folkehelseinstituttet

BWT Wassertechnik GmbH
Industriestrasse 7
D-69198 Schriesheim
Germany

Your ref:
Our ref: 521.1, 03/2355-
Date: February 17, 2003

APPROVAL OF BEWADES N UV UNITS

Reference are made to:
- Your application for type approval, dated 29th october 2002
- Our e-mail dated 16. January 2003
- Your answer to our e-mail dated 16. January 2003.

1. Introduction

The application for type approval includes Bewades models in the N-series.

We expect that the UV units are built according to the drawings and that the monitoring and control of the UV units have the intended function, and are in accordance with ÖNORM M 5873-1. Therefore there is no need for us to do any inspection of your units. Our requirements for control/monitoring equipment and maintenance are included in this approval.

This approval only includes UV units with capacities intended for water works supplying more than 50 persons.

2. Approval

Type approval according to ÖNORM M 5873-1 is given for Bewades model 240W80/27 N, 320W80/35 N, , 300W100/27 N, 400W100/35 N, 500W100/40 N, 600W100/40 N, 800W100/50 N, 1000W100/50 N and 1200W100/50 N, 80W80/11N, 100W100/11 N, produced by BWT Wassertechnik GmbH. The approval is only valid when UV lamps specified in your application is used (Philips TUV 55W HO(G55 T8) for 80W models and Philips TUV 75W HO (G75 T8) for the 100W models).

2.1
Materials in the UV units that will be in contact with the water must not cause any health hazards.

2.2
The water must receive a UV dose (Reduction Equivalent Fluence Rate) of minimum 40 mWs/cm^2 (40 mJ/cm^2) at a wave length of 253,7 nm.

2.3
Bypass will not be accepted.

2.4
The maximum capacities for the different units are given for different UV transmission/absorbance values. The UV transmission values are given at 254 nm, measured in a 5 cm cuvette. The dimensioning of UV systems must take into account the lowest UV transmission measured.

Maximum capacities (in m^3/h) for the UV unit versus UV transmission/absorbance are given in the table below. The approved maximum capacities is dependent on the maximum temperature difference observed (ΔT), between the minimum and the maximum temperature observed in the incoming water.

Table 1. The capasities are in accordance with ÖVGW-Zertifikat, , dated April 10 and 17, 1997.

T50 (%)		**82.5**	**80**	**70**	**60**	**50**	**40**	**34.6**	
T100 (%)		**68**	**64**	**49**	**36**	**25**	**16**	**12**	
Unit	**ΔT**								
240W80/27N	**5**	**18.8**	**17.9**	**14.3**	**11.1**	**8.5**	**6.3**	**5.4**	
	15	**17.8**	**16.9**	**13.5**	**10.5**	**8.0**	**6.0**	**5.1**	**m^3/h**
	30	**16.2**	**15.4**	**12.3**	**9.6**	**7.3**	**5.5**	**4.6**	
300W100/27N	**5**	**34.5**	**32.8**	**26.4**	**20.9**	**16.3**	**12.5**	**10.8**	
	15	**32.6**	**31.0**	**25.0**	**19.8**	**15.4**	**11.8**	**10.2**	
	30	**29.8**	**28.3**	**22.8**	**18.1**	**14.1**	**10.8**	**9.3**	
320W80/35N	**5**	**29.7**	**28.1**	**22.2**	**17.1**	**12.7**	**9.2**	**7.6**	
	15	**28.1**	**26.6**	**21.0**	**16.1**	**12.0**	**8.7**	**7.2**	
	30	**25.6**	**24.3**	**19.2**	**14.7**	**11.0**	**7.9**	**6.6**	
400W80/35N	**5**	**39.7**	**37.7**	**30.2**	**23.7**	**18.2**	**13.7**	**11.7**	
	15	**37.6**	**35.7**	**28.6**	**22.4**	**17.2**	**12.9**	**11.0**	
	30	**34.3**	**32.6**	**26.1**	**20.5**	**15.7**	**11.8**	**10.1**	
400W100/35N	**5**	**48.2**	**45.6**	**36.0**	**27.6**	**20.5**	**14.8**	**12.2**	
	15	**45.6**	**43.1**	**34.0**	**26.1**	**19.4**	**14.0**	**11.5**	
	30	**41.6**	**39.4**	**31.1**	**23.8**	**17.7**	**12.7**	**10.5**	

