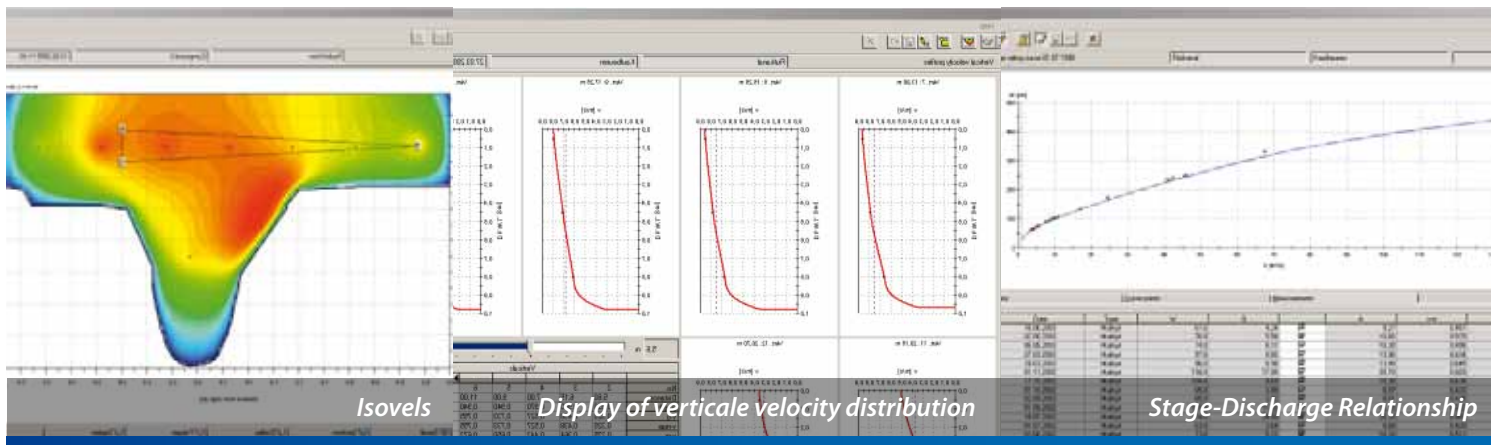




Software Q 4.0

Acquisition, Evaluation and Management of Discharge Data

- Evaluation of flow measurements according to ISO 748
- Relational database system
- Online registration of measurement values



Tool for discharge measurement

The APP allows the acquisition, management and analysis of flow rates by using Microsoft Windows operating system. The technical basis of the program is provided by the German gauging regulation, Annex D. The determination of the flow rate (Q) must be executed applying the **surface velocity method**, which is widely used in hydrological measurements.

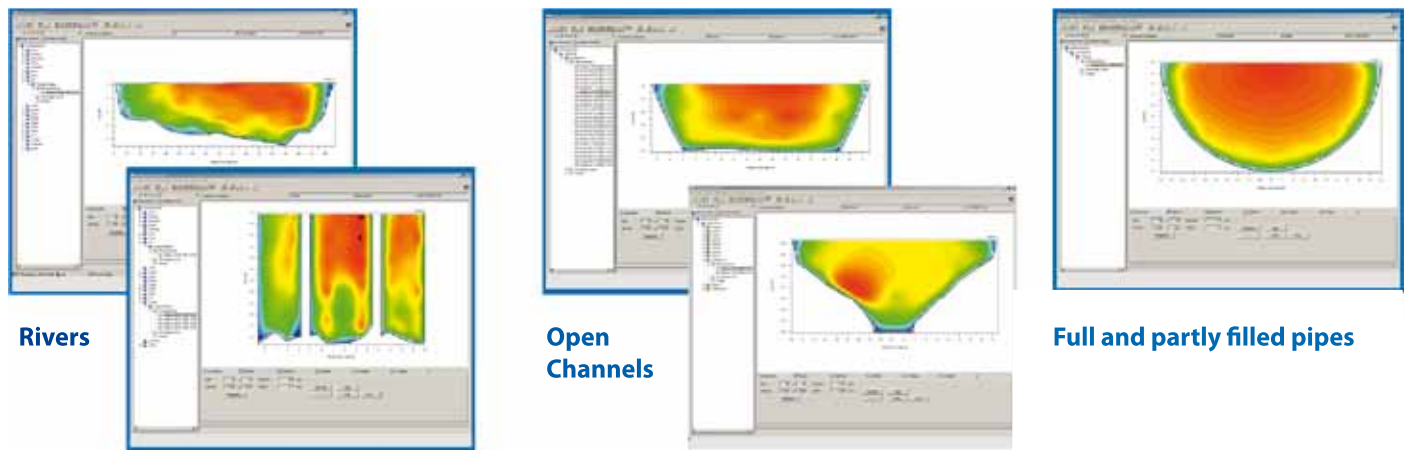
Considering the device-specific parameters, the total flow can be evaluated immediately after the data acquisition.

