

1-CUBE s. r. o.

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User's guide **BEER, WINE AND ALCOHOLIZED BEVERAGES ANALYZER** **Type AP0**

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1.0 ANALYZER – CONTENTS OF CONSIGNMENT

Standard range of supply for one unit of device – type AP0:

Beer analyzer AP0.....	1 unit
Antifoam agent 30 g.....	1 unit
Refill for steam generator(pack 50 ml).....	1 unit
Syringe 5 ml.....	3 units
Set (5pcs) of measuring vessels.....	1 unit
Set (5pcs) of testing vessels.....	1 unit
Plastic tank (3 l) with valve.....	1 unit
Plastic rinser 250 ml.....	1 unit
Software to install in 1 PC.....	1 unit
Plastic tank (10 l) to	1 unit
Centring preparation.....	1 unit
Software.....	1 unit

Accessories:

Densimeters with in-built thermometer will be supplied according to customer's specifications:

Densimeter range 1.0000 – 1.0060 g/ml, serial number.....	
Densimeter range 1.0060 – 1.0120 g/ml, serial number.....	
Densimeter range 1.0120 – 1.0180 g/ml, serial number.....	
Densimeter range 1.0180 – 1.0240 g/ml, serial number.....	
Densimeter range 1,0240 - 1,0300 g/ml, serial number.....	
Densimeter range 1.0300 – 1.0360 g/ml, serial number.....	

Alcoholometers with in-built thermometer will be supplied according to customer's specifications:

Alcoholometer range 3 –5% volume, serial number.....	
Alcoholometer range 3 – 8 % volume, serial number.....	
Alcoholometer range 8 – 13 % volume, serial number.....	
Alcoholometer range 13 – 23 % volume, serial number.....	
Verification of densimeters and alcoholometers.....	
Rinser for distilled water.....	
Glass measuring vessel for densimeter and alcoholometer	
Testing glass flasks 100 ml.....	
Glass graduated cylinder 100 ml, class A.....	
Refill for steam generator (pack 30 ml).....	
Antifoam agent 30, 60 ml	

Spare parts - supplied according to customer's specification and request :

Note: Accessories and spare parts aren't a part of the consignment and may be delivered only on special request of customer.

2.0 USE OF THE DEVICE

The product is dedicated for industrial using.

It serves for determination in beer and during its fermentation:

- apparent, real and original extract in degrees of Plato
- content of alcohol in volume and mass %
percentage, converted to 20 degrees of Celsius
- energy use efficiency in kJ/100 g or kcal/100g
- beer density converted to 20 deg. of Celsius
- apparent and real fermentation degree in %
- preparation of samples for the determination of volatile matters

It serves for determination in wine and during its fermentation:

- density at 20 deg. of Celsius
- content of alcohol in volume and mass %
percentage at 20 degrees of Celsius
- dry extract in g/litre
- preparation of samples for the determination of volatile matters

It serves for determination in alcoholized beverages:

- density at 20 deg. of Celsius
- content of alcohol in volume and mass %
percentage at 20 degrees of Celsius
- preparation of samples for the determination of volatile matters

3.0 ASSEMBLY AND MAINTENANCE INSTRUCTIONS

Assembly of the device:

The analyzer (see picture 1.) needs to be located to a horizontal base (isolated laboratory desk) near to a socket – 230 V/50 Hz, sink and supply of pressure rinse drinking water.

Hereafter it is necessary to ensure rate of illumination at the workplace min. 300Lx.

Note: It's useful to ensure permanent dry on the laboratory desk where the analyzer is located and there mustn't be any chemicals on it; nonperformance of this principle can result in exposure of safety at work, reduction of service life, the device may even be damaged.

Installation of pressure cooling water has to be made with the help of ½“ hose by its connecting through closing valve located near to the analyzer and by installation into the inlet of the cooling water-22 which is a part of consignment and is located on the back panel.

