

Hoja de Datos  
Bombas de Agua de Salvaguardias Tecnológicas

Nº units required:	4
Ítem Nº:	EJ-P01-A; EJ-P01-B; EJ-P01-C; EJ-P01-D
Service:	Cooling water for EJ System. Engineered Safeguards Service Water Main Pumps

ENVIRONMENTAL & SECURITY DATA	Location:	Open Water Basin. Pump head located inside enclosed building (see "sizing diagram")		Active / Passive Security:	Active
	Temperature:	·Outdoors: From +0.6 to +41°C ·Indoors: From +15 to +40°C		Quality Group (RG 1.26):	Nuclear Safety Related
	Relative Humidity:	From 40 to 95%		Security Class:	3
	Special conditions:	Outdoors service implies mild maritime ambient (coast)		Seismic Category (RG 1.29):	1
	Accumulated Radiation:	Indoor	Outdoor	Required Input Motion (RIM):	See seismic acceleration diagram; +104.10 height (IES415 to IES418; Rev.0)
	Accidental 40 years dose	Mild Environment, according to IEEE-323		Electric Qualification (IEEE 323, & 344):	1E

DESIGN DATA (per unit)	Fluid:	--	Fresh Water (Ebro River Water)		
	Basic Chemistry:		Lowest	Highest	Extreme (**)
	pH:	--	7.5 - 8.5	7.5 - 8.5	7.5 - 8.5
	Alkalinity:	ppm CaCO <sub>3</sub>	150 - 200	x3 Minimum	x30 Minimum
	Conductivity:	µS/cm	1000 - 1500		
	Chloride Content:	ppm	150 - 200		
	Calcium Content:	ppm	100 - 130		
	Fluid design temperature (Nominal / Min. / Max.):	°C	+35.0	+0.5	+40.0
	Viscosity (Nominal):	cP	0.720		
	Vapor pressure (Nominal):	kg/cm <sup>2</sup>	0.056		
	Density at nominal working temperature:	kg/m <sup>3</sup>	997.6		
			Min. Duty (*)	Design Duty	Max. Duty (*)
	Volumetric Flow rate	m <sup>3</sup> /h	2125	3370	3850
	Total Dynamic Head (TDH)	kg/cm <sup>2</sup> (g)	As per pump curve. TBD by Supplier	2.92 (***)	As per pump curve. TBD by Supplier
	Shut off head:	kg/cm <sup>2</sup> (g)	Shut off Head must be ≥ 120% than nominal TDH		
	Water level	m	--	See drawing	--
	Pump efficiency	%	TBD by Supplier	TBD by Supplier	TBD by Supplier
	Power Consumption (Mechanical):	kW	TBD by Supplier	TBD by Supplier	TBD by Supplier
	Electric motor efficiency	%	TBD by Supplier	TBD by Supplier	TBD by Supplier
	Power Consumption (Electrical):	kW	TBD by Supplier	TBD by Supplier	≤ 470 kW
	Design Pressure / Testing Pressure:	Kg/cm <sup>2</sup> (g)	10.55 (150 psig)		Design pressure x 1.25
	Design Relative Humidity (Min. / Max):	%	40	100	
	Corrosion allowance:	mm	≥ 3		
Design live:	Years	40			
Operational duty:	--	Pump operation has two duty scenarios: a) Full operation 24h, in an alternating dual pump configuration. b) Standby 24h + monthly operational tests. Standby is expected to be the main operational scenario			

(\*) Pump must be able to normally operate between minimum & maximum flow limit values. Real flow values are estimated to fall within these values. Values will be revised with Bidder's pump performance curve, to ensure that limit values fall within recommended pump operation values.

(\*\*) Worst Case scenario, corresponding to 30 days after LOCA. Basin starts at "Highest" (day 1) and gradually concentrates until "Extreme" is reached (day 30). Pump must be capable of handling, at least, one "Extreme" event. After an "Extreme" event, pump is no longer required to comply from its remaining Design Live.

(\*\*\*) Considering a 28" discharge nozzle. Requested TDH includes head required to compensate differential height between suction and discharge nozzles.