The convenient user interface provides the user with a variety of applications for detailed flow analysis.

From the collected data, vertical **velocity profiles** and **isovels** are calculated and illustrated in graph format. These graphs allow suspect measurements to be recognized early in the measurement process, so that they can be corrected or immediately discarded. Just one click generates a detailed measurement protocol from the input data, shows calculation results, velocity profiles of each vertical and measuring section.

Area of application

Software Q 4.0 can be used for discharge measurements in various areas of applications:



Data bank system

Software Q 4.0 is based on a relational **database management system**. The advantages of this system are:

- redundancy-free storage
- referential integrity
- simple data back up option
- easy data search option
- data interchange with SQL interface

Data export

Lists can be copied in MS Excel (*.xls). Graphics can be copied to the clipboard or can be exported as Bitmap (*.bmp), Enhanced Metafile (*.emf) and Windows Metafile (*.wmf).

The export module enables the user to export measurements into WISKI (Kisters) and waterlevels into AquaCoup format (aquaplan).

Data management for current meter and calibration equations

Software Q differs between various kinds of measuring instruments. Calibration equations can be assigned to every instrument.

Generating Discharge-Rating-Curve

Discharge-Rating curves can be generated by using several support points in order to derive a suitable stage-discharge relationship. Results can be compared with measured discharges from the database.

Supported Methods

One Point Method:

Velocity measurements are made on each vertical by setting the velocity-meter at a depth of 0.6 below the surface. The value observed is taken as the mean velocity in the vertical. The surface velocity is equal to the mean velocity.

Two-Point Method:

Velocity measurements are made on each vertical by setting the velocity-meter to a depth of 0.2 and 0.8 below the surface. The average of the two values is taken as the mean velocity in the vertical. The surface velocity is equal to the mean velocity. The two-point method by Kreps is made at each vertical setting the velocity meter as close as possible to the water surface and to 0,62 of the water depth. The average of the two values is taken as the mean velocity in the vertical. The surface velocity is equal to the upper measured velocity.

Multi-Point Method:

Using this method, the values of the velocity are obtained from observations at a number of points on each vertical between the surface of the water and the bed of the channel. The velocity observations at each position are then plotted and the unit width discharge or mean velocity determined by numerical methods (Spline-Approximation).

Evaluation

For each measurement a record of the measurement is made. The following information is included:

Measurement Record:

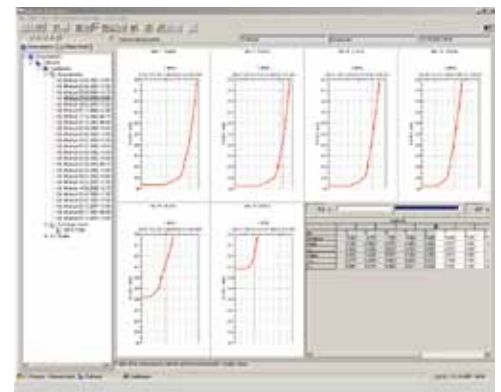
Messprotokoll	Art der Messung Vielpunkt (vollständig)	Bearbeitet durch Ingenieurbüro für Wasser und Umwelt, Berlin	Seite 1 / 3
Messstelle Name: Hochwasser-Kanal Mindel Gewässer: Mindel Hochwasser-Kanal Fluss-Km: Bezugspegel: Betreiber: Wasserkraftwerk Hr. Klaus W. L. Messstrasse: SEBA Hansen-Menzinger Lage der Messstelle: 48.696952, 10.482597 Mindel nahe Westemacherstraße-Brücke Bemerkung:			
Messstellen-Nr.: A Lfd. Nr. der Messung: 1 Datum der Messung: 23.08.2016 Einzugsgebiet: Betreiber-Nr.: 1 Gesamter Durchfluss: Ja		WS-Beobachtung: bei Beginn bei Ende Uhrzeit (Sommerzeit): 10:15 10:50 Wasserstand: 20 20	
Messgerät 1: Stangensonde Geräteart: Sensor Hersteller: Valeport Typ: FlowSens Geräte-Nr.: Schaufel-Nr.: Flügelhöhe-Nr.: Letztes Prüfdatum: 28.09.2017			
Zählgerät Hersteller: Typ: Geräte-Nr.:			
Messeneinrichtung: (keine Angabe)			
Beschaffenheit des Ufers befestigt		Sohle Beschaffenheit: Kies in Bewegung: Nein	
Verkrautung Nein Entkr. von: Entkr. bis:		Besondere Vorkommnisse / Bemerkung:	
Wetter Windstärke: (keine Angabe) Windrichtung: (keine Angabe) Niederschlag: Nein Lufttemperatur: Wassertemperatur:		Skizze des Messquerschnitts beigefügt: Nein	
Unterschrift des Messleiters			

