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INSTRUCTION MANUAL ABBE REFRACTOMETER

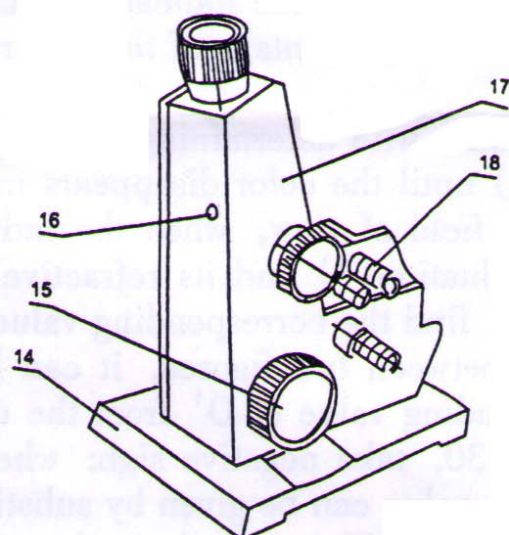
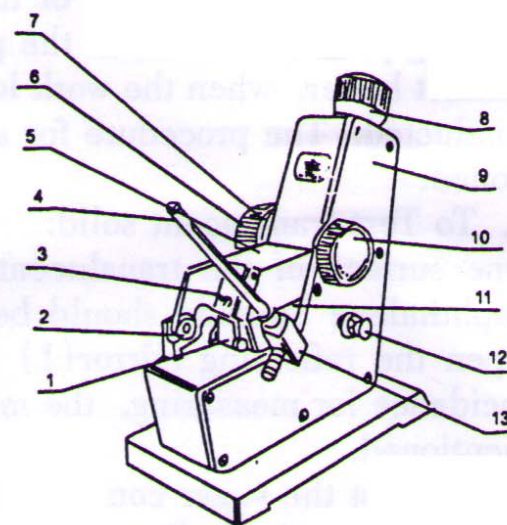


I. Purpose:

The instrument serves for measuring the refractive indices n_D and mean dispersions $n_F - n_C$ of transparent and translucent liquid or solid, Mainly the transparent liquid. Attaching a thermostat to this instrument, the refractive indices n_D within the range of temperature $0^\circ\text{C} \sim 70^\circ\text{C}$ can be measured. Refractive indices and mean dispersions belong to one of the important optical constants in substance, which can be used to determine the optical performance, purity, concentration and dispersion etc. The instrument is capable of determining the percentage of sugar content in saccharose solutions ($0 \sim 95\%$, equal to refractive indice $1.333 \sim 1.531$). Therefore, this instrument can be widely used as one of the indispensable tools in petrological, oil and fat, Pharmaceutical Paint, food, chemical and sugar - making industries as well as in the factories, colleges and research institutes concerned with geological survey.

Model	2WAJ
Refractive Index (n_D) Range	1.300 ~ 1.700
Refractive Index (n_D) Accuracy	0.0002
Refractive Index (n_D) Min. Div.	0.0005
Brix (%) Range	0 ~ 95
Brix (%) Min. Div.	0.25
Weight (KG)	3

The base of system (14) is for the purpose of support on which is mounted the housing (17). All optical components and other main structures except the prism and the eyepieces are fitted up in the housing (17). Upon the housing is fixed the prism group, which consists of the incident prism, the refracting prism and the prism mount. These two prisms are respectively fixed in the prism mount using a special glue. The mount for incident prism (5) and the mount for refracting prism (11) are connected with the axiles (2). The incident prism can be opened and closed. The two incident prism mounts should be closed by means of the knob (10) in such a way that a homogeneous space can be kept between the surfaces of the two prisms, and the space is to be filled with the test liquid. (3) is the shield. (18) is the thermostat connector (four in all). (4) is the thermometer. (13) is the socket for thermometer which can be connected with a plastic hose. (1) is the reflecting mirror. (8) is the eyepiece. (9) is the covering plates. (15) is the knob for adjusting the graduation of refractive index. (6) is the knob for adjusting dispersion. (7) is the scale knob for dispersion value. (12) is the condenser for illuminating the graduated circle.



