Hach FH950 Gauging Meter Quality Assurance Checking

Overview:

This procedure details the Quality Assurance of Hach FH950 electromagnetic flow gaugings prior to Archiving. It does not cover the process involved in gauging a stream using the Hach FH950, or loading the gauging into hilltop.

When the quality assurance has been completed, the gauging is given to the data team to be archived.

Does the Gauging Contain?

- Gauging Card
- Raw Hach file (.tsv) Print out
- Hilltop Face card
- (Calculation of stage time – where applicable)

If not, please return to the Technician to complete.

The Hach FH950 raw file is in .tsv form. This can be opened in an excel workbook or a text editor (e.g. Notepad) to be printed and stapled onto the gauging card. This is the raw gauging file. The percentage of flow per vertical / station needs to be verified when checking the quality code of the gauging (>10% discharge in any one vertical affects QC).

It is preferable, due to readability, that the .tsv form be printed through excel, landscape, fit to single page, as although the font is small, the columns remain intact, unlike when it is printed from Notepad. If the format of the printout is not easily readable, reprint and reattach the printout, as the .tsv should be located in the appropriate site gauging folder.

Hach FH950 Gauging Meter Quality Assurance Checking

1. Check .TSV Gauging File

Firstly, is the .TSV file in the appropriate network folder?

(\\ares\hydrology\hydrology sites*site name*\gaugings\Hach)

Is all the information present? Is it correct? Dates, times, meter s/n are critical. Do edges have zero velocities? Note: The date is in the American MM/DD/YYYY format.

(*Highlighted areas indicate what to check*)

Profile Name: MANGA_ATUA
Operator Name: JWC
10:19:18 02.22.2021

Stage Reference: 0.000 m

Model: FH950
s/n: 203101004725
Boot: v1.00
Application: v1.06

Sensor Type: Velocity and Depth
s/n: 203210339354
Boot: v1.00
Application: v1.02

Filter: FPA Parameter: 40 s
Pre-filter: On Rank: 5
EMI: 50Hz.

Station Entry: Non-fixed
Flow Calculation: Mean-section
Start Edge: Left edge water
# of Stations: 23
Stream Width: 6.400 m
Total Discharge: 0.095 m^3/s
Total Area: 0.725 m^2
Mean Depth: 0.113 m

Measurement Results:

Time	Station	Location (m)	Method	Depth (m)	0.6 (m/s)	Average Velocity (m/s)	Area (m^2)	Flow (m^3/s)
9:52:48	1	4.3	0 point	0	0	0	0.01	0
9:54:13	2	4.6	1 point	0.07	0.024	0.024	0.025	0.001
9:55:28	3	4.9	1 point	0.095	0.06	0.06	0.032	0.002
9:56:37	4	5.2	1 point	0.12	0.064	0.064	0.037	0.002
9:58:43	5	5.5	1 point	0.13	0.06	0.06	0.043	0.002
9:59:58	6	5.8	1 point	0.155	0.033	0.033	0.046	0.002
10:01:15	7	6.1	1 point	0.155	0.066	0.066	0.042	0.003
10:02:32	8	6.4	1 point	0.125	0.098	0.098	0.037	0.004
10:03:43	9	6.7	1 point	0.12	0.108	0.108	0.036	0.004
10:05:03	10	7	1 point	0.12	0.134	0.134	0.036	0.005
10:06:15	11	7.3	1 point	0.12	0.163	0.163	0.037	0.007
10:07:24	12	7.6	1 point	0.13	0.191	0.191	0.036	0.007
10:08:41	13	7.9	1 point	0.11	0.226	0.226	0.034	0.008
10:09:49	14	8.2	1 point	0.115	0.266	0.266	0.035	0.009
10:10:56	15	8.5	1 point	0.12	0.252	0.252	0.037	0.009
10:12:03	16	8.8	1 point	0.125	0.218	0.218	0.037	0.007
10:13:16	17	9.1	1 point	0.125	0.177	0.177	0.037	0.006
10:14:34	18	9.4	1 point	0.12	0.132	0.132	0.034	0.005
10:15:44	19	9.7	1 point	0.11	0.139	0.139	0.034	0.004
10:16:48	20	10	1 point	0.115	0.125	0.125	0.031	0.003
10:17:47	21	10.3	1 point	0.095	0.093	0.093	0.024	0.002
10:18:48	22	10.6	1 point	0.065	0.068	0.068	0.003	0
10:19:00	23	10.7	0 point	0	0	0	0	0