Software Q 4.0.03

Messprotokoll	Art der Messung Vielpunkt (vollständig)	Bearbeitet durch Ingenieurbüro für Wasser und Umwelt, Berlin	Seite 2 / 3				
Messstelle Hochwasser-Kanal Mindel Datum der Messung: 23.08.2016 Anzahl der Lotrechten / Messlotrechten: 20 / 16							
Nr. der Lotrechtem Abs-stand vom Nullpunkt am linken Ufer		Wasserstand am Absolut					
Uhrzeit bei Wasserstandsänderung (Sommerzeit)		Wasser-tiefe (Ableswert)					
An-zahl der Messpunkte		Lage des Messpunktes über Sohle					
Geschw. (m/s)		Bemerkungen					
m		cm					
f		g					
1	0,00	20	10:15	0	---		
2	0,00	20	10:16	13	---		
3	0,50	20	10:17	14	1	5	0,092
4	1,00	20	10:20	17	2	5	0,078
5	1,50	20	10:22	17	2	5	0,041
6	2,00	20	10:24	18	2	5	0,013
7	2,50	20	10:26	18	2	5	0,065
8	3,00	20	10:28	17	2	5	0,088
9	3,50	20	10:30	19	2	5	0,081
10	4,00	20	10:32	17	2	5	0,059
11	4,50	20	10:34	19	2	5	0,086
12	5,00	20	10:36	19	2	5	0,071
13	5,50	20	10:38	18	2	5	0,078
14	6,00	20	10:40	18	2	5	0,084
15	6,50	20	10:42	17	2	5	0,09
16	7,00	20	10:44	17	2	5	0,087
17	7,50	20	10:46	20	2	5	0,076
18	7,80	20	10:48	19	2	5	0,045

Software Q 4.0.03

Velocity Distribution in the vertical:

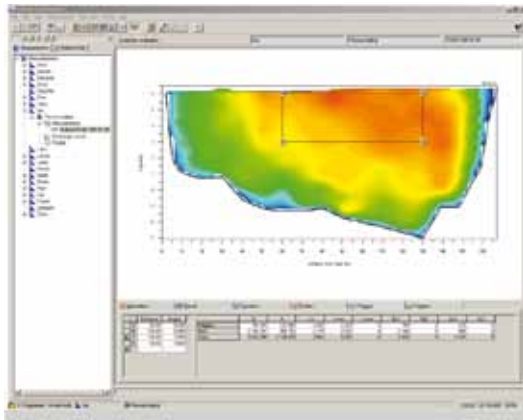


Enhanced Evaluation

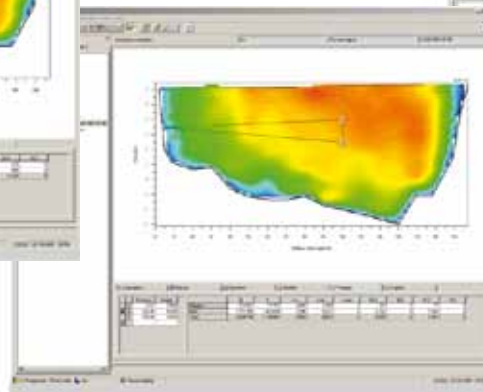
With the separately available Profi-Module even complex flow conditions can be examined in much more detail than what the standard version has to offer. The flow distribution in the

measuring section is calculated based on the **Finite-Differences-Algorithm**.

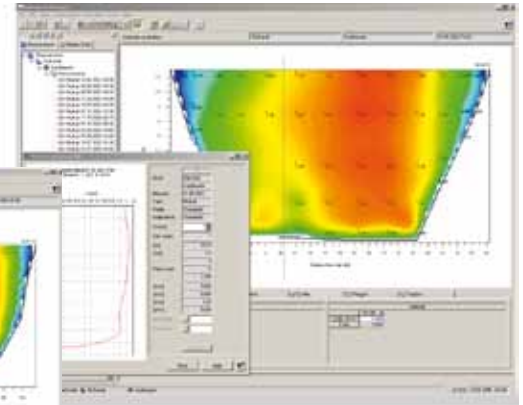
Evaluation of Areas of Interest



Hydraulic Calibrations of Sewer Pipes and Open Channel



Virtual Vertical and Horizontal Sectional Views



Modules and Interfaces

Module Current Meter: For online-connection of the current meter, direct processing and indication of the current meter impulses; additional impuls converter required.
(see brochure *Mobile Discharge Measurement Systems*)

Module Tube: For measurements in full- and partly filled pipes. Sedimentation at the bottom can be taken into account.

Module Ice: For multi-point measurements below an ice sheet. Thickness of ice and ground ice will be taken into account.

Interfaces for:

- SEBA HydroProfiler M and M-Pro
(see brochure *HydroProfiler-M/M-Pro*)
- OTT MFpro and ADC
- OTT Vota
- Import of Section-by-Section-ADCP-measurements (Teledyne RD Instruments)

The right is reserved to change or amend the foregoing technical specification without prior notice.

Contact:

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