Warning:

During the assembly it is necessary to hold inlet of the cooling water-22 in the same position like it is mounted on the analyzer to avoid its turning. Nonperformance of this principle can result in leakage of inner pressure main in the analyzer and its following

destruction!!!! After the assembly of pressure cooling water test please impermeability of installation and eliminate the pertinent leakage! Requirement – pressure of the cooling water must range from 400 to 600 kPa, (from 4 to 6 bar).

Installation of waste: release carefully the rose little hose (marked „Waste“) fixed with the adhesive on the back panel of analyzer. Put one end of this hose into the sink and the other one put on the valve -20. If the hose is not long enough it is possible to extend it with the help of the reduction and a hose with the inner diameter at least -1/2”.

Installation of discharge of the cooling water - 23 realize with a flexible hose 3/4” as short as possible. Then drift the hose in the direction from the analyzer towards the sink.

Electric installation of a socket 230 V/50 Hz/16A for the analyzer must be made in such a way that the socket must be protected by fuse (for example with circuit breaker, safety fuse of value 16A and equivalent short-circuit current strength).

If you look at the socket from the front, the location of the conductors is as follows:

on the left – phase conductor, (L1)

on the right – neutral conductor, (N)

earthing pin – up – as a protective grounding conductor (PE)

Maintenance:

The device must be kept clean, it means that once the work is finished all painted or glass parts have to be wiped with moist cloth to remove the rest dirt.

Glass vessels:

Rinse glass testing and measuring vessels at the end of the working day with distilled water and dry them with temperature about 120°C for about 30 minutes in a kiln. Store them in the way to prevent their contamination.

Change the working filling in steam generator:

Do it in case:

- a sample penetrated to the generator (it may happen if during distillation electricity is disconnected)
- when in the process the steam generator filling has been corrupted

Procedure of change the working filling in steam generator:

Open the discharge valve-20 and once the filling is completely out close the valve-20. Rinse the steam generator with distilled water.

Follow the procedure: Open the valve-3 and close it at the moment when you see the distilled water level in the check window-4. Subsequently open the discharge valve – 20 and close it once the distilled water is completely out.

Once the rinsing is finished close valve -17 located on the distilled water reservoir, and disconnect the hose of valve-17, let water flow out of it and dose 1.8 ml of working fill with the syringe into the hose. Insert the hose back to the valve - 17 of the reservoir.

Open the valve -3 until the level of the working fill is up to 3/4 of check window -4 and then close the valve-3.

Warning: Don't change working filling in the steam generator in the moment when the

distillation of the sample is on the run, otherwise it can cause an injury of staff and destruction of the analyzer.

The analyzer can be connected to grid not earlier than in 24 hours after their unpacking from transport cover and after balancing of temperature in medium where it will be operated.

Place the electric cables to be protected against mechanical damage.

Fill the water reservoir-6 **only with distilled or demineralized water**, close it with plastic closure but do not tighten it completely and locate it to the upper side of the analyzer in such a way that the stop valve-17 is oriented to the back side of the analyzer.

By means of transparent hose fastened on the back side of the analyzer and indicated by sign "Distilled water" connect the analyzer with valve-17 of water reservoir -6. Check if the hose isn't suspended, otherwise you must shorten it! Then open the valve-17 and check if the connection is tight!

Put the glass measuring vessel -9 into the holder -8 which is located on the right side of the analyzer (view from the front) and fill it with 100 ml of decarbonized drink. Put carefully the densimeter in it (it must begin to swim). Insert the centring preparation on the measuring vessel - 9 and check if the densimeter's axe is in the centre of the centring preparation's cross. The axes of the densimeter and the measuring vessel have to be co-axial! In the opposite case release the plastic holder -11 (with the help of plastic screw-11 and move it to the right place to keep alignment of the densimeter(alcoholometer) and the vessel.

In case the scale touches the walls of measuring vessel during the measurement and rubs against the walls during its movement, the read value isn't accurate!! The new scale centering in the measuring vessel-9 has to be realized - see above.