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2. Check Hilltop Face card

Hydrometric Gauging at Manga-atua at Hopelands Rd at 22-Feb-2021 10:06:00

Summary Results

Stage	1.327 m	Flow	0.095 m3/s	Area	0.725 m2
Mean Vel.	0.130 m/s	Max. Depth	0.155 m	Slope	0 mm/km
Width	6.400 m	Hyd Radius	0.113 m	Wet Perim.	6.436 m
Sed. Conc.	-1 mg/l	Temperature	18.4 C	Stage Change	0 mm/hr
Method & Vert 4621		Verticals	211002003	Gauging No	420905
Meter S/N 203210339354		Slope	0.000	Intercept	0.000

Vertical spacing was Good.
The uncertainty is 7.6% and flow is between 0.087 and 0.102 using ISO748:1979
The uncertainty is 7.7% and flow is between 0.087 and 0.102 using ISO748:2007
Uncertainties and flows are to the 95% confidence limit.

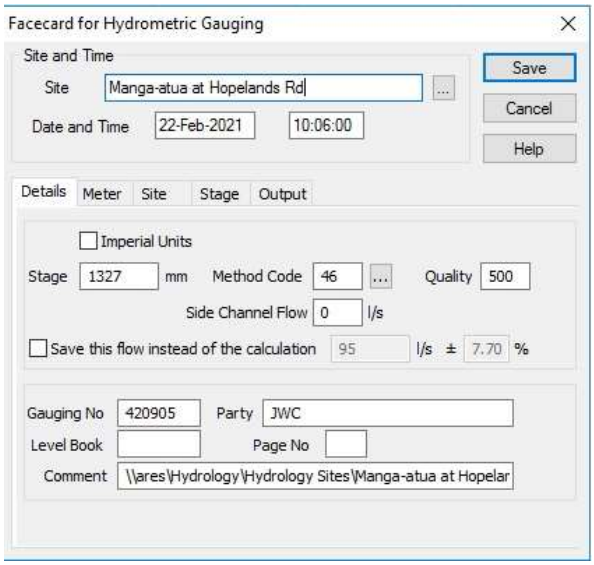
Details

OFFSET (m)	DEPTH (m)	POINT VELOCITIES (method code = vel (m/s)	MEAN VEL (m/s)	SEGMENT VALUES VEL (m/s)	AREA (m2)	FLOW (m3/s)
4.300	0.000		E=50%			
				0.012	0.0105	0.000
4.600	0.070	6=0.024	0.024			
				0.042	0.0247	0.001
4.900	0.095	6=0.060	0.060			
				0.062	0.0322	0.002
5.200	0.120	6=0.064	0.064			
				0.062	0.0375	0.002
5.500	0.130	6=0.060	0.060			
				0.047	0.0427	0.002
5.800	0.155	6=0.033	0.033			
				0.050	0.0465	0.002
6.100	0.155	6=0.066	0.066			
				0.082	0.0420	0.003
6.400	0.125	6=0.098	0.098			
				0.103	0.0367	0.004
6.700	0.120	6=0.108	0.108			
				0.121	0.0360	0.004
7.000	0.120	6=0.134	0.134			
				0.149	0.0360	0.005
7.300	0.120	6=0.163	0.163			
				0.177	0.0375	0.007
7.600	0.130	6=0.191	0.191			
				0.209	0.0360	0.008
7.900	0.110	6=0.226	0.226			
				0.246	0.0338	0.008
8.200	0.115	6=0.266	0.266			
				0.259	0.0352	0.009
8.500	0.120	6=0.252	0.252			
				0.235	0.0367	0.009
8.800	0.125	6=0.218	0.218			
				0.198	0.0375	0.007
9.100	0.125	6=0.177	0.177			
				0.155	0.0367	0.006
9.400	0.120	6=0.132	0.132			
				0.136	0.0345	0.005
9.700	0.110	6=0.139	0.139			
				0.132	0.0338	0.004
10.000	0.115	6=0.125	0.125			
				0.109	0.0315	0.003
10.300	0.095	6=0.093	0.093			
				0.081	0.0240	0.002
10.600	0.065	6=0.068	0.068			
				0.034	0.0032	0.000
10.700	0.000		E=50%			
				Totals	0.7255	0.095

