

Eufor Inter SPRL
Am Hertogenwald 7
4700 EUPEN
BELGIUM

Your ref: B-2017/112
Berson order no. 18100211

May 23, 2017

Dear Mr Wathelet,

With reference to your order, we herewith confirm that the Ultraviolet System Berson InLine 450+ USEPA with serial no. 2018.104.1 has been designed and manufactured to meet the requirements of the 2006 United States Environmental Protection Agency (USEPA) UV Disinfection Guidance Manual (UVDGM). Please find attached the letter from Carollo Engineers, dated May 20, 2009, which lists the Berson InLine systems that have been validated in accordance with the 2006 USEPA UVDGM.

Berson confirms that this system will deliver a validated reduction equivalent dose (RED) of 22 mJ/cm², at a maximum flow of 65 m³/hr and a minimum UV transmittance of 90%. At this RED, a log 4 inactivation of Giardia cysts will be achieved.

Yours sincerely,

Berson Milieutechniek B.V.



Paul Buijs
Managing Director

May 20, 2009

Mr. Andrew Clark
Berson UV-techniek
De Huufkes 23
5674 TL Nuenen
The Netherlands

Subject: Portland UV Validation – InLine Series Reactors

Dear Mr. Clark:

Carollo Engineers has completed validation testing of the InLine+ Series of reactors at the Portland UV Validation test facility and is analyzing the data and preparing the final report. The validation was conducted in accordance with the 2006 USEPA UV Disinfection Guidance Manual (UVDGM).

The InLine+ reactors were validated over a three-dimensional matrix of UV transmittance, flow, and reduction equivalent dose (RED), using MS2 and T1 phage as test microbes. The measured data was used to derive UV dose monitoring equations that predict MS2 and T1 REDs as a function of flow, UVT, UV sensor readings, and microbe UV sensitivity. Table 1 presents the range of flow, UVT and RED tested with each InLine+ reactor.

Table 1: Summary of Inline + Series Validation

Model	Test Microbe	Flow [MGD]		UVT [%]		RED (mJ/cm ²)	
		Min	Max	Min	Max	Min	Max
IL 450+	MS2	0.09	2.40	64.54	98.31	4.08	113.48
IL 450+	T1	0.23	2.36	64.93	94.64	4.62	25.17
IL 1000+	MS2	0.10	2.50	49.65	98.12	9.59	122.01
IL 1000+	T1	0.21	2.50	50.02	89.92	6.96	22.98
IL 4000+	MS2	0.10	7.32	64.65	97.95	17.83	129.59
IL 4000+	T1	0.30	7.37	64.79	94.04	4.48	24.46
IL 4500+	MS2	0.09	7.27	49.66	98.83	10.25	126.25
IL 4500+	T1	0.16	7.29	49.88	80.03	6.67	19.78
IL 12000+	MS2	0.46	14.00	64.90	97.95	9.23	131.17
IL 12000+	T1	1.42	14.08	65.13	88.23	6.25	24.44
IL 14000+	MS2	0.79	14.04	65.07	98.91	8.06	175.65
IL 14000+	T1	3.01	14.01	64.28	87.89	7.2	21.63

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Mr. Andrew Clark
Berson UV-techniek
May 20, 2009
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For specific details of the test conditions and design limitations, please refer to the full validation report.

Respectfully submitted,

CAROLLO ENGINEERS, P.C.



Harold Wright
Associate

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