80,00/50
75 mm (3")	2s-4/75,00/25	2s-4/AL/75,00/25	199,5/75,00/25	2s-4/75,00/50	2s-4/AL/75,00/50	199,5/75,00/50	3s-4/75,00/50	4s-4/75,00/50
63 mm (2-½")	2s-4/63,00/25	2s-4/AL/63,00/25	199,5/63,00/25	2s-4/63,00/50	2s-4/AL/63,00/50	199,5/63,00/50	3s-4/63,00/50	4s-4/63,00/50
56 mm	2s-4/56,00/25	2s-4/AL/56,00/25	199,5/56,00/25	2s-4/56,00/50	2s-4/AL/56,00/50	199,5/56,00/50	3s-4/56,00/50	4s-4/56,00/50
53 mm (2.12")	2s-4/53,00/25	2s-4/AL/53,00/25	199,5/53,00/25	2s-4/53,00/50	2s-4/AL/53,00/50	199,5/53,00/50	3s-4/53,00/50	4s-4/53,00/50
50 mm (2")	2s-4/50,00/25	2s-4/AL/50,00/25	199,5/50,00/25	2s-4/50,00/50	2s-4/AL/50,00/50	199,5/50,00/50	3s-4/50,00/50	4s-4/50,00/50
45 mm (1-¾")	2s-4/45,00/25	2s-4/AL/45,00/25	199,5/45,00/25	2s-4/45,00/50	2s-4/AL/45,00/50	199,5/45,00/50	3s-4/45,00/50	4s-4/45,00/50
40 mm	2s-4/40,00/25	2s-4/AL/40,00/25	199,5/40,00/25	2s-4/40,00/50	2s-4/AL/40,00/50	199,5/40,00/50	3s-4/40,00/50	4s-4/40,00/50
37.5 mm (1-½")	2s-4/37,50/25	2s-4/AL/37,50/25	199,5/37,50/25	2s-4/37,50/50	2s-4/AL/37,50/50	199,5/37,50/50	3s-4/37,50/50	4s-4/37,50/50
31.5 mm (1-¼")	2s-4/31,50/25	2s-4/AL/31,50/25	199,5/31,50/25	2s-4/31,50/50	2s-4/AL/31,50/50	199,5/31,50/50	3s-4/31,50/50	4s-4/31,50/50
28 mm	2s-4/28,00/25	2s-4/AL/28,00/25	199,5/28,00/25	2s-4/28,00/50	2s-4/AL/28,00/50	199,5/28,00/50	3s-4/28,00/50	4s-4/28,00/50
26.5 mm (1.06")	2s-4/26,50/25	2s-4/AL/26,50/25	199,5/26,50/25	2s-4/26,50/50	2s-4/AL/26,50/50	199,5/26,50/50	3s-4/26,50/50	4s-4/26,50/50
25 mm (1")	2s-4/25,00/25	2s-4/AL/25,00/25	199,5/25,00/25	2s-4/25,00/50	2s-4/AL/25,00/50	199,5/25,00/50	3s-4/25,00/50	4s-4/25,00/50
22.4 mm (7/8")	2s-4/22,40/25	2s-4/AL/22,40/25	199,5/22,40/25	2s-4/22,40/50	2s-4/AL/22,40/50	199,5/22,40/50	3s-4/22,40/50	4s-4/22,40/50
20 mm	2s-4/20,00/25	2s-4/AL/20,00/25	199,5/20,00/25	2s-4/20,00/50	2s-4/AL/20,00/50	199,5/20,00/50	3s-4/20,00/50	4s-4/20,00/50
19 mm (¾")	2s-4/19,00/25	2s-4/AL/19,00/25	199,5/19,00/25	2s-4/19,00/50	2s-4/AL/19,00/50	199,5/19,00/50	3s-4/19,00/50	4s-4/19,00/50
18 mm	2s-4/18,00/25	2s-4/AL/18,00/25	199,5/18,00/25	2s-4/18,00/50	2s-4/AL/18,00/50	199,5/18,00/50	3s-4/18,00/50	4s-4/18,00/50
16 mm (5/8")	2s-4/16,00/25	2s-4/AL/16,00/25	199,5/16,00/25	2s-4/16,00/50	2s-4/AL/16,00/50	199,5/16,00/50	3s-4/16,00/50	4s-4/16,00/50