T50 (%)		**82.5**	**80**	**70**	**60**	**50**	**40**	**34.6**	
T100 (%)		**68**	**64**	**49**	**36**	**25**	**16**	**12**	
Unit	**ΔT**								
500W100/40N	**5**	**67.0**	**64.1**	**51.2**	**40.1**	**30.6**	**22.9**	**19.4**	
	15	**64.0**	**60.6**	**48.4**	**37.9**	**28.9**	**21.6**	**18.4**	
500W100/40N	30	**58.5**	**55.3**	**44.2**	**34.6**	**26.4**	**19.7**	**16.8**	
600W100/40N	5	**76.3**	**72.2**	**56.8**	**43.4**	**32.1**	**22.8**	**18.7**	
	15	**72.1**	**68.2**	**53.6**	**41.0**	**30.3**	**21.5**	**17.6**	
	30	**65.8**	**62.2**	**48.9**	**37.4**	**27.6**	**19.6**	**16.1**	
800W100/50N	5	**116.1**	**109.4**	**84.5**	**62.9**	**44.7**	**29.7**	**23.1**	
	15	**109.8**	**103.5**	**79.9**	**59.5**	**42.3**	**28.1**	**21.8**	
	30	**100.0**	**94.3**	**72.8**	**54.2**	**38.5**	**25.6**	**19.9**	
1000W100/50N	5	**146.0**	**137.8**	**106.9**	**80.1**	**57.4**	**38.9**	**30.6**	
	15	**138.2**	**130.4**	**101.2**	**75.8**	**54.4**	**36.8**	**29.0**	
	30	**126.2**	**119.0**	**92.3**	**69.2**	**49.6**	**33.6**	**26.5**	
1200W100/50N	5	**161.4**	**153.0**	**121.5**	**94.2**	**71.1**	**52.2**	**45,9***	
	15	**152.9**	**145.0**	**115.1**	**89.2**	**67.4**	**49.4**	**43.5***	
	30	**139.9**	**132.6**	**105.3**	**81.6**	**61.6**	**45.2**	**39.8***	
80W80/11N	5	-	**4.2****	**3.7**	**3.2**	**2.7**	**2.4**	**2.2**	
	15	-	**4.0****	**3.5**	**3.0**	**2.6**	**2.2**	**2.1**	
	30	-	**3.7****	**3.2**	**2.8**	**2.4**	**2.1**	**1.9**	
100W100/11N	5	-	**6.8****	**6.0**	**5.3**	**4.7**	**4.1**	**3.9**	
	15	-	**6.4****	**5.7**	**5.0**	**4.4**	**3.9**	**3.7**	
	30	-	**5.9****	**5.2**	**4.6**	**4.0**	**3.6**	**3.4**	

* T100 = 13%; **T100 = 62%

2.5

All units must have an intensity meter to measure UV intensity. The intensity meter must have an indication of a minimum acceptable value related to the maximum capacity of the UV unit. In addition, all units must have an indicator lamp for each UV lamp. A UV sensor measuring the UV intensity in each UV chamber should preferably be located in the part of the chamber with lowest intensity. This facilitates the transmission of the signals/connections between the sensor, intensity meter, shut-down valve and water quality. **The sensor must be specific for UV-irradiation with wavelength around 254 nm, and must be checked and calibrated against a reference sensor, or repaced if necessary, once a year. The sensor calibration must be done in accordance with guidelines given by the manufacturer or the supplier.**

2.6

All systems must have an automatic shutdown valve, which stops the water flow if the UV dose requirements is not met.

2.7
The UV lamps for the Bewades N-models must be replaced every 8 000 hours. Therefore, registration of lamp life must be included.

2.8
The irradiation chamber, including quartz sleeve and sensor must be cleaned when needed, at least four times a year. The need for cleaning is dependent on the water quality.

2.9
An instruction manual, in Norwegian, for operation, control and maintenance must be included with every UV unit.

2.10
Essential spare parts including UV lamps, relay for UV lamps, fuses and quartz sleeves with seals must follow every UV unit by delivery.

2.11
It is the supplier's responsibility that the UV units are installed in accordance with the instructions in this approval.

3. Conclusion
This type approval is in accordance with the Norwegian drinking water regulations, adopted January 1th 2002. The capacities given in this type approval is based on tests performed by Institut für Medizinische Physik Veterinärmedizinische Universität Wien, in accordance with the Austrian ÖNORM M 5873 (Vornorm vom 1.2.1996).

Yours sincerely,

Truls Krogh
Department director

Vidar Lund
Scientist