

# Clogwyn 326 Micro Hydro Scheme

Abstraction Offtake Location Grid Reference: SH 61773 47209



License : WA/065/0006/007

Application Reference for Technical Variation :WRHYDROMATCH1007

1.0 Site Details: Clogwyn Hydro													hydromatch.com
Gross Head:	114.00 m											Head Loss	5.0 %
Design Flow:	0.026 m <sup>3</sup> /s											Turbine Flow Split:	60.0 %
'Hands Off Flow'	0.002 m <sup>3</sup> /s											Bypass Flow Split:	40.0 %
% PE =	5	10	20	30	40	50	60	70	80	90	95	98	
Flow (m <sup>3</sup> /s)	0.062	0.045	0.028	0.020	0.016	0.012	0.009	0.007	0.005	0.003	0.002	0.001	
Head (m)	114.00	114.00	114.00	114.00	114.00	114.00	114.00	114.00	114.00	114.00	114.00	114.00	

2.0 Turbine Matches: Clogwyn Hydro		hydromatch.com
Selected Turbine Type:	Pelton	Selected Turbine System: Pelton 2 - 25 (HM)

3.0 Design Summary: Clogwyn Hydro				hydromatch.com
System Type:	Pelton	Design Flow:	0.026 m <sup>3</sup> /s	
Power:	<b>20.13 kW</b>	Net Head:	108.30 m	
Energy Capture:	<b>52,043 kWh</b> (365 days)	CO <sub>2</sub> Saving:	27.43 tonnes	

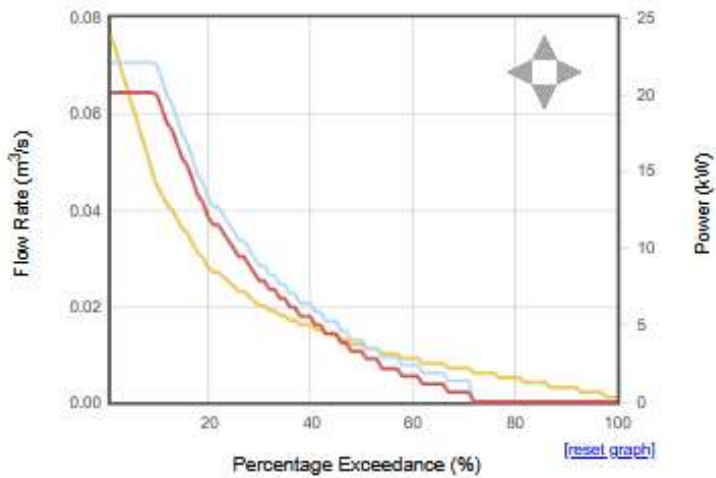
4.0 System Details: Clogwyn Hydro			hydromatch.com	
<b>4.1 Turbine</b>				
Name:	Pelton 2 - 25 (HM)			
Manufacturer:	Hydromatch			
Flow:	Minimum	Peak		
Turbine Power:	0.003 m <sup>3</sup> /s	0.026 m <sup>3</sup> /s		
Efficiency:	1.39 kW	22.10 kW		
Site Adjustment Factor:	1.000	80 %		
<b>4.2 Drive</b>				
Name:	Direct Drive			
Manufacturer:	Hydromatch			
Efficiency:	100 %			
<b>4.3 Generator</b>				
Name:	Small standard generator 0 to 75kW			
Manufacturer:	Hydromatch			
Power:	Minimum	Peak		
Efficiency:	0.63 kW	20.13 kW		
Efficiency:	92.1 %			
<b>4.4 Controller</b>				
Name:	Standard controller			
Manufacturer:	Hydromatch			
Efficiency:	99 %			
<b>4.5 Intake</b>				
Name:	High head intake with fish pass			
Manufacturer:	Hydromatch			

Further information available at [hydromatch.com/machinery](http://hydromatch.com/machinery)

