FST Hemispheres

Model 27.000

Manual

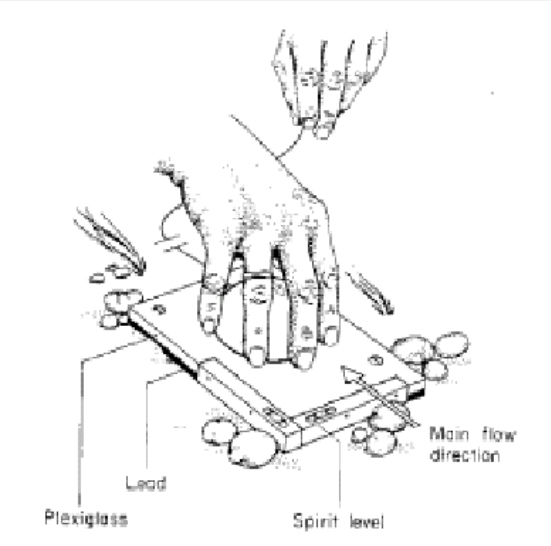
KC Denmark

Research Equipment

Limnology • Oceanography • Hydrobiology

	Manual for FST Hemispheres	Model no. 27.000

Field Procedures for FST Hemispheres



From Statzner, B and R. Müller. 1989. Standard hemispheres as indicators of flow characteristics in lotic benthos research. Freshwater Biology 21: page 445-459.

Figure 1. Placing hemisphere on the plane in a stream.

1. Place the Plexiglas plane in a shallow (ideally 1,8 cm deep) horizontal pit dug in the stream bottom (Fig. 1).

2. Make sure the plane is level (a slope of less than 2,5% in each direction). Place small stones under the corners in coarse substrate to make the plane horizontal.

3. Place the hemispheres on the plane, one after another, noting the densest hemisphere that moved.

4. The placement procedure for each hemisphere is as follows:
    a. Hold the hemisphere with one hand slightly above the plane with the brass wire loop facing downstream and the monofilament line loosely held by the other hand (Fig. 1).
    b. Bring the upstream edge of the hemisphere into contact with the plane.
    c. Allow the hemisphere to drop down between the fingers completely to the plane – do not press the hemisphere down onto the plane.
    d. Slowly remove the hand from the area.

5. Note the heaviest hemisphere that moves on the plane (short movements of less than 2 cm should be considered artifacts and should be neglected).

6. The density of the hemispheres can be found in Table 1.

Specifications

Material	Pressure moulded polycarbonate thickness 2,5 mm
Calibration	No. 1 – 21 star metal with screwed and glued bottom plate
Tolerance	Specific gravity better than 1%
Capsuling	Hermetically welded in plastic
Base plate	PVC with ballast inlay (lead) and inlayed tube level for correct horizontal positioning
Surface	Sprayer sealed (algae-fusing surface). Hempel 71400
Transportation	Alloy transport box with plastic inserts
Application	
Current velocity	0 – 4 m/sec.
Temperature	- 10 to + 40 Cº (storing: -20 to +50 Cº)
Maintenance	None – or simply wipe off with a dry cloth

Sphere #	Density (g cm³)		Sphere #	Density (g cm³)		Sphere #	Density (g cm³)
1	1.015		8	1.439		15	3.361
2	1.031		9	1.624		16	3.795
3	1.063		10	1.834		17	4.284
4	1.095		11	2.070		18	4.836
5	1.129		12	2.337		19	5.460
6	1.199		13	2.637		20	6.166
7	1.274		14	2.987		21	6.958

Table 1 – density of the hemispheres

Technical information

The hemisphere method describes near-bottom flow conditions in watercourse. The method is based on a simple concept:

Which weight of a hemisphere exposed to a flow is moved by a given current from a reform plate.

The set of hemispheres consists of 21 identical hemispheres with different specific gravity.

The modern description of the quality of running waters requires a solid understanding of physical conditions.

Modern conservation of running water and restoration of nature aims at natural variation of the physical environment of running water, considering channel form, as well as discharge and bottom space sediment.

This complicates the use of traditional methods of measuring flow for example propeller instruments, well known to be unreliable for measuring current in weeded running water or near the stream - bottom.

The hemisphere method is an attractive alternative / supplement for a detailed evaluation of the physical environment when restoring running water, establishing spawn banks, etc.

The method is especially suitable if the flow forces prevailing at the stream - bottom is of interest.

Literature:

Standard hemispheres as indicators of flow characteristics in lotic bentos research.

Bernhard Statzner & Rainer Müller, Zoologisches Institut der Universitat Karlsruhe, W.Germany, Freshwater Biology (1989) 21, 445 - 459

Calibration of FST-hemispheres against bottom shear stress in a laboratory flume. Freshwater Biology (1991) 26, 227 - 231

Frutiger, A. & Schib, J.L. (1993): Limitations of FST-hemispheres in lotic benthos research. - Freshwater Biology 30, 463 - 474

Statzner, B. (1993): Response to Frutiger & Schib (1993) "Limitations of FST-hemispheres in lothic benthos research". - Freshwater Biology 30, 475 - 483

Dittrich, A. & Schmedtje, U. (1995): Indicating shear stress with FST-hemispheres - effects of stream-bottom topography and water depth. Freshwater Biology 34, 107 - 121

B. Statzner * F. KoPunann ** and A.G. Hildrew. ***

* URA CNRS "Ecologie des Eaux Douces" University of Lyon 1, France.
** Bayerisches Landesamt für Wasserwirtschaft München Germany
*** Queen Mary and Westfield College, London U.K.

Rev. July 4, 2016 – lkj

KC Denmark

Research Equipment
Limnology • Oceanography • Hydrobiology

E-mail: kc@kc-denmark.dk website: http://www.kc-denmark.dk/
Holmbladsvej 17-19, DK 8600 Silkeborg. Denmark. Tel. +45 86 82 83 47. Fax +45 86 82 49 50
Bank: Sydbank. SWIFT: SYBKDK22 IBAN DK5070460000104832
VAT no. DK 29 61 96 62