

PERFORMANCE INCREASE OF 560 % ON WELLS WITH OBO RESIN PRESSED WOOD

The High-Pressure Impulse Process (**HPI-Process®**) with high pressure water is used for the rehabilitation and development of wells. Two pairs of nozzles rotate in two planes by means of water recoil and thus generate deep pressure waves. The deposits loosened here are pumped out of the well simultaneously.



Figure 1: HPI-rehabilitation in Aichhalden

Rehabilitation of Deep Well 1 of the municipal Aichhalden in August 2019

Deep Well 1 of the municipal Aichhalden in Baden-Württemberg was built in 1962 and consists of so-called OBO synthetic resin pressed wood pipes with a nominal diameter of DN 350, with a depth of approx. 98 m below ground level. The filter sections are located in the areas 24 - 40, 45 - 55, 62 - 89 and 94 - 96 m below ground level. The camera inspection before rehabilitation showed filter slots partly or completely closed by iron and subordinate manganese (hydric) oxide.

2 l/s pump test in 1962 showed that the water level dropped by 33 m to 42 m below ground level over a period of 27 hours. This corresponds to a specific capacity of 0.061 l/s per meter of lowering. The 3-hour short-pump test before rehabilitation in 2019 showed a similar value of 0.065 l/s per meter of lowering with decreasing tendency.

Through the subsequent 8-hour HPI-rehabilitation with high-pressure water, a total of almost 1,700 L of deposits were loosened and discharged. The well was treated in three sections, the withdrawal rate was successively increased from 4.5 l/s to up to 7 l/s.

In order to measure the increase in performance due to the rehabilitation, a further 3-hour short pumping test with a withdrawal rate of 2 l/s followed, during which a subsidence of only 4.64 m (previously 30.72 m) occurred during quasi-detention. The specific yield of the well could thus be increased by a very remarkable 563 % to 0.431 l/s per meter of drawdown. The drawdown was reduced by more than 26 m. In comparison to the new construction, the performance was increased by approx. 600 %.

This is all the more remarkable, since the only previous rehabilitation (1997) using pistons, high-pressure internal flushing and HPI with gas had only approximately restored the new state according to the pumping test.

Even with the rehabilitation of very old wells with less resistant filter screen materials, extreme increases in performance can be achieved, even compared to the new construction. For this purpose, it is absolutely necessary to dissolve already hardened deposits from the filter gravel and parts of the existing soil material by means of a dosed impulse injection using **HPI** with high pressure water.

l/s	specific capacity before rehabilitation, 3h (l/s/m)	Spec. capacity after rehabilitation, 3h(l/s/m)	Performance increase through regeneration
2	0,065	0,431	+563%
	specif. capacity 1962, 27h (l/s/m)		Performance towards 1962
2	0,061	0,431	+ 607%
	lowering before rehab., 3h	lowering after rehab., 3h	lowering
2	30,72	4,64	26,08m lower

Figure 3: Results of the **HPI-Process®** - rehabilitation compared to 1962