

Sedie legale e amministrativa: Via Monviso,41 - 12020 VILLAFALLETTO (CN)
Tel.0171/935111-Fax:0171/935150



SCOTTA

### **RELAZIONE COLLAUDO CENTRALE DOS VALLES**

 N° collaudo
 CL-02-2017
 DATA
 29-05-\*2017
 COMMESSA
 REDAZIONE
 G.M.BARALIS
 CONTROLLO

 CENTRALE
 DOS VALLES
 CLIENTE
 ANPAC

ELABORATO DI COLLAUDO E PROVE DI MESSA IN MARCIA

### **CENTRALE DOS VALLES**

**TURBINA PELTON 3 GETTI** 

**ASSE VERTICALE** 

**GRUPPO 1** 





## SCOTTA S.p.A. Sede legale e amministrativa: Via Monviso,41 - 12020 VILLAFALLETTO (CN) Tel.0171/935111-Fax:0171/935150



### PROVE PARALLELO GRUPPO 1

DATA 29/06/2017

PARAMETRI MACCHINA G1										
h.	POTENCIA MECANICA	POTENCIA ELECTRICA	CAUDAL	PRESSIONE		INJECTOR				
				P ANA	ALOG	1	2	3		NOTE
	kW	kW	m^3/s	bar	m	%	%	%		
9:15	166	155	0,07	38,16047	390,00	10				minimo tecnico
9:30	362	337	0,13	38,16047	390,00	20				
9:50	541	503	0,19	38,11155	389,50	30				
10:15	715	672	0,24	38,06262	389,00	40				
10:20	857	806	0,28	38,00391	388,40	50				
10:30	1018	957	0,32	37,96477	388,00	60				
10:40	1116	1060	0,35	37,86693	387,00	70				max injector
10:50	1171	1124	0,37	37,78865	386,20	80				overflow injector
11:20	1209	1160	0,39	37,71037	385,40	90				overflow injector
12:00	1229	1180	0,40	37,59295	384,20	100				overflow injector
*	1226	1177	0,44	37,50	383,25	70	10			
*	1483	1439	0,51	37,40	382,23	70	20			
*	1689	1638	0,57	37,30	381,21	70	30			
*	1940	1882	0,62	37,20	380,18	70	40			
*	2089	2026	0,66	37,10	379,16	70	50			
*	2152	2098	0,69	37,00	378,14	70	60			
*	2201	2146	0,72	36,80	376,10	70	70			
*	2245	2189	0,75	36,40	372,01	70	70	10		
*	2358	2299	0,82	36,30	370,99	70	70	20		
*	2670	2603	0,88	36,20	369,96	70	70	30		
*	2838	2767	0,93	36,00	367,92	70	70	40		
*	2888	2815	0,96	35,80	365,88	70	70	50		
*	2949	2875	1,00	35,50	362,81	70	70	60		maximo tecnico
*	3018	2943	1,05	35,00	357,70	70	70	70		overflow turbina
				00,00						
	(*) bajo	caudal, prueb	oas impuls	ivas						





### SCOTTA S.p.A.

Capitale sociale Euro 16.000.000,00 i.v.
Codice Fiscale - Partita IVA - Registro Imprese di Cuneo:
03429380045
R.E.A. 290102 C.C.I.A.A. Cuneo
Sede legale e amministrativa:

Via Monviso, 41 - 12020 VILLAFALLETTO (CN) Tel.: 0171/935111 - Fax: 0171/935150



# EXECUTION OF TEST FOR THE DETERMINATION OF THE STEADY STATE PERFORMANCE OF THE MACHINE





Turbine group efficiency measures are performed with reference to the IEC standard 41 (equivalent to the Italian standard CEI EN 60041):

"Field acceptance tests to determine the hydraulic performance of hydraulic turbines, storage pumps and pump-turbines".