- Are the 15 items consistent with Raw Hach (.tsv) output? (*Highlighted areas indicate what to check*)

- Check section discharge for % of total flow. **If greater than 10% max QC 400.**
- Hilltop location
-Date and time of gauging
-Temperature
-Gauging Number
-Computed discharge
-Computed stage (where appropriate)
-Effective Water's Edge
-Verticals
-Correct number of verticals
-Stage change and/or rate of rise and fall (where appropriate)
-Area
-Mean Velocity
-Max Depth
-Width

3. Check Hilltop Face card of Hydrometric Gauging



Details:
Stage (Hilltop Manager print out)
Method code – **43 for Hach gaugings**
Gauging No
Party
Meter:
Slope and intercept correct for prop
Gauging meter Serial No [meter, prop]
Calibration date
Site: (depends on gauging)
Location
Water Temp – clear/discoloured
Origin on right bank? *– Check that this and the location/offset values are consistent. Hilltop sorts stations into ascending order, regardless of if they're descending in the tsv, so ensure that these match otherwise the cross-section will be reversed*
Stage:
Arrival/Start/Finish/ Departure
Need ESG reading where applicable here
Stage change (mm/hr)
Comment:
The comment field is not long enough to store the network location of the tsv file, so this is unnecessary, but check that the file is located in the expected place on the network, if it is not, return the card to the technician so that they can find the file on their computer and put it in the required network location. **If the file cannot be located on the network drive or the technician's computer, then the gauging will have to be given QC200.**