14 mm	2s-4/14,00/25	2s-4/AL/14,00/25	199,5/14,00/25	2s-4/14,00/50	2s-4/AL/14,00/50	199,5/14,00/50	3s-4/14,00/50	4s-4/14,00/50
13.2 mm (.530")	2s-4/13,20/25	2s-4/AL/13,20/25	199,5/13,20/25	2s-4/13,20/50	2s-4/AL/13,20/50	199,5/13,20/50	3s-4/13,20/50	4s-4/13,20/50
12.8 mm	2s-4/12,80/25	2s-4/AL/12,80/25	199,5/12,80/25	2s-4/12,80/50	2s-4/AL/12,80/50	199,5/12,80/50	3s-4/12,80/50	4s-4/12,80/50
12.5 mm (½")	2s-4/12,50/25	2s-4/AL/12,50/25	199,5/12,50/25	2s-4/12,50/50	2s-4/AL/12,50/50	199,5/12,50/50	3s-4/12,50/50	4s-4/12,50/50
11.2 mm (7/16")	2s-4/11,20/25	2s-4/AL/11,20/25	199,5/11,20/25	2s-4/11,20/50	2s-4/AL/11,20/50	199,5/11,20/50	3s-4/11,20/50	4s-4/11,20/50
11 mm	2s-4/11,00/25	2s-4/AL/11,00/25	199,5/11,00/25	2s-4/11,00/50	2s-4/AL/11,00/50	199,5/11,00/50	3s-4/11,00/50	4s-4/11,00/50
10 mm	2s-4/10,00/25	2s-4/AL/10,00/25	199,5/10,00/25	2s-4/10,00/50	2s-4/AL/10,00/50	199,5/10,00/50	3s-4/10,00/50	4s-4/10,00/50
9.5 mm (3/8")	2s-4/9,50/25	2s-4/AL/9,50/25	199,5/9,50/25	2s-4/9,50/50	2s-4/AL/9,50/50	199,5/9,50/50	3s-4/9,50/50	4s-4/9,50/50
9 mm	2s-4/9,00/25	2s-4/AL/9,00/25	199,5/9,00/25	2s-4/9,00/50	2s-4/AL/9,00/50	199,5/9,00/50	3s-4/9,00/50	4s-4/9,00/50
8 mm (5/16")	2s-4/8,00/25	2s-4/AL/8,00/25	199,5/8,00/25	2s-4/8,00/50	2s-4/AL/8,00/50	199,5/8,00/50	3s-4/8,00/50	4s-4/8,00/50
7.1 mm	2s-4/7,10/25	2s-4/AL/7,10/25	199,5/7,10/25	2s-4/7,10/50	2s-4/AL/7,10/50	199,5/7,10/50	3s-4/7,10/50	4s-4/7,10/50
6.7 mm (.265")	2s-4/6,70/25	2s-4/AL/6,70/25	199,5/6,70/25	2s-4/6,70/50	2s-4/AL/6,70/50	199,5/6,70/50	3s-4/6,70/50	4s-4/6,70/50
6.3 mm (¼")	2s-4/6,30/25	2s-4/AL/6,30/25	199,5/6,30/25	2s-4/6,30/50	2s-4/AL/6,30/50	199,5/6,30/50	3s-4/6,30/50	4s-4/6,30/50
5.6 mm (No. 3-½")	2s-4/5,60/25	2s-4/AL/5,60/25	199,5/5,60/25	2s-4/5,60/50	2s-4/AL/5,60/50	199,5/5,60/50	3s-4/5,60/50	4s-4/5,60/50
5 mm	2s-4/5,00/25	2s-4/AL/5,00/25	199,5/5,00/25	2s-4/5,00/50	2s-4/AL/5,00/50	199,5/5,00/50	3s-4/5,00/50	4s-4/5,00/50
4.75 mm (No. 4)	2s-4/4,75/25	2s-4/AL/4,75/25	199,5/4,75/25	2s-4/4,75/50	2s-4/AL/4,75/50	199,5/4,75/50	3s-4/4,75/50	4s-4/4,75/50
4 mm (No. 5)	2s-4/4,00/25	2s-4/AL/4,00/25	199,5/4,00/25	2s-4/4,00/50	2s-4/AL/4,00/50	199,5/4,00/50	3s-4/4,00/50	4s-4/4,00/50

