# Peak / Valley Detection Principle

Technical Note
T220001001

## Introduction

To provide a precise and user friendly Peak/Valley detection function, OPTIZEN™ series adopted an algorithm as explained in below.

## Peak/Valley Detection Algorithm

The Peak/Valley detection proceeds through following steps a) to f).

a) Enter the number of points, $N$, to be applied to the peak detection algorithm. $N$ means the number of scanning data points (see Fig. 1).

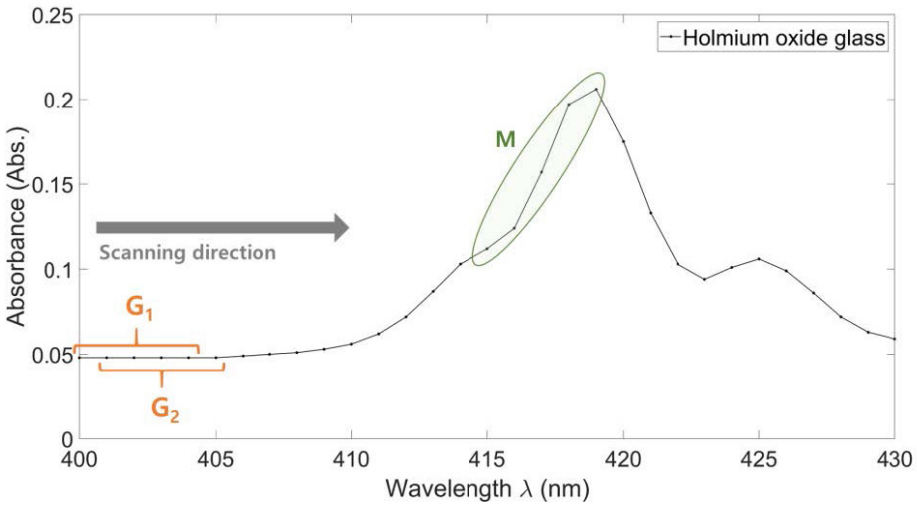


Fig 1. Scanning data points when $N = 5$

b) The algorithm starts scanning the data from short wavelength to long wavelength comparing their values. In this case, $N$ consecutively increasing (or decreasing) data points are scanned and classified as an increasing (or decreasing) group (G) as follows (see Fig. 2).
   · Increasing group $M_1$, $M_2$, $M_3$, ...
   · Decreasing group $m_1$, $m_2$, $m_3$, ...

c) List each group in order (as shown in Fig. 2).
   · Ex) $M_1$ $m_1$ $m_2$ $M_2$ $m_3$ $m_4$ $m_5$ $M_3$ $m_6$

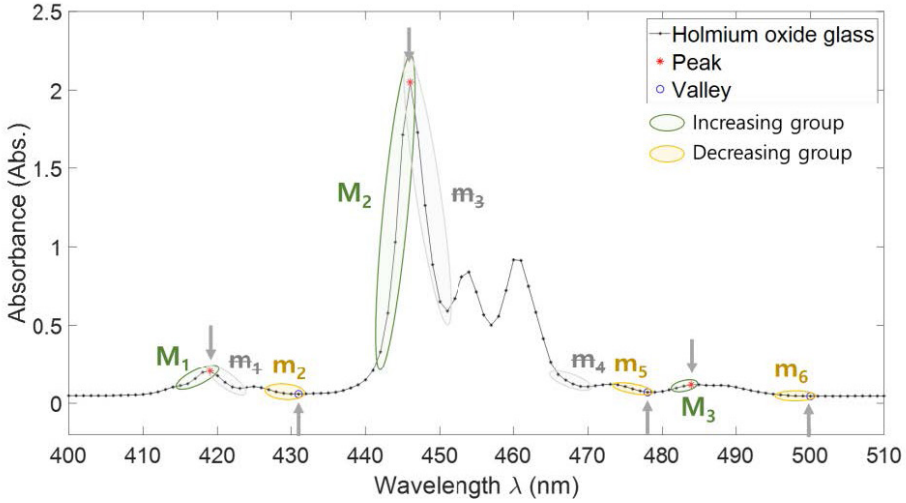


Fig 2. Peak detection from Holmium oxide glass spectrum when $N = 5$

d) If any group s of the same classification are consecutive (({M1 M2}, {m3 m4 m5}, etc.), the preceding group(s) is(are) deleted.
   · Ex) $M_1$ ~~$m_1$~~ $m_2$ $M_2$ ~~$m_3$~~ ~~$m_4$~~ $m_5$ $M_3$ $m_6$ → $M_1$ $m_2$ $M_2$ $m_5$ $M_3$ $m_6$.
e) Set the maximum value as a peak in the interval between group M and group m (Peak - $P_1$, $P_2$, $P_3$, ... ).
f) Set the minimum value as a valley in the interval between group m and group M (Valley - $V_1$, $V_2$, $V_3$, ... ).

## Conclusion

The user can change the Peak/Valley detection condition by changing the number of scanning data points, $N$. If no Peak/Valley is detected within the desired range, it can be solved by adjusting $N$ simply. The tendency to continuously increase (or decrease) can be broken if the scanning interval is too small the difference between two consecutive measured values can become less than photometric repeatability. In this case, no increase (or decrease) group is formed. This can be solved by appropriately setting the measurement scanning interval to a larger value. The difference between two consecutive measured values can be distinguished easily so that the peak can be seen.

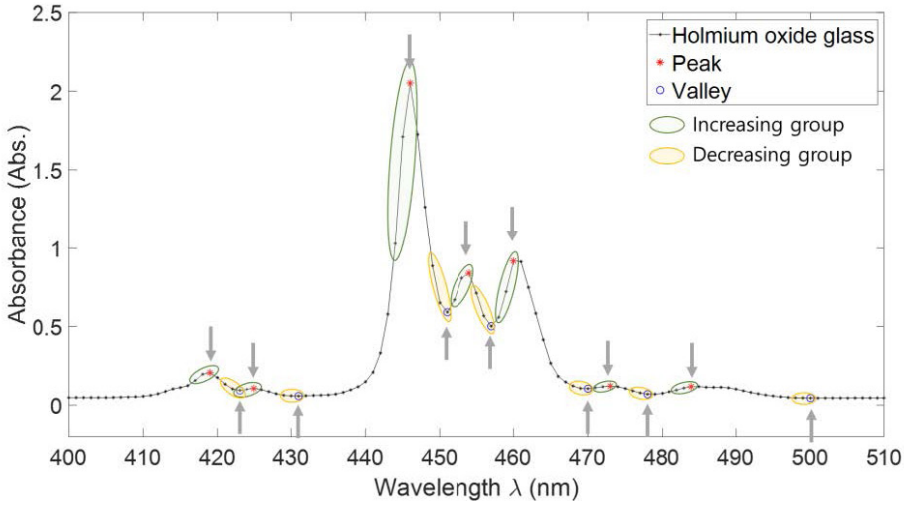


Fig 3. Peak detection from Holmium oxide glass spectrum when $N = 3$



Related models: **OPTIZEN Alpha, OPTIZEN View (Ver. 5.0 and above)**

**Phone** +82-42-932-7586~8 / **Fax** +82-42-932-7589
**E-mail** rnd@klabkis.com
www.optizen.kr/english