In particular, the following procedure must be followed:

- 1. Instantaneous power measurement produced (chapter 9 of the Italian standard CEI EN 60041: 1997-11);
- 2. The Net Hydraulic Head measurement of the turbine (chapter 2 of the Italian CEI EN 60041: 1997-11);
- 3. Turbine discharge measurement (chapter 10 of the Italian standard CEI EN 60041: 1997-11);
- 4. Calculation and analysis of the results (chapter 8 of the Italian standard CEI EN 60041: 1997-11).

### 1 - MEASUREMENT OF THE INSTANT PRODUCT POWER

Measurement of instantaneous power produced is detected in stable working conditions (for example: parameters 2-Net head and 3-Discharge variables in the instrument precision field) in two ways:

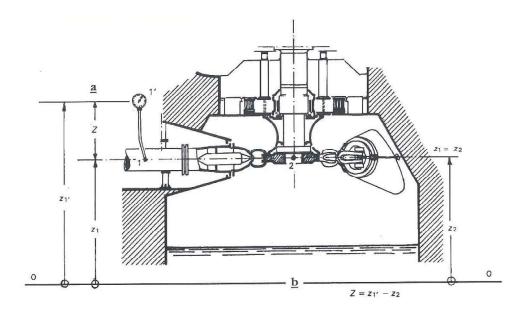
- a. By reading the production counter at 15min intervals;
- b. By reading the power value on the multifunction instrument (Network Analyzer), net of the self-consumption of the system. It's necessary to compare the reading with the production counter value at least twice to check the correspondence.

### 2 - MEASUREMENT OF THE NET HYDRAULIC JUMP OF THE TURBINE

Net Head turbine measurement is got by reading the precision pressure gauge installed on the penstock immediately downstream of the machine valve, immediately upstream of the turbine spiral case. Through a geometric measurement of the position of the runner quote compared to the center of the manometer and considering the kinetic energy possessed by the incoming fluid, the net Head is got.







$$Hn = p_1 + \frac{{U_1}^2}{2g} + z$$

Whit:

 $H_n = net Head [m];$ 

 $p_1 = pressure gauge [m];$ 

 $U_1$  = kinetic energy calculated in manometre section [m/s];

g = gravity acceleration [m/s<sup>2</sup>];

z = geometric measurement of the position of the runner quote compared to the center of the manometer [m].

### 3 - MEASURED TURBINED DISCHARGE

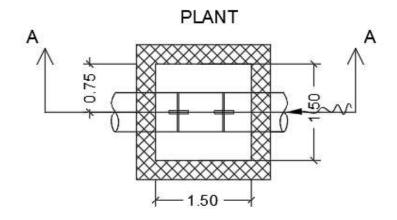
Turbinated discharge is measured using a CLAMP-ON ultrasonic meter installed on the penstock in a position that the measuring section has 10 straight diameters upstream and 5 straight diameters downstream of the pipeline.

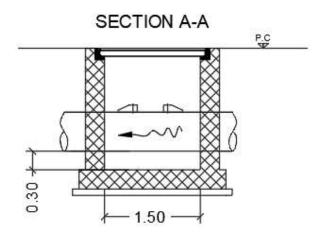
Pipe diameter will define the number of acoustic path and the measuring well size where the acoustic meter must be installed.

For this hydroelectric power plant, penstock has a nominal diameter of DN600. Therefore, it is proposed to install a CLAMP-ON ultrasonic meter with 2 acoustic paths installed near the central building at a distance of at least 3m upstream from the machine valve if the incoming supply line is straight for at least 10m.



Otherwise it will be necessary to find a position of the measuring well that respects the stated straight diameters. The well must have the following dimensions:





### 4 - ANALYSIS OF RESULTS

In cases where it's not possible to carry out tests under contract conditions, the measured values can be transposed to the guarantee values only if the physical quantities variations involved (head H, speed U and power P) deviate from the contractual values inside the range + -10% of the physical quantity itself.