Test sieves for cereal grains PN-ISO 5223 compliant

Aperture size	Ø200 mm x 50 mm	Ø200 mm x 50 mm	Purpose
----------	Plastic frame	Ak alloy frame	----------
0,70 x 20,00	PS/0,70x20,00/50	PS/AL/0,70x20,00/50	rapeseed
1,00 x 20,00	PS/1,00x20,00/50	PS/AL/1,00x20,00/50	all kinds of grain
1,60 x 20,00	PS/1,60x20,00/50	PS/AL/1,60x20,00/50	rye, barley
1,70 x 20,00	PS/1,70x20,00/50	PS/AL/1,70x20,00/50	triticale, common wheat
1,80 x 20,00	PS/1,80x20,00/50	PS/AL/1,80x20,00/50	wheat
1,80 x 25,00	PS/1,80x25,00/50	PS/AL/1,80x25,00/50	oats
1,90 x 20,00	PS/1,90x20,00/50	PS/AL/1,90x20,00/50	durum wheat
2,00 x 20,00	PS/2,00x20,00/50	PS/AL/2,00x20,00/50	wheat
2,20 x 20,00	PS/2,20x20,00/50	PS/AL/2,20x20,00/50	barley
2,20 x 25,00	PS/2,20x25,00/50	PS/AL/2,20x25,00/50	malting barley
2,50 x 20,00	PS/2,50x20,00/50	PS/AL/2,50x20,00/50	wheat
2,50 x 25,00	PS/2,50x25,00/50	PS/AL/2,50x25,00/50	malting barley
2,80 x 20,00	PS/2,80x20,00/50	PS/AL/2,80x20,00/50	wheat
2,80 x 25,00	PS/2,80x25,00/50	PS/AL/2,80x25,00/50	malting barley
3,50 x 20,00	PS/3,50x20,00/50	PS/AL/3,50x20,00/50	all kinds of grain
4,00 x 25,00	PS/4,00x25,00/50	PS/AL/4,00x25,00/50	oats
Ø 1,40	PO/1,40/50	PO/AL/1,40/50	rice
Ø 2,80	PO/2,80/50	PO/AL/2,80/50	rapeseed
Ø 3,25	PO/3,25/50	PO/AL/3,25/50	buckwheat
Ø 4,50	PO/4,50/50	PO/AL/4,50/50	corn
Ø 5,00	PO/5,00/50	PO/AL/5,00/50	buckwheat

Grid sieves ISO-3310-1; 933-3 compliant

Aperture size	Ø300 mm x 50 mm	300x300 mm x 75 mm
----------	Ak alloy frame	Aluminium frame
=50.00mm	P/3s-4/50,00/50	PK/3s-4/50,00/75
=40.00mm	P/3s-4/40,00/50	PK/3s-4/40,00/75
=31.50mm	P/3s-4/31,50/50	PK/3s-4/31,50/75
=25.00mm	P/3s-4/25,00/50	PK/3s-4/25,00/75
=20.00mm	P/3s-4/20,00/50	PK/3s-4/20,00/75
=16.00mm	P/3s-4/16,00/50	PK/3s-4/16,00/75
=12.50mm	P/3s-4/12,50/50	PK/3s-4/12,50/75
=10.00mm	P/3s-4/10,00/50	PK/3s-4/10,00/75
=8.00mm	P/3s-4/8,00/50	PK/3s-4/8,00/75
=7.20mm	P/3s-4/7,20/50	PK/3s-4/7,20/75
=6.30mm	P/3s-4/6,30/50	PK/3s-4/6,30/75
=5.00mm	P/3s-4/5,00/50	PK/3s-4/5,00/75
=4.00mm	P/3s-4/4,00/50	PK/3s-4/4,00/75
=3.15mm	P/3s-3/3,15/50	PK/3s-3/3,15/75
=2.50mm	P/3s-3/2,500/50	PK/3s-3/2,500/75

* sieve diameter compatible with sieves of other manufacturers: Retsch, Fritsch, Haver&Boecker

Sieve shakers

LPzE-2e sieve shakers

APPLICATION

LPzE-2e is a sieve shaker with diameter sizes ranging from 199 to 225 mm. The shaker may be used to analyse up to 3 kg of bulk material in dry and wet sieving applications. The smallest of our test sieve shakers powered by a MULTISERW-Morek electromagnetic drive.
Sieving time, interval and vibration amplitude may all be adjusted and saved directly from a control panel to obtain reproducible sieving analysis results.

