

## 2.2.1 Monitoring and inspection check list during operation (minimum requirements)

(Houben & Treskatis 2003 - 2020)

TYPE OF OPERATIONAL DOCUMENTATION	TARGET	AIM	RECOMMENDED INSPECTION FREQUENCY
OPERATIONAL DATA	Water levels in well and observation well	Development of drawdown in respect of pumping and hydrogeological boundary conditions	Daily
	Delivery rates	Legal restraint of water rights (not to exceed legal abstraction limit) Also: basic data for calculation of specific well yield development	Daily
	Raw water quality	Legal restraint of water rights to determine chemical influence on well ageing	Semiannually
	Operating hours, energy consumption, pressure head	Utilization ratio of well; functional efficiency	Daily
VISUAL INSPECTION	Inner protection zone	Groundwater protection	Weekly
	Well head	Functional efficiency Groundwater protection	Weekly
	Well casing and screen	Structural state Identification of ageing	Semiannually to annually (depending on ageing potential)
	Pump, riser pipe	Structural state Identification of ageing	Semiannually to annually (depending on ageing potential)
FUNCTION CHECK	Screen	Evaluation of ageing, entrance resistance, specific well yield	Semiannually to annually (depending on ageing potential)
	Pump	Pumping rate, energy consumption, tightness of riser pipe	Annually

(Houben & Treskatis 2020)

## 2.2.2 Inspection and maintenance check list (1)

(Houben & Treskatis 2020)

Name of water extraction plant: \_\_\_\_\_

Name of water well: \_\_\_\_\_

	FLAWLESS	MINOR DEFECTS	DEFECTS
<b>FUNCTIONAL INSPECTIONS</b>			
Screen pipes, sounding pipes in gravel pack (camera inspection)	.....	.....	.....
Discharge equipment (Deposits in pump inlet, sieve OK or damaged, tightness of riser, pump capacity)	.....	.....	.....
<b>PRODUCTION DATA</b>			
Water level in the well (Measurability in sighting hole? Closure of openings in well head OK?)	.....	.....	.....
Power consumption of pump (Display OK?)	.....	.....	.....
Flow rate (Display OK?)	.....	.....	.....
Operating pressure (Manometer display OK?)	.....	.....	.....
Operating hours of pump (Reading?)	.....	.....	.....
Water quality (Current analysis available?)	.....	.....	.....
<b>WELL SITE</b>			
Accessibility of site (Waste to be removed?)	.....	.....	.....
Vegetation, surface condition, erosion, settling	.....	.....	.....
Fixtures, bandings, underground construction existing?	.....	.....	.....
Condition of well enclosure	.....	.....	.....
Shaft cover	.....	.....	.....
Sealing of shaft cover	.....	.....	.....
Closure of shaft cover	.....	.....	.....
Fence system	.....	.....	.....
<b>WELL ENCLOSURE</b>			
Shaft cover springs and rubber seals	.....	.....	.....
Shaft cover insulation/inner seals	.....	.....	.....
Screw fittings on shaft cover	.....	.....	.....
Shaft ceiling	.....	.....	.....
Joints shaft bottom - walls	.....	.....	.....
Joints shaft ceiling - walls	.....	.....	.....

## 2.2.2 Inspection and maintenance check list (2)

(Houben & Treskatis 2020)

	FLAWLESS	MINOR DEFECTS	DEFECTS
Entry protection			
Entry ladder	.....	.....	.....
Mounting of entry ladder	.....	.....	.....
Condition of shaft bottom/walls (Humidity, cracks)	.....	.....	.....
Cleanliness/condensation/ rain water penetration	.....	.....	.....
Grid of pump sump	.....	.....	.....
Function of dewatering pump	.....	.....	.....
Burglar alarm	.....	.....	.....
Ventilation pipes/insect screen	.....	.....	.....
<b>WELL HEAD AND FITTINGS</b>			
Well head – external condition	.....	.....	.....
Sealings of well head (bolts, sighting hole)	.....	.....	.....
Pipes (Corrosion, waste water)	.....	.....	.....
Shut-off devices – external condition	.....	.....	.....
Shut-off devices – function, accessibility	.....	.....	.....
Vent valves – external condition	.....	.....	.....
Non-return valves – external condition	.....	.....	.....
Non-return valves – function, accessibility	.....	.....	.....
Flowmeter – readability, functionality	.....	.....	.....
Manometer – external condition	.....	.....	.....
Manometer – readability, functionality	.....	.....	.....
<b>ELECTROTECHNICAL EQUIPMENT</b>			
Connection cable	.....	.....	.....
Switches	.....	.....	.....
Sockets	.....	.....	.....
Electric switchboard – external condition	.....	.....	.....
Electric switchboard – switches	.....	.....	.....
Electric switchboard – contacts	.....	.....	.....
Electric switchboard – sealings	.....	.....	.....
Electric switchboard – closure	.....	.....	.....
Electric switchboard – wiring	.....	.....	.....
Heating/dehumidifier – external condition	.....	.....	.....
Heating/dehumidifier – function	.....	.....	.....

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