

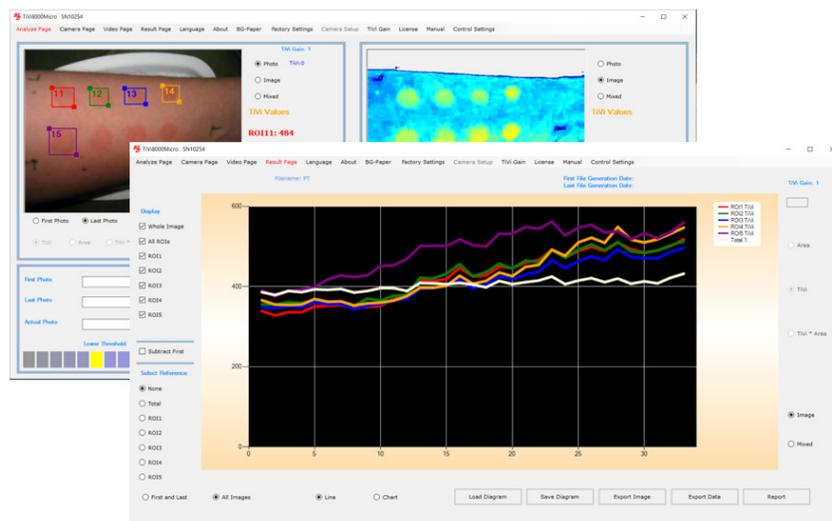
Tissue Viability Imager TiVi8000Micro

for

Microcirculation Mapping



using hand-held probe and tablet computer



generates quantitative information about the microcirculation

Tissue Viability Imaging quantifies what can be observed by the unaided eye and takes subjectivity out of skin testing.

Wheels Bridge

PIONEERS IN TISSUE VIABILITY IMAGING



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Intended Use

The *TiVi8000Micro* is designed to map and display real time dynamic alterations in skin or other tissue microcirculation, depicting vasodilation and vasoconstriction effects related to:

- Topical or systemic applications of vaso-active materials
- Skin irritation or skin damage
- Any physiologic process affecting the microcirculatory system
- Bed-side monitoring as well as laboratory testing of microvascular events

TiVi8000 is not registered as a Medical Device. The intended use is research and validation of skin care products under development.

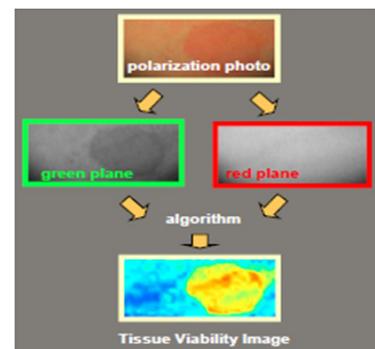
Microvascular Research | Rapid Panelist Screening | Point of Sale Assessment | Demonstration

Basic Operation Principle and Analysis Tools

The Tissue Viability Imager *TiVi8000Micro* continuously displays a dynamic map of the microcirculation using live video capture. Individual image snapshots are selected and saved to file for detailed analysis and comparison. Unlike other imaging technologies, this methodology is unaffected by movement artefacts making it an ideal tool for investigating microcirculation in moving objects. Local erythema and blanching are easily and accurately quantified through region of interest analysis. After selecting control and test site regions of interest in individual microcirculation images, the *TiVi8000Micro* software calculates relative changes in erythema intensity and area. Measurement data may be exported to an Excel spreadsheet or compiled as a hard-copy report. All images are exportable to the Tissue Viability Imager *TiVi700* system for optional in-depth analysis.

Skin microcirculation is most effectively investigated through non-invasive and noncontact methods in order to avoid adverse effects from injected tracer elements and applied probes. Since the microvascular bed is highly heterogeneous by nature, imaging methods are far superior to those utilizing single point measurements. The patented TiVi technology combines polarization spectroscopy with advanced image processing resulting in highly versatile yet easy to use imaging systems. In studies involving skin care, cosmetics, textiles, drug development, occupational medicine and microvascular or medical research, *TiVi8000Micro* increases productivity by automatically visualizing and quantifying important parameters such as erythema and blanching. All measurements are collected without the need to touch the tissue under investigation and without being affected by tissue movement artefacts. Mini-tablet computer portability greatly facilitates studies in the laboratory, at the clinic and even at the work-site.

Operating in cross-polarized mode, the green component of light reaching the camera detector is attenuated due to a high absorption rate by the red blood cells. At the same time the red light component is virtually unaltered due to its low rate of absorption by the red blood cells. In contrast, surrounding tissue absorbs both the green and the red light components at approximately the same rate. *TiVi8000Micro* takes advantage of this wavelength dependence in red blood cells absorption. The software first separates the colour matrixes and then applies an algorithm subtracting the value of each picture element in the green colour matrix from the corresponding value in the red colour matrix. The software then generates and displays an output matrix which represents the local red blood cell concentration.



Selected References

- Sub-epidermal imaging using polarized light spectroscopy for assessment of skin microcirculation.* O'Doherty J, Henricson J, Anderson C, Leahy MJ, Nilsson GE, Sjöberg F. *Skin Res Technol.* 2007 Nov;13(4):472-84.
- Comparison of instruments for investigation of microcirculatory blood flow and red blood cell concentration.* O'Doherty J, McNamara P, Clancy NT, Enfield JG, Leahy MJ. *J Biomed Opt.* 2009 May-Jun;14(3).
- Cutaneous bioengineering instrumentation standardization: the Tissue Viability Imager.* Nilsson GE, Zhai H, Chan HP, Farahmand S, Maibach HI. *Skin Res Technol.* 2009 Feb;15(1):6-13.

More reference and information about the TiVi-technology on our WEB-site: www.wheelsbridge.se