BENEFITS

- Memory of 10 programmes
- Low noise
- Solid and user-friendly
- Test sieves may easily be changed with adjustable stretching tapes

TECHNICAL CHARACTERISTICS

Sieve working diameter	193 mm
Sieve working height	25 lub 50 mm
Sample weight	0 - 3000 g
Amplitude /vertical and torsion vibration/	0 - 2,5 mm
Vibration frequency - constant	stała - 50 Hz
Operation time - adjustable	0 - 60 min
Weight	25 kg
Power supply	230 V

CATALOGUE REFERENCES

LPzE-2e	Test sieve shaker Ø100 and 200 mm
LPzE-2s-ZM1	sieve lid for dry sieving
LPzE-HB-ZM1	HB sieve lid for dry sieving
LPzE-2s-ZM2	sieve lid for wet sieving
LPzE-HB-ZM2	HB sieve lid for wet sieving
LPzE-2/Zs/25	sieve receiver pan for dry sieving (plastic) - low
LPzE-2/Zs/50	sieve receiver pan for dry sieving (plastic) - high
LPzE-2/Zs/AL/25	sieve receiver pan for dry sieving (Ak) - low
LPzE-2/Zs/AL/50	sieve receiver pan for dry sieving (Ak) - high
199,5/Zs	HB sieve receiver pan for dry sieving (Ak)
LPzE-2/Zm/25	sieve receiver pan for wet sieving (plastic) - low
LPzE-2/Zm/50	sieve receiver pan for wet sieving (plastic) - high
LPzE-2/Zm/AL/25	sieve receiver pan for wet sieving (Ak) - low
LPzE-2/Zm/AL/50	sieve receiver pan for wet sieving (Ak) - high
199,5/Zm	HB sieve receiver pan for dry sieving (Ak)

LPzE-3e sieve shaker

APPLICATION

LPzE-3e is a sieve shaker with diameter sizes ranging from 199 to 305 mm. The shaker may be used to analyse up to 5-8 kg of bulk material in dry and wet sieving applications. Yet another test sieve shaker powered by a MULTISERW-Morek electromagnetic drive.
Sieving time, interval and vibration amplitude may all be adjusted and saved directly from a control panel to obtain reproducible sieving analysis results.

BENEFITS

- Memory of 10 programmes
- Low noise
- Solid and user-friendly
- Test sieves may easily be changed with adjustable stretching tapes

TECHNICAL CHARACTERISTICS

Sieve working diameter	293 mm
Sieve working height	50 mm
Sample weight	5-8 kg
Amplitude /vertical and torsion vibration/	0 - 2,5 mm
Vibration frequency - constant	stała - 50 Hz
Operation time - adjustable	0 - 60 min
Weight	30 kg
Power supply	230 V

CATALOGUE REFERENCES

LPzE-3e	test sieve shaker Ø200 and 300 mm
LPzE-3s-ZM1	sieve lid for dry sieving
LPzE-3s-ZM2	sieve lid for wet sieving
LPzE-3/Zs	sieve receiver pan for dry sieving (Ak)
LPzE-3/Zm	sieve receiver pan for wet sieving (Ak)

LPzE-4e sieve shaker

APPLICATION

LPzE-4e is a sieve shaker with diameter sizes ranging from 199 to 405 mm. The shaker may be used to analyse up to 15 kg of bulk material in dry and wet sieving applications. The largest of our test sieve shakers powered by a MULTISERW-Morek electromagnetic drive.
Sieving time, interval and vibration amplitude may all be adjusted and saved directly from a control panel to obtain reproducible sieving analysis results.

BENEFITS

- Memory of 10 programmes
- Low noise
- Solid and user-friendly
- Test sieves may easily be changed with adjustable stretching tapes

CHARAKTERYSTYKA TECHNICZNA

Sieve working diameter	393 mm
Sieve working height	60 mm
Sample weight	0 - 15 kg
Amplitude /vertical and torsion vibration/	0 - 1,5 mm
Vibration frequency - constant	stała - 50 Hz
Operation time - adjustable	0 - 60 min
Weight	35 kg
Power supply	230 V

OZNACZENIA KATALOGOWE

LPzE-4e	sieve shaker Ø200, 300 and 400 mm
LPzE-4s-ZM1	sieve lid for dry sieving
LPzE-4s-ZM2	sieve lid for wet sieving
LPzE-4/Zs	sieve receiver pan for dry sieving (Ak)
LPzE-4/Zm	sieve receiver pan for wet sieving (Ak)

Additional

LPzB-2e sieving machine

APPLICATION

The air jet sieving machine LPzB-2e is suitable, in particular, to sieving lightweight materials with small-sized particles that require dispersion. It is capable of storing ten programmes with any setting parameters: sieving time, interval, set vacuum in kPa, power in %. Automatic vacuum setting ensures repetitive and reliable results. One of the operation modes also allows sieving in adjustable vacuum in the range of 0-100% power capacity.
Modern design, proven air distribution system that uses a rotating nozzle, adjustable vacuum in automatic or manual mode, as well as the possibility of using sieves with a height of 25 mm makes the sieving technology even more excellent.

