

Applications Note

AN 1083

$\Delta = 2t + \frac{\lambda}{2}$ (must equal a whole number of λ for a bright fringe or

$$n\lambda = 2t + \frac{\lambda}{2}$$

$$t = \frac{n\lambda - \frac{\lambda}{2}}{2} = \frac{\lambda}{2} \left(n - \frac{1}{2} \right)$$

substituting

$$D^2 = 2s \left[\frac{\lambda}{2} \left(n - \frac{1}{2} \right) \right]$$



Six Things to Help Your Instrument Perform at Its Best

... tips 1-4 will go a long way in keeping the instrument healthy, but you should also have it periodically checked by an expert.

Abstract

Occasionally you may have to send it to a HunterLab facility to be repaired, but generally it will operate properly with just a bit of consideration and minor maintenance. Below are some tips on things you can do to help your instrument perform the best that it can. (And they may just save you some repair money, too!)

Anyone who has ever owned a car knows that sometimes it will have a problem, such as a dead battery or flat tire, that prevents the car's use until repairs are made. However, most of the time, that car runs well as long as you fill it with decent gasoline, check the oil regularly, and take it to a mechanic for preventive maintenance once in a while. Same is true for your HunterLab instrument.

1. Install and Use Your Instrument at an Appropriate Location.

Your User's Manual indicates the optimal operating conditions for your instrument, including temperature and humidity level. Use the instrument only under those conditions. If the temperature or humidity changes drastically, allow the instrument to stabilize in the new conditions before standardizing and using it. A clean, draft-free room that is heated in the winter and air-conditioned in the summer is the safest location for your instrument.

You should also be certain that you connect the instrument to a stable, instrument-grade power line, preferable with a line conditioner and battery back-up system in place. It should not be connected to the same power line as other heavy-draw equipment.

2. Keep The Instrument Clean.

When your mother told you that "cleanliness is next to godliness," she was probably trying to get you to wash your hands or clean your bedroom, but keeping your instrument clean is important, too, and can make a big difference in whether it performs as it should.

Some of the most interesting stories from our Service Department involve instruments that were simply dirty, such as an instrument that would not read color properly until it was turned with the port down. Grated cheese fell out of the sample port and optics, and once it was all out, the instrument operated perfectly with no further service required! We've seen a MiniScan EZ with acetone spilled onto the plastic display screen, melting it into illegibility, and drastically dirty ones (like the one pictured below) that were filthy inside and out. This instrument would not operate because the optics, computer boards, and battery packs were all covered with black grease.



Here are some more specifics on how to keep your instrument clean.

- **Use the cleaning accessories provided.** Some instruments are shipped with a lens brush and/or lens cleaning solution. Use the brush periodically to sweep lint and dirt off the clear surfaces in the optical path, such as accessible lenses or cover glasses. Use the lens cleaner to clean similar surfaces as described in your User's Manual.
- **Clean the instrument parts indicated in your User's Manual.** Some parts of the instrument that may be cleaned are lenses, viewing windows, spheres, the floor of the transmittance compartment, and the exterior instrument body.

Keep your samples out of the instrument. When measuring samples that may drop lint or crumbs into an open instrument port, use a cover glass or glass port insert if one is available, or consider using the instrument in the port-down orientation, if possible. Measure liquids in a leak-proof, clear container and beware spillage. Do not expect your instrument to be waterproof, even if it looks like the sample port is sealed.

- **Clean and regularly inspect the standard tiles.** Specific instructions on cleaning and maintaining the tiles, black glass, didymium filter, and light trap are provided in your User's Manual. Follow them regularly, particularly prior to running diagnostic tests or critical samples. Store the standards in a closed standards box or tile holder, if you have one.

3. Perform Diagnostics Regularly and Keep Records of the Results.

Perform any diagnostic tests recommended in the User's Manual for your instrument, such as the green tile test, repeatability test, or didymium filter check. Keep a log of the results over time so that when a problem is suspected, the historical results may be checked for trends. Performing diagnostics regularly will help you notice promptly when there might be a problem so that it can be corrected more quickly.

4. Perform Only Those Servicing Tasks for Which You Are Qualified.

You should replace lamps and fuses only as described in your User's Manual and should not open any other parts of the instrument without HunterLab assistance. Use only the HunterLab lamps and fuses indicated .

5. Have Preventive Maintenance Performed by HunterLab Regularly.

Following the suggestions in tips 1-4 will go a long way in keeping the instrument healthy, but you should also have it periodically checked by an expert. Continuing our car analogy, you can be very conscientious about washing and waxing your car and filling it with gas and oil, but it will still need to go to the mechanic once in a while for an oil change and to have the tires rotated. HunterLab's Service Department offers a preventive maintenance program whereby once a year a trained service technician will inspect and test your instrument, check and adjust mechanical and electro-mechanical parts, replace lamps and air filters as needed, as well as clean the optical components, even those areas of the instrument that you cannot and should not access.

6. Read Your User's Manual and Refer to It Often.

In addition to providing the information referenced in the sections above, your User's Manual provides safety information, suggestions for how to measure certain types of samples, expected lamp lives, and required warm-up times and standardization intervals. Reading the manual helps ensure that you are operating the instrument as intended. Understanding how the instrument normally operates will help you recognize when there might be a problem.

About HunterLab

HunterLab is the technology leader in color measurement solutions, providing instruments, software, knowledge and service to a wide variety of industries.

With over 5 decades of experience in more than 65 countries, HunterLab applies our leading edge technology to your products helping you measure and communicate color simply and effectively.