Technical Data Sheet

Grating Replicas

#80051

This specimen is a replica of a 2,160 lines/mm waffle pattern diffraction grating. When imaging the specimen it should be kept in mind that the line spacing is 0.463 µm also the pattern will not be visible until the imaging system is set to resolve that level of detail, which is around x2,500. At this magnification the lines of the pattern will be just over 1mm apart.

To calculate the electron microscope magnification using the pattern of the diffraction grating replica, do the following:

Measure (in millimeters) between the limiting lines of as many squares of the replica pattern as possible. Apply the following formula:

MAGNIFICATION = (A x 2160) ÷ B

A is distance in mm between limiting lines
B is number of spaces between limiting lines

$$\text{Magnification} = \frac{\text{Distance in mm between limiting lines x 2,160}}{\text{Number of spaces between limiting lines}}$$

Note: Limiting lines are chosen arbitrarily by the viewer. Statistical significance increases with the distance between the 2 limiting lines due to the increased size of the sample; i.e., the more "lines or spaces" included in the measurement, the more accurate the calibration.

Care of Grating Replica Specimens:

When not in use, the replica should be kept in a dust-free atmosphere (as the same vial in which it is supplied). The replica surface can be damaged if it is touched with any hard object. **NEVER TRY TO CLEAN IT**. Care should be taken with the TEM specimen to avoid bending the grid, which can cause cracking of the replica. When viewing a replica specimen in the TEM always begin at low magnification, with one square of the supporting copper grid filling the EM screen, slowly increase the illumination to near maximum intensity (but not to cross-over) then reduce the level of the illumination and go to the desired magnification. Repeat this procedure every time a new area of the replica is to be viewed.

Note: Artifacts such as furrows or other distortions are on the gold surface of the original master grating and do not affect the accuracy of the line spacing.