

1. Is Standard Automated White-on-White perimetry (SAP) available on HEP?

Yes. HEP uses the standard stimulus sizes of Goldman III and V. A unique feature of HEP's SAP is that between 40 and 16 dB a stimulus of Goldman size III is presented, but below 16 dB HEP increases the stimulus size. The increase in size between 15 and 0 dB is linear and follows a published Goldman table. The brightness remains the same. This unique feature is an advantage of HEP over conventional perimeters and was published for the first time at ARVO 2010 by Goren et.al.

2. Is Flicker-Defined Form (FDF) Perimetry considered selective perimetry?

Yes, FDF Perimetry targets primarily the magnocellular signal pathway. The magnocellular retinal ganglion cells are sparsely distributed on the retina and primarily respond to movement and contrast. M-cells are particularly sensitive to high-frequency and high-contrast stimulus such as flicker perimetry. Thus, when M-cells die, reduced visual function may be detected earlier. In contrast, white-on-white perimetry targets all retinal ganglion cells where other cells may take over M-cell function and a visual field defect might be masked.

3. When do I use Flicker-Defined Form (FDF) Perimetry and when do I use SAP?

FDF Perimetry is designed to aid in detecting visual field loss in patients with early glaucoma, whereas SAP is recommended for continuous patient follow-up once a suspect or glaucoma case has been determined. FDF Perimetry may be used with glaucoma suspects and patients with early to moderate glaucoma. Patients with severe glaucoma should be followed with SAP. SAP has also been shown to be useful as an aid in detecting VF loss with neurological defects and other conditions associated with extensive and deep VF loss.

4. Is there a learning curve with Flicker-Defined Form (FDF) Perimetry?

Every type of perimetry has a learning curve and FDF's learning curve is comparable with others (Lamparter et al., ARVO 2010). Keep in mind that the first and second visual field should be ignored and discarded. The reason for this is that the first visual field may show defects caused by artifacts, such as learning curve, poor patient instruction or misunderstanding of the test. Only the third visual field should be used for diagnosis and follow-up analysis. For FDF Perimetry an extended first introduction of the stimulus is highly recommended. Always use the integrated demonstration mode on the first exam for introduction of the new stimulus and test procedure.

5. Are Flicker-Defined Form (FDF) and Frequency Doubling Technology (FDT) similar types of perimetry?

FDF Perimetry resolves a problem with frequency doubling perimetry, where the patient responds to "flicker" which they perceive before the frequency doubling phenomena is perceived. In FDF Perimetry the target is only visible if the illusion of a gray patch or circle against the background is perceived by the patient.

6. What is the maximum size test field (eccentricity) of HEP?

HEP is designed to test the central visual field up to 30° and will offer one additional visual field test up to 60°, expected in 2011.

7. Which type of monitor is used to present the HEP stimuli?

The integrated monitor is a cathode ray tube (CRT). Internal or external means are used to accelerate and deflect the electron beam that is then used to create images in the form of light emitted from the fluorescent screen. The excitation of phosphor molecules on the surface of the monitor creates the HEP stimuli. A CRT presents black and white images rather than color.

8. Is HEP a projection perimeter?

No, HEP is a monitor-based system.

9. Does HEP also offer Short Wavelength Automated Perimetry (SWAP)?

HEP provides FDF rather than SWAP because FDF is believed to provide the same or better detection results.

10. Can the patient use his or her own glasses?

Yes, the patient can use his or her own distance glasses provided the frame fits appropriately and that the distance prescription is not more than 4 diopters different from the optimal prescription. A correction for presbyopia is not necessary. HEP is designed for infinity. If distance glasses or contact lenses are unavailable, place trial lenses for the distance prescription in the trial lens holder. The optimum distance between the eye and the lens holder is approximately 0.6 inch. The trial lens holder is usually stored in the back drawer of the HEP instrument.

11. Is it advisable to use HEP without correcting with lenses?

A correction for presbyopia is not necessary. For myopia we recommend that patients with less than -4 diopters do not need corrective lenses. Please always correct for astigmatism.

12. What is the suggested room lighting for testing with HEP?

SAP testing should be performed in a dark room. However, the FDF test is designed to be used with ambient room illumination (be careful to avoid reflection on the lens). The integrated white eye occluder is designed to maintain light adaptation in the untested eye. Occasionally a patient may, due to issues of ocular dominance, find this method of occlusion inadequate or uncomfortable. Use a standard black eye occluder in such instances.

13. Which threshold strategy is used with HEP?

HEP uses its own and unique threshold strategy, the Adaptive Staircase Thresholding Algorithm – ASTA. ASTA is a bracketing strategy with quick termination. HEP uses different strategies for different purposes:

ASTA Standard is the recommended basic test strategy for new patients.

ASTA Follow-Up is developed for serial follow-up analysis. ASTA Follow-Up requires baseline examinations and uses visual field results from ASTA Standard as starting values to drive the test. Test time is therefore reduced. ASTA Follow-Up is unique in the perimetry market.

ASTA Fast is a strategy which should be applied for normal patients only. Trend analysis is not possible.

14. What is the test duration on the HEP?

Test duration varies based on test strategy and test pattern. For instance, a 24-2 ASTA Standard test takes approximately 5 minutes per eye for a normal patient. Test time may be extended due to the patient's reaction and disease status. Test time is considerably reduced by the ASTA Follow-Up test strategy to approximately 2.5 minutes per eye. The supra-threshold screening strategy S-30 takes only 30 seconds per eye.