Verification and possible adjustment of the balance of distillate -12,

Fill the testing flask with the decarbonized drink to the volume mark and then follow the point 6.2. Once the distillation is finished as described in the point 6.2. please check if the volume of the obtained distillate is approximately 1 cm under the volume mark. If it is not like that unrelease the nut and adjust the position of analytical weights on the balance arm by its screwing in the following way: small volume of distillate – screw the weight in the direction of the free end of the balance, big volume of distillate – screw the weight in the direction of the division block of the analyzer.

Notice:

Magnitude of translation on the balance arm has to be done sensitively depending on extent of the deviation from the required distillate volume. Always once the weights on the balance arm-24 are set newly verify, following the procedure as described in 6.2. if the the volume of the obtained distillate is approximately 1 cm under the volume mark.

After adjusting the analyzer is ready to work.

Cleaning among individual measurements:

Once the distillation is finished let the rest of sample flow out of analyzer by opening the discharge valve-13. Take carefully the rubber plug from pouring opening-10 on the distilling instrument and by means of a washing hose with a jet – 14 and pushing the button to rinse -2 wash the inner walls of the distilling flask-16. Let flow the rinse water out of instrument. Close the discharge valve-13 and put the rubber plug on-10.

Warning:

Close the discharge valve-13 sensitively to the first resistance, then stop closing, otherwise the glass distilling device can be broken!! Adjust the clearance of the valve -13 with the help of the valve nut-13 in case of the resistance.

The analyzer is ready to work.

Recommandation:

Once the working day is finished, it is recommended to clean and dry all the parts that have been in touch with the sample or rinsing water with moist cloth to remove the rest of beer and dirt.

After this the analyzer is ready to work again.

4.0 SAFETY RECOMMENDATIONS

The instrument may be operated only by person who is qualified for work with caustics and electric subjects who became completely acquainted with its function within the framework of the training, or who became thoroughly acquainted with the user's guide of this device.

During the manipulation with the device and samples after distillation be extremely careful because the staff can be burned or scalded!!

Measuring device can be used only for measurements defined by its technical specification, only in range of measured values given by technical conditions of device. Never connect the device to pressure cooling water with pressure more than 6 bar

Before starting every measurement check if the device isn't visibly damaged.

It is hazardous for anyone to do any measurement with the broken device. It is hazardous for anyone except for the producer and authorized service company to repair the apparatus.

5.0 TECHNICAL DATA

range of alcohol contain measurement.....	3 –13% (23 %) vol, at 20°C
range of density measurement.....	1.0000 – 1.0360 g/ml at 20°C
range of original extract measurement.....	0 – 24 °Plato
dimensions.....	540x440x 80 mm(length x depth x height) without the plastic vessel for distilled water
weight of empty device.....	about 20 kg
signalization.....	acoustic
voltage system.....	TN-S, 230 V, 50 Hz , 1+PE+N

6.0 OPERATING INSTRUCTIONS

6.1. Before the beginning of the analysis open the valve of the pressure cooling water supply (which is not part of the instrument).

Switch on the main switch-1 to the position „UP“. Check the height of level in generator through the check window -4 on the front panel of the analyzer. If the level is below 2/3 of its diameter, open the supplying valve-3 and let the distilled water to flow in to reach the level of 2/3 of the check window diameter.

Once the level in generator has been reached close the valve -3.

Notice: before every single distillation, it is necessary to have the right level , in the opposite case the analyzer will not work right!

Pour the samples freed of carbone dioxide (by agitation) to numbered testing flasks in quantity over the top mark, close them with their plugs and place them to the hangings of water reservoir with water in it. We recommend you to pour water to the tank sufficiently long time before the analysis because its temperature has to balance with the temperature of environment. We do

recommend to change this water only in case when it is dirty. Recommended quantity of water : 2 – 3 cm under the brim of the tank - in case that all positions in the tank are completely occupied, it means 5x testing flasks, 2x measuring vessels, 5x (densimeters and alcoholometers.). Locate testing flasks in to the handle of tank till the temperature divergences of samples and water are balanced. It takes at average 30 minutes. Put also measuring glass vessels, densimeters, alcoholometers and rinser with the distilled water in the reservoir.