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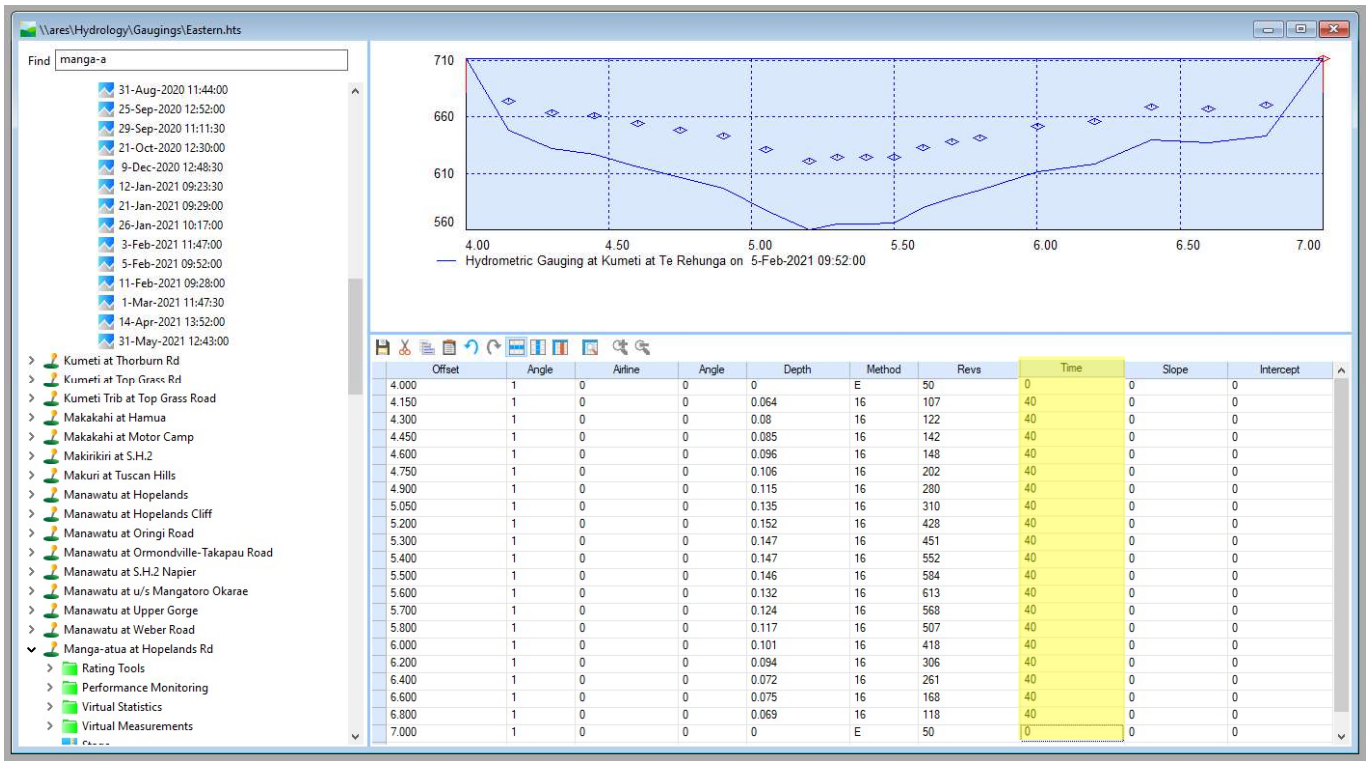
Anything specific to the results of the gauging, e.g. control shifts, control for the gauging, digger upstream/on control, trees cut down etc.

4. Check the Exposure Time

In the Hydrometric Gauging ensure that the Time column has been edited to include the gauging vertical exposure time. This is typically 40 seconds – check the parameter value on the .tsv file.