## 5.0 Operation Details: Clogwyn Hydro

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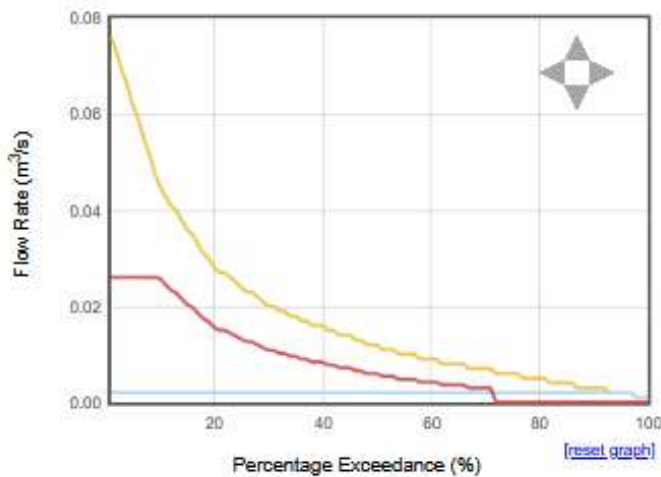
### 5.1 Operation Graph



■ Total Flow (m<sup>3</sup>/s)  
■ Turbine Power (kW)  
■ Electrical Power (kW)

Operation	Days	(%)
Design	33	9
Variable	226	62
Shutdown	106	29

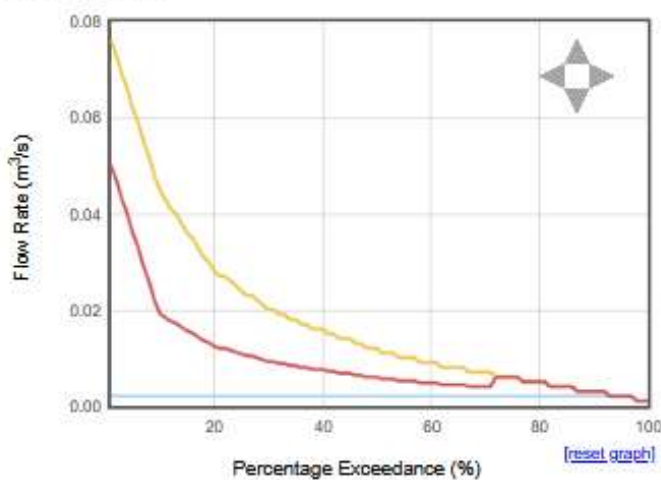
### 5.2 Turbine Flows



■ Total Flow (m<sup>3</sup>/s)  
■ 'Hands off' Flow (m<sup>3</sup>/s)  
■ Turbine Flow (m<sup>3</sup>/s)

Max Inst. Flow	0.026 m <sup>3</sup> /s
Hourly Abstraction (Vol)	94 m <sup>3</sup>
Daily Abstraction (Vol)	2,246 m <sup>3</sup>
Annual Abstraction (Vol)	264,524 m <sup>3</sup>

### 5.3 Bypass Flows



■ Total Flow (m<sup>3</sup>/s)  
■ 'Hands off' Flow (m<sup>3</sup>/s)  
■ Total Bypass Flow (m<sup>3</sup>/s)

'Hands off' Flow	0.002 m <sup>3</sup> /s
Turbine flow split	60.0 %
Bypass flow split	40.0 %

Hydromatch.com

## 'Hands off' Flow rate calculation method (HoF via screened orifice)

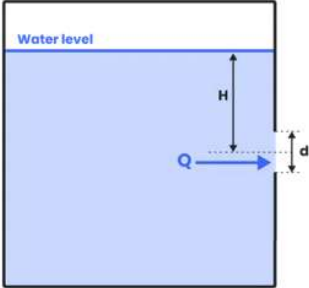
Diameter of orifice (d) ...  
40 mm

Area of orifice (A) ...  
1,256.6 mm<sup>2</sup>

Coefficient of discharge (Cd) ...  
0.81

Center line head (H) ...  
200 mm

Discharge (Q) ...  
0.0020163 m<sup>3</sup>/s



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$$Q = C_d \times A \times \sqrt{2gH}$$