Once the temperatures are balanced take the measuring vessel-9 out, dry perfectly its inside and outside surface with clout. Pour the sample into the measuring vessel-9 and place it into the holder-8 on the analyzer. Take carefully the densimeter with the expected range out of the reservoir, dry its surface and place it into the measuring vessel-9 with the measured sample. Walls of densimeter mustn't touch the walls of vessel -9.

Densimeter starts diving to the sample, during this phase we recommend you to hold it carefully with two fingers on its stem so that it would plunged slowly- partly it will not be broken and it will not plunge deeper than it's final location. So you will read the right value because the densimeter is not burdened with the liquid which has dipped its surface over the final value.

Check if the densimeter's axe is in the centre of the centring preparation's cross if not centre it as described above. Densimeter's location in the sample is steady after about 2 min., after this time read the values of density, temperature and the number of the sample and record them.

The way of the right reading is shown on the pic.3.

The line between the eye of the observer and the read level must be vertical with axis of densimeter's scale for accurate reading. Write down the measured values to corresponding sample. After the reading take the densimeter carefully out, rinse it with water and put it back to the holder in the plastic reservoir so that it would have the same temperature as the measured samples.

Pour the measured sample back to the same testing vessel; set exactly the volume of sample to the mark with the help of syringe (the way of reading is shown on pic. 4).

Rinse the inside walls of the measuring vessel-9 with the distilled water and dry it.

6.2. Take the rubber plug out of pouring opening-10 and drop carefully 2 drops of antifoam agent (applies to beer), dose slaked lime for wine samples to the inner space. Then pour the all the sample from testing flask into the distilling flask-16. Rinse inner walls of testing flask with a little bit of distilled water from the rinser. Do it this way: after dosing about 10 ml of distilled water to the testing flask spin carefully the rinsing water in testing flask with circular move to dip completely the inner surface of the flask. Then pour carefully all the rinsing water to the pouring opening-10 of the distilling flask-16. We recommend to rinse the inner walls of the testing flask two times.

Close the pouring opening-10 with rubber plug. Dose 5ml of distilled water into the same testing flask (by means of rinser) and place it into the holder of the balance of distillate -12 under the outlet of the cooler to collect all the distillate to this testing flask.

Turn the button Start-5 into the position „START“. Subsequently the automatic sample distillation runs.

Notice: Once the button is in the position “Start” the electro-magnetic valve on the supply of the cooling water opens automatically and water starts to flow through the cooler to the waste.

Before the beginning of work with analyzer it is necessary to check if the shut-off valve on the supply of the cooling water is open.

The end of “Distillation” signaled by acoustic alarm. Turn the button Start-5 into the position „STOP“. Let the distillate stop dropping to the testing flask, then take the testing flask out of the holder of the balance of distillate -12.

6.3.

Close carefully the testing flask with the rubber plug, pay attention not to dip the plug in distillate. Locate the testing flask into the holder of reservoir till the temperature divergence is balanced. It takes at average 30 minutes. Then take out the testing flask out of the tank, dry its

surface and place it on the horizontal base in the height of eyes in front of the green area on the distilled water reservoir-6 and complete accurately its volume up to the mark (see pic. 4) with distilled water from the syringe. Then pour the distillate to clean and dry measuring vessel -9 and place it to the holder-8. If you do not realize the measurement of alcohol immediately after volume refilling close the testing flask with the rubber plug. Put out the alcoholometer with requested range from the balance tank, dry its outside by means of a clean clout or pulp and put it carefully into the measuring vessel-9 with the distillate – located in the holder -8. Follow the procedure which is the similar to the procedure with densimeter- described above. Read the values – alcohol content and temperature on the scale of alcoholometer – see above similar procedure for densimeter. Write down the values to the particular sample.

If you go on with other distillation or if you stop working with the instrument – realize “cleaning of the distilling instrument” see the procedure described above.

Among the measurement put the alcoholometer in the holder in the reservoir so that it would have the same temperature as the measured samples.

Pour the measured distillate out of vessel -9, dry its inner surface.

Warning: between every single distillation or “cleaning of the distilling instrument” it is necessary to refill the steam generator with distilled water see the procedure described above.