Usage and operation

I), Preparations:

1, Before measuring, one must calibrate the reading with a standard specimen and the polished surface of refracting prism should be dropped with one or two drops of naphthalene bromide, then the polished surface of the standard specimen can be put on. Observe if the bright and dark boundary line in the telecope unit lies or not in between the cross - lines, and if not adjust the screw shown of Fig 7, so that the image of the boundary line moves into the center of the cross - lines. Reduce the initial error of the indicating value to the minimum through repetitive observations and calibrations, including the operator's aiming error. After such a correction, do not allow to remove any parts during the test. If there is any doubt about the determined refractive index during routine testing work, one can use the above - mentioned methods for correction.

2, Before measuring and doing the calculation, the rough surface of the refracting prism and the standard specimen should be cleaned with a piece of absorbent cotton dipped with a kind of liquid mixed by 1: 1 absolute alcohol and ether to prevent from dirt which is sure to affect image sharpness and measuring accuracy.

II), Testing work:

1, To test transparent and translucent liquid:

Drop the tested liquid onto the surface of the prism with a dropping tube then cover the incident prism with a dropping tube then cover the incident prism and lock with the knob (10), with the demand that the liquid layer should be homogeneous, spreaded full of the field of view, bubble less. Open the shield(3) and close the reflecting mirror(1), then adjust the ocular dipoter so that the cross - line image sharply, then turn the knob(15) to look for the position of the bright and dark boundary line in the ocular field of view, then turn the knob(6), again to cause the boundary line to be without any color, and then fine - focus the knob(15) so as to make the boundary line lie in the center of the cross - lines, and eventually turn the condenser(12) properly. At this moment the value indicated below the ocular field of view is right the refractive index of the liquid under test.

2, To test transparent solids:

The object to be tested needs a smooth polished surface. Open the incident prism and add one or two drops of naphthalene bromide onto the smooth plane of refracting prism, then clean the polished surface of the tested object so that it can contact better, when the work looking for the boundary line in the eyepiece can be conducted. The procedure for aiming and reading accords with the above - mentioned.

3, To Test translucent solid:

One surface of the translucent solid should be a polished plane, upon which naphthalene bromide should be dropped, then stick it on the refracting prism. Open the reflecting mirror(1) and adjust the angle, and use it as a surface of incidence for measuring, the method for operation being the same as the above - mentioned.

4, To Test the sugar concentration of sugary liquid:

The operation is similar with testing the refractive index of liquid, its reading can be taken from the indicated value of the field of view. The readout taken then is right the percentage of the sugary liquid concentration.

5, To determine mean dispersion value:

Similar with determining the refractive index. What is needed is to turn the knob (6) until the color disappears in relation to the bright and dark boundary line in the field of view, when the indicated value Z in the scale knob for dispersion graduation (7) and its refractive index n_D should be taken down. According to n_D , find the corresponding value of A and B from the dispersion table. If n_D lies in between two figures, it can be found by interpolation. Then find the corresponding value of O' from the dispersion table according to the value Z . When $Z > 30$, take negative sign; when $Z < 30$, take positive sign. The mean dispersion value can be given by substituting the found A , B and O' into the dispersion equation (The example is shown in the latter part of this manual).

6, When refractive indices are required to measure at various temperatures, insert the thermometer into its socket (13) and connect it, which is to be adjusted to the temperature required, and the measurement can be conducted after the temperature is stabilized for the minutes.

In this direction will find a vision of the measurement technique:
<http://www.industrial-needs.com/measuring-instruments.htm>

NOTE: "This instrument doesn't have ATEX protection, so it should not be used in potentially explosive atmospheres (powder, flammable gases)."