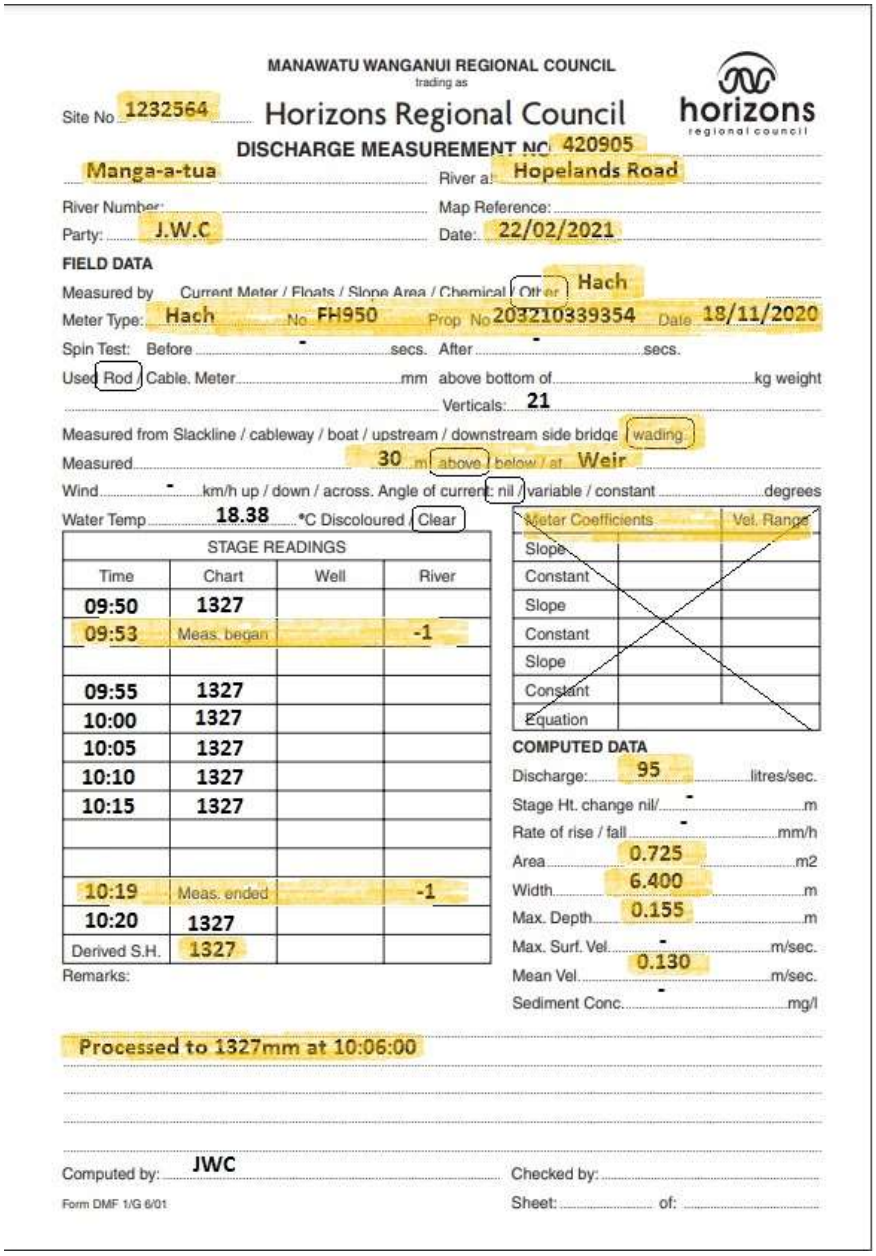


5. Physical Face card

- Is this consistent to Hilltop output?
- Stage filed to the logged stage/External Staff Gauge? Provisional Ratings: logged stage

(*Highlighted areas indicate what to check*)

Hach FH950 Gauging Meter Quality Assurance Checking



MANAWATU WANGANUI REGIONAL COUNCIL
trading as
Horizons Regional Council

Site No 1232564

DISCHARGE MEASUREMENT NO 420905

Manga-a-tua — River at: Hopelands Road

River Number: — Map Reference:

Party: J.W.C — Date: 22/02/2021

FIELD DATA

Measured by: Current Meter / Floats / Slope Area / Chemical / Other: Hach

Meter Type: Hach — No: FH950 — Prop No: 203210339354 — Date: 18/11/2020

Spin Test: Before - secs. After - secs.

Used: Rod / Cable. Meter ... mm above bottom of ... kg weight

Verticals: 21

Measured from Slackline / cableway / boat / upstream / downstream side bridge / wading

Measured 30 m above / below / at Weir

Wind - km/h up / down / across. Angle of current: nil / variable / constant ... degrees

Water Temp 18.38 °C Discoloured / Clear

STAGE READINGS			
Time	Chart	Well	River
09:50	1327		
09:53	Meas. began		-1
09:55	1327		
10:00	1327		
10:05	1327		
10:10	1327		
10:15	1327		
10:19	Meas. ended		-1
10:20	1327		
Derived S.H.	1327		

Remarks:

Meter Coefficients		Vel. Range
Slope		
Constant		
Slope		
Constant		
Slope		
Constant		
Equation		

COMPUTED DATA

Discharge: 95 litres/sec.
Stage Ht. change nil/ - m
Rate of rise / fall - mm/h
Area 0.725 m2
Width 6.400 m
Max. Depth 0.155 m
Max. Surf. Vel. - m/sec.
Mean Vel. 0.130 m/sec.
Sediment Conc. - mg/l

Processed to 1327mm at 10:06:00

Computed by: JWC — Checked by:

Form DMF 1/G 6/01 — Sheet: ... of: ...