15. Is it possible to pause the visual field test?

Yes. The patient may stop the test by holding down the patient response button. Also, the patient may ask the operator to pause the test. The instrument continues the test as soon as the patient releases the patient response button or the operator presses **resume test**.

16. How does the HEP measure the reliability of the patient?

Fixation losses and blinks are recognized by a small integrated camera. False Positives are measured by the patient's response time. False Negatives are applied several times during the visual field examination by presenting stimuli in already completed locations. All reliability parameters are recorded. There is a real-time display of all reliability parameters on the operator screen.

17. Is the pupil size automatically measured on HEP?

Yes, the pupil size is recorded after 45 seconds and during the entire test procedure.

18. Is dilation required for HEP?

A HEP visual field can be undertaken with an undilated pupil unless the diameter is smaller than 2.5 mm. If the pupil is less than 2.5 mm the pupil should be dilated, if possible.

19. Does HEP show the results of the Glaucoma Hemifield Test (GHT) after the visual field is completed?

Yes. The Glaucoma Hemifield Test (GHT) is a classification of threshold test results that analyzes defect in zones of the upper and lower field.

20. Is a trend analysis possible on the HEP?

Following the acquisition of a second visual field, the Trend Analysis tab appears and displays serial visual field data. HEP offers a trend analysis graph of the Mean Deviation as well as a Pattern Standard Deviation. The MD and PSD values of all available fields of the type selected will be displayed in chronological order. The lower 5th percentile limit (green) and lower 0.05th percentile (red) are indicated.

21. Is it possible to “Change Eye”?

No. The Blind Spot and Nasal Step are at pre-defined locations in each visual field examination and this important test information would be missing if the eye was changed retrospectively. The visual field examination has to be repeated in such cases.

22. What is the size of the HEP normative database?

The HEP normative database includes 400 normal patients per eye. The ages range from 18 to 80 years.

23. Does HEP have an import function for visual fields acquired with other perimeters?

No, there exists no direct import. HEP visual fields can of course be imported via the E2E file import.

24. How can HFA data and HEP data be compared?

The default settings for the new Flicker-Defined-Form (FDF) Perimetry on the Heidelberg Edge Perimeter has a dynamic range from 0 to 28 dB (FDF Units). These units are unique and differ from Standard Automated Perimetry (SAP). In order to offer compatibility of perimetry units and to offer continuous monitoring of patients formerly examined with different perimeters, the HEP uses an optional unit conversion from FDF units into legacy-scale units. FDF Perimetry results can be displayed on the same scale as used on Humphrey perimeters to make comparison with legacy data easier. HEP SAP units are comparable to other perimeters.

25. Does the HEP have to be warmed up before testing?

Assuming the instrument is at room temperature, the HEP is immediately calibrated upon start-up and testing can be performed immediately.

26. Are the visual field results automatically saved?

Yes, the visual field results are automatically saved when a test is completed. Data is stored as a separate tab in the HEYEX (Heidelberg Eye Explorer) software.

27. Can I network HEP and other Heidelberg Engineering devices?

Heidelberg Engineering products share a common database in which all information is stored in one location. Contact the support hotline at (800) 931-2230 Option 2 for more information.

28. Can the HEP visual field result be exported?

Yes, results can be exported as an E2E file or PDF.

29. Can HEP be connected to practice management system?

Yes, HEP can often be connected to patient data management software. This enables quick and convenient import of patient data into the digital patient file. Contact the support hotline at (800) 931-2230 Option 2 for the latest list of compatible programs.

30. Should HEP visual field results be considered abnormal when they are not within the normal range?

Patterns of loss that are not well defined or that are not supported by other observations, may require re-testing of the visual field or further evaluation. However, patterns of loss that are clearly consistent with other findings have increased credibility. These include:

- clear nasal step or arcuate scotoma correlating well with optic nerve head observations
- clear hemianopia
- loss clearly correlating with ophthalmoscopic findings
- loss clearly correlating with clinical history

31. What are possible “red flags” that suggest the HEP visual field results should be retested?

There are several factors that should be considered when assessing visual field test results:

- untrained patient and perimetric learning curve
- eyelid artifacts (accentuated at the grayscale printout)
- “trigger-happy” field
- signs of excessive false positive responses, trial lens defects, or other artifacts
- false positives over 15%
- fixation losses exceeding 20%

32. Can Flicker-Defined Form (FDF) Perimetry cause photosensitive epilepsy?

The nature of the flickering display used by FDF may raise concerns over the possibility of causing photosensitive epilepsy. This is unlikely due to the frequency of the flickering stimulus and photosensitive epilepsy is most commonly a binocularly driven phenomenon. However, in the unlikely event that a patient experiences discomfort or disorientation the test should be stopped. The test can be resumed after a black eye patch is positioned over the non-tested eye, although it should again be stopped if the patient continues to experience discomfort. A SAP test can be used to test a patient who has experienced discomfort with FDF, as no flicker is used for this test.

33. Does HEP apply the Heijl-Krakau method?

No. HEP tracks the patient’s eye with an integrated camera and offers a real-time display to ensure a record of fixation losses.

Corporate Headquarters

Heidelberg Engineering GmbH • Tiergartenstr. 15 • 69121 Heidelberg • Germany
Phone + 49 6221 6463-0 • Fax +49 6221 646362 • www.HeidelbergEngineering.de

U.S.A.

Heidelberg Engineering, Inc. • 1499 Poinsettia Avenue, Suite 160 • Vista, CA 92081
Phone 760-598-3770 • Fax 760-598-3060 • www.HeidelbergEngineering.com

 **HEIDELBERG**
ENGINEERING 