6.4 Analyzer shutdown:

Close the valves on the supply of:

- cooling water for device
- distilled water for device

Extract the supply plug from the socket.

Warning: the device has water in its glass parts so it has to be located in a room where the temperature never drops below 0 °C , otherwise the device may be destroyed!!!

Picture 1. Front panel

Legend:

- 1- main switch
- 2 - button to rinse
- 3- supplying valve
- 4 - check window
- 5- button “START”
- 6-distilled water reservoir
- 7-magnifying glass

- 8-upper holder of the measuring vessel
- 9-measuring vessel
- 10- pouring opening
- 11- bottom holder of the measuring vessel
- 12- holder of the balance of distillate
- 13-discharge valve
- 14- washing hose with a jet
- 15-sink
- 16-distilling flask
- 24-balance arm

Picture2. Back panel

Legend:

- 17-valve of the reservoir of the distilled water
- 18-hose to the steam generator
- 19-fuse-16A
- 20-discharge valve for the steam generator
- 21-inlet el. cable
- 22-inlet of the cooling water
- 23-discharge of the cooling water

6.5. Instalation of the programme:

The name of the programme for beer analysis is **APO and the customer's name**. It is created in Excell. It is sufficient to copy it into PC, best into the directory created before where later all the results of samples analysis will be saved.

Work with the programme:

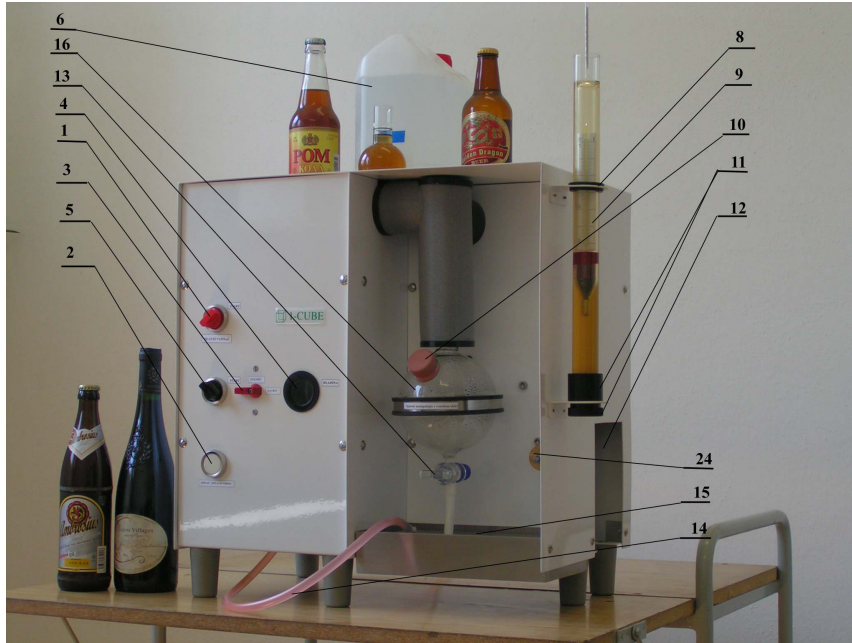
The work with the program is similar to work with Excell table. Put the input data into the yellow frame. The data in the frames Sample density [g/ml], Sample temperature [C], Alcohol of distil. [%vol], Distillate temperature [C] have to be entered to receive the right results of the analysis. There are the right values including the calculation of the calibrating divergences in the blue frames. There are analysis results in the red frames.