Hoja de Datos  
Bombas de Agua de Salvaguardias Tecnológicas

<b>CONSTRUCTION DATA</b> (per unit)	<b>Pump type:</b>	Vertical Turbine Pump	
	<b>Drive:</b>	<ul style="list-style-type: none"> <li>- Direct coupling</li> <li>- 6kV AC Electric Motor</li> <li>- Equipped with terminal box, wire to wire connectors, including wire fasteners (for more details, see spec. 3860-E-112C; Appendix C)</li> <li>- Electric Motor must be oversized to allow a TDH increase of 10%</li> <li>- For complete datasheet of pump electric motor, see <b>IHD083</b>. Motor datasheet must be completed by Supplier.</li> </ul>	
	<b>Direction of rotation:</b>	TBD by supplier	
	<b>RPM:</b>	$\leq 1000$ $\leq 1500$ is also acceptable, but not preferred.	
	<b>Connections:</b>		
	Nozzle loads:	See accompanying paper: IHD082 – Nozzle Loads Guide (v071015)	
	Suction (Type / Code):	n/a	n/a
	Discharge (Type / Code):	Flanged	$\leq 24"$ ANSI B16.5; RF; 150# $> 24"$ MSS-SP-44; RF; 150# Remark: 300# rating is also acceptable if required for seismic qualification
	<b>Min. submergence:</b>	TBD by supplier	
	<b>Weight:</b>		
	Empty (kg):	TBD by supplier	
	Duty (kg):	TBD by supplier	
	<b>Number of stages:</b>	TBD by supplier. Single stage is preferred.	
	<b>Impeller:</b>		
	Type:	Semi-open impeller is preferred to provide a better solids passing capability.	
	Nominal diameter (mm):	TBD by supplier.	
	Max. diameter (mm):	TBD by supplier. Must allow a minimum <b>10%</b> increase in pump TDH with the proposed electric motor.	
	Periferic speed (m/s):	Nominal: TBD by supplier. Maximum: TBD by supplier.	
	<b>Solid Passing Capacity (Max. Ø of particle):</b>	TBD by supplier	
	<b>Wear rings:</b>	Yes (when available)	
	<b>Shaft:</b>	Solid shaft	
	<b>Lineshaft:</b>	Open lineshaft is preferred (see bearing lubrication)	
	<b>Lineshaft Bearing lubrication:</b>		
	Type:	Refrigeration / lubrication by pumped media is greatly preferred. * In case Supplier proposes enclosed lubrication / refrigeration, consider osmotized water as lubricating / refrigerating media. * If existing, lubrication / refrigeration piping has full ASME III-ND requirements.	
	Flow:	n/a (see "Type")	
	Head loss:	n/a (see "Type")	
	$\phi_{max}$ particles:	n/a (see "Type") *If supplier proposes enclosed refrigeration, a Y strainer is to be provided by supplier. Mesh type to be defined by supplier.	
	<b>Shaft Sealing:</b>		
	Type:	TBD by supplier	
	Manufacturer:	TBD by supplier	
Refrigeration:	If required, refrigeration / lubrication by pumped media is greatly preferred. See bearing lubrication for details.		
<b>Coupling:</b>			
Type:	TBD by supplier		
Manufacturer:	TBD by supplier		
<b>Accessories:</b>	<ul style="list-style-type: none"> <li><b>a)</b> Vortex breaker</li> <li><b>b)</b> Aspiration basket strainer</li> <li><b>c)</b> Class 1E thermocouples in pump "dry" bearings; wired to terminal box (Thermocouples are not required in fluid immersed bearings).</li> <li><b>d)</b> Class 1E dual thermocouples in motor bearings, wired to terminal box.</li> <li><b>e)</b> Class 1E dual RTDs in motor phases, wired to terminal box</li> <li><b>f)</b> Motor heaters for moisture protection.</li> <li><b>g)</b> Coupling protector via mesh of perforated plate is preferred, to allow visual inspection of coupling.</li> <li><b>h)</b> Alignment pins for all main connections.</li> </ul>		

Hoja de Datos  
Bombas de Agua de Salvaguardias Tecnológicas