The equipment complies with:
PN-86/M-94001 Measurements of moulding and core sands. Determination of bentonite grading.
PN-EN 933-10 Tests for geometrical properties of aggregates. Assessment of fines. Grading of filler aggregates (air jet sieving).

TECHNICAL CHARACTERISTICS

Sieve working diameter	193 mm
Sieve working height	25 mm
Sample weight	0 - 100 g
Working pressure - adjustable	0 - 10 kPa
Vibration frequency - constant	stała - 50 Hz
Operation time - adjustable	0 - 60 min
Weight	~10 kg
Dimensions	Ø270x430 mm
Power supply	230 V

CATALOGUE REFERENCES

LPzB-2e	air jet sieving machine Ø200 mm
LPzB-2e-ZM1	filtering lid
LPzB-2e-ZM2	filtering receiver pan

Those sieves need to be ordered as separate items.

Sound absorbing cabinets

APPLICATION

For many years, MULTISERW-Morek has been offering sound absorbing cabinets to reduce the noise generated during the operation of sieve shakers in laboratory settings. Based on our experience, we have developed cabinets that enable noise levels to be reduced by several to tens of dB as compared to operation in open conditions. Steel walls with the thickness of 50 mm are filled with a special sound-absorbing foam. On customer's request, cabin doors may be equipped with an inspection window for on-going monitoring of the sieving process..

CATALOGUE REFERENCES

SzE-2e	dedicated for LPzE-2e and LPzE-3e shakers
SzE-4e	dedicated for LPzE-3e and LPzE-4e shakers

Optional sound absorbing cabinet with customised dimensions

Software

APPLICATION

The MMK software is suitable for labs performing sieving / fraction decomposition analyses. The software serves to facilitate, improve and shorten the duration of tests as much as possible, while enabling to store the results of the tests being made, create test series, and compare and present data in the form of reports and charts.

CATALOGUE REFERENCES

MMK	Sieving analysis software

OUR OFFER includes:

TEST SIEVES
SIEVE SHAKERS
compliant with ISO-3310-1; 3310-2

SOIL
VSS-1P-000
plate bearing test set
100 kN

MOULDING AND CORE SAND TESTING EQUIPMENT
LRP device to determine
wet tensile strength

AGGREGATES
Air sieving machine
PN-EN 933-10 compliant

CEMENT
Vicat apparatus
PN-EN 196-3 compliant

CONCRETE
Automatic concrete
compression machine
2000kN and 3000kN
PN-EN 12390-4 compliant

ASPHALT (MMA)
Automatic Marshall compactor
PN-EN 12697-30

Firma Morek
MULTISERW
Your Partner! Your Advisor!

Marcyporęba 36 | 34-114 Brzeźnica | Poland

+48 33 879 21 72 | +48 33 879 28 21
+48 502 027 268 | +48 512 231 248

morek@multiserw-morek.pl

www.multiserw-morek.pl

Affidavit

Public Contract name:	**Metal Powder Atomizer**
Registered company name / Trade name / Name:	3D LAB SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA (3D LAB SP. Z O.O.)
Seat:	02-862 WARSAW, FARBIARSKA 63B, POLAND
Company Identification No.:	0000572964

The Supplier of the above-mentioned Public Contract undertakes to:

a) ensure compliance with all labour law regulations (concerning remuneration, working hours, rest periods between shifts, paid overtime), as well as regulations concerning employment and safety and health protection for the entire duration of the contractual relationship established on the basis of this Public Contract, to all persons involved in the performance of the contract (regardless of whether the activities will be performed by the Supplier himself or his subcontractors) and

b) ensure compliance with legal regulations in the field of environmental law, which meets the objectives of environmental policy related to climate change, use of resources and sustainable consumption and production. The Supplier must therefore take all measures that can reasonably be required of him to protect the environment and reduce the damage caused by pollution, noise and other activities, and must ensure that emissions, soil pollution and waste water from his activities do not exceed the values laid down in the relevant legislation.

At the same time, the Supplier acknowledges that a breach of the above obligations may be a reason for the Contracting Authority to withdraw from the contract in accordance with its relevant provisions.

Signature of the person authorized to represent the Supplier:	
Place:	WARSAW, POLAND
Date:	18.03.2022
First name, Surname, Position in the company:	JAKUB ROZPENDOWSKI, MEMBER OF THE MANAGEMENT BOARD
Signature:	[redacted]