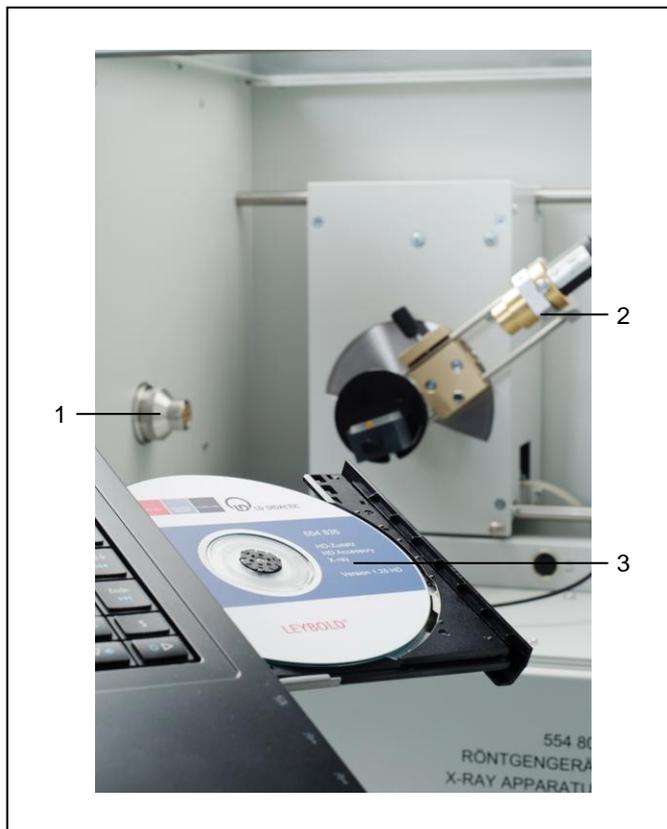


04/12-W07-Hund



Operating Instructions 554 835

HD accessory X-ray (554 835)

- 1 Collimator HD
- 2 Counter tube holder HD
- 3 Software for the X-ray apparatus

1 Description

Previously the resolution of school X-ray units could only record the characteristic lines of a Bragg spectrum with reduced sharpness. These were therefore too wide and measured with too low an intensity compared to the continuum. With the HD accessory consisting of a high resolution collimator (1) and a counter tube holder with narrow slits (2) as well as new software (3) the maximum angular resolution of the goniometer is increased to 0.01° . Together with the narrow slits, Bragg spectra with 4-fold resolution are possible. This way the lines are not only four times sharper but also the contrast between the sharp lines and the wide continuum is increased accordingly.

2 Technical Specifications

Gap Widths: 0.3 mm
 Goniometer: Resolution 0.01° (by firmware update)
 Matching: X-ray apparatus (554 800 / 554 801)

3 Scope of Delivery

Collimator HD (1)
 Counter Tube Holder HD (2)
 Software for the X-ray apparatus HD (3)

4 Software Installation and Firmware Update

The software supplied with the system (3) replaces the software supplied with the X-ray apparatus.

The installation of the HD version of this software is necessary because only this software can increase the goniometer resolution to 0.01° by means of a firmware update.

The software is installed using the set-up routine on the CD-ROM. Prior removal and/or uninstallation of the older X-ray software version is not necessary.

When the software is started and the PC is connected to the X-ray apparatus the system will automatically detect that the firmware needs to be updated. Please select the button "Update X-ray apparatus" when prompted and execute the update.

5 Future Software Updates

The HD-Software (554 835) supplied is not available for download from our internet site; it is only available as part of the HD accessory set X-ray package.

You may, however, update the included software by using any software for the X-ray apparatus (554 800) available online at <http://www.ld-didactic.com>, if your X-ray apparatus has been previously fitted with the HD firmware.

6 Set-up of the X-ray apparatus

The collimator HD (1) and the counter tube holder HD (2) may be inserted into your X-ray apparatus as the normal variants (see the operating instructions for your X-ray apparatus 554 800).

After the installation of the two HD components, an X-ray tube and a Bragg crystal, it is necessary to calibrate the crystal by using the software.

Select "Crystal calibration" in the software settings (F5), select the correct Bragg crystal and the correct anode material and select "Start search". After completing the calibration the angular deviation must be saved in the goniometer by hitting "Adopt".

Due to the narrow slits in the collimator and the counter tube holder, the maximum counting rates are distinctly smaller than when using normal gaps.

Note

Due to the increased angular resolution of the system there may be a prime orientation for the collimator.

If necessary, after the calibration of the crystal turn the collimator by 180° and repeat the calibration of the crystal. If in your X-ray apparatus this results in a distinctive and reproducible deviation in the count rate maximum please mark the prime orientation of the collimator.

7 Recording a Bragg spectrum

After the set-up of the X-ray apparatus a Bragg spectrum can be recorded as usual. Note that the angular resolution $\Delta\beta$ may not be greater than 0.03° . It is best to set it at 0.02° so the sharp peaks are not missed.

The figure shows the comparison of the spectrum with a gold tube in first order of the LiF crystal with a normal collimator (grey) and with the HD accessory (red).

The improved resolution of the fine structure of the L_α and L_β lines is clearly visible. It is also important to note the increased contrast, i.e. the ratio of the peaks to the continuum.

The maximum count rate (left scale versus right scale) has become significantly smaller, which may be compensated for by using longer measurement times.