Customer:	ERANDA		
Product No.			
Operator name:			
Date and time:	22.4.2009 7:11		
Last calibration:	20.04.09		
Next calibration:	22.04.10		
PARAMETERS:	Active set:		
Sample description:			
Sample density [g/ml]:	1,0098	→	1,00891 [g/ml]
Sample temperature [°C]:	14,94	→	15,07 [°C]
Alcohol of distil. [%vol]:	4,5	→	4,79 [%vol]
Distillate temperature [°C]:	20,3	→	20,36 [°C]
RESULTS:			
Beer density /20° C:	1,00805	g/ml	
Relat. beer density:	1,00988		
Alcohol of dist. /20° C:	4,74	% vol	
Relat.distil.density:	0,99319		
Relat.remains.density:	1,01669		
Apparent extract:	2,53	%w °PLATO	
Real extract:	4,25	%w °PLATO	
Alcohol:	3,77	%w °PLATO	
Original extract:	11,58	%w °PLATO	
Apparent fermentation:	78,15		
Real fermentation:	63,3		
Energy:	42,6	kcal/100g	178,2 kJ/100g

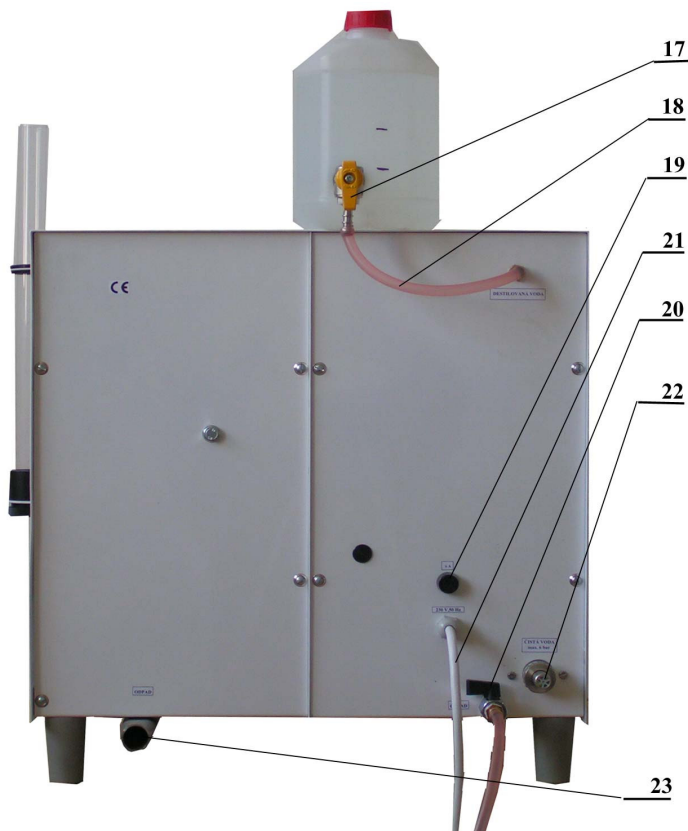
7.0.Service:

For service and liquidation contact the manufacturer: 1-CUBE, Hamry 3567, 580 01 Havl.Brod, Czech Rep.
tel. 00 420- 569 433 620
fax.00 420-569 422 144
1-cube@1-cube.com

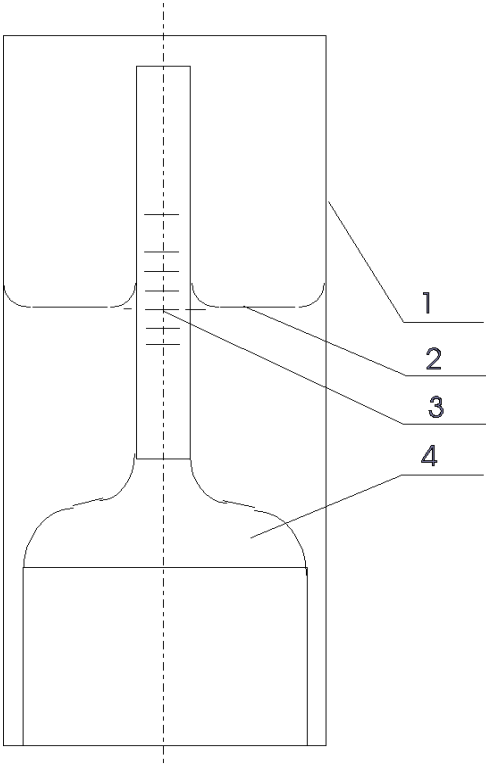
Pic.1.



Pic.2.



Pic.3.



Pic.4.