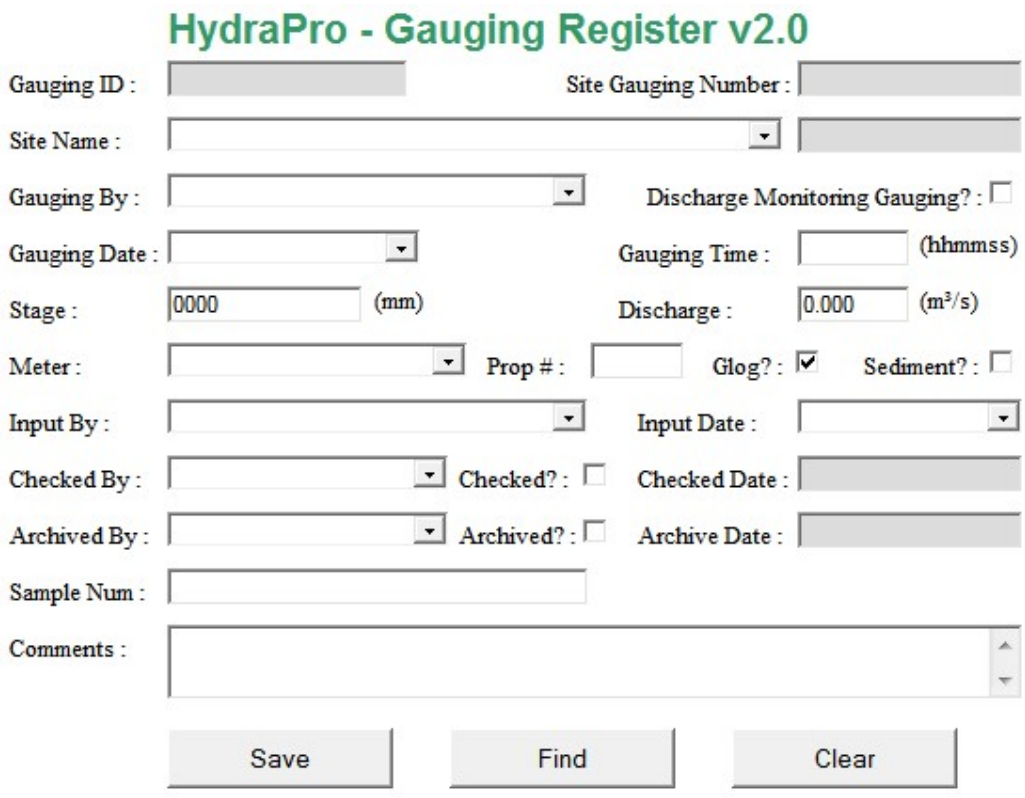
-Gauging Number
-Site Number and Site Name
-Party and Date of gauging
-Meter Type, No. and Prop No.
-**No Current Meter coefficients or spin test for Hach FH950**
-Method code and verticals (**method code for Hach is 43**)
-Location of gauging
-Water temperature
-Recorder, well and river stage heights/time at beginning and end of gauging as well as on arrival and departure
-Computed flow **l/s**
-Derived stage height and time for gauging
-Stage Height change (where applicable)
-Area
-Width
-Maximum depth
-Mean velocity
-Angle of current and Section

6. Gauging Register

- Is this consistent with Hilltops output? Has the Register been completed?
- Does the filed stage height match?
- Does the Gauging Time match?
- Does the discharge measurement match the filed Hilltop discharge?
- Are the up-to-date gauging meter serial and prop numbers entered?

Hach FH950 Gauging Meter Quality Assurance Checking

- (note: for the Hach, the meter is *Hach FH950*, and the serial number of the meter is entered in the 'prop' field)



If all the information is present and correct continue to complete quality assurance of the gauging *if not, please return to the Technician to complete*