NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH
ON-SITE WASTEWATER SECTION

INNOVATIVE WASTEWATER SYSTEM APPROVAL

INNOVATIVE WASTEWATER SYSTEM NO: IWWS-95-4 R2

ISSUED TO:	Cultec, Inc. 878 Federal Road Brookfield, CT	
FOR:	Contactor Models EZ-24 (new), 75, 100 and 125 and Field Drain Panels (C-1 through C-4) chambered disposal system	
APPROVAL DATES:	December 1, 1995	(Contractor Model 100 Approved)
	June 25, 1998	(Contractor - Models 75, 125 and Field Drain Panels Approved)
	April 5, 1999	(Contractor Model EZ-24 Approved)

In accordance with 15A NCAC 18A.1969, an application by Cultec, Inc. of Brookfield CT for approval of the chamber (gravel-less) nitrification trench system has been reviewed, and the Contactor Models EZ-24, 75, 100, and 125 and Field Drain Panel chamber systems have been found to meet the standards of an innovative system when all of the conditions are met:

I. PERMITTING

Prior to the installation of the Contactor Models EZ-24, 75, 100 and 125 or Field Drain Panel system at a site for which application is being made for an Improvement Permit or Construction Authorization or at a site for which an Improvement Permit or Construction Permit or Construction Authorization has been previously issued for a system described in 15A NCAC 18A. 1955, .1956, or .1957, the owner or owner's legal representative shall notify the local health department. The local health department shall issue a Construction Authorization or amend the previously issued Improvement Permit or Construction Authorization allowing for the use of the proposed innovative system upon a finding that all provisions of this approval and all other applicable rules shall be met. Use of the proposed innovative system and any conditions shall be described in the Construction Authorization or amended Construction Authorization, as applicable. Such information shall also be described on the Operation Permit to be issued upon the acceptable completion of the system installation. This approval shall apply only to the specified products and any changes or alterations to the specified product shall void this approval.

II. SYSTEM DESCRIPTION

a. Minimum pretreatment by septic tank as required in 15A NCAC 18A. 1952.

b. The Cultec Contactor and Field Drain Panel chamber systems are arched, ribbed, open-bottomed, thermoformed high density polyethylene chambers with a minimal wall thickness of 0.25 inches. The Cultec Contactor Models EZ-24, 75, 100, 125, and Field Drain Panel Chamber systems and geotextile fabric shall meet or exceed the material specifications shown in Table I and Table II below.

TABLE I
CULTEC POLYETHYLENE CHAMBER SYSTEM
MATERIAL SPECIFICATIONS

Physical Property	Test Method	Value	Unit
Density	**ASTM D -1505**	**.949**	**g/cc**
Tensile Modulus	**ASTM D - 638**	**120,000**	**psi**
Tensile Strength @ Yield	**ASTM D - 638**	**3,600**	**psi**
Flexural Modulus	**ASTM D - 790**	**165,000**	**psi**
Tensile Impact	**ASTM D - 1822**	**170**	**FT - lbs/in^2**

TABLE II
CULTEC No. 410 GEOTEXTILE FABRIC
(Mirafi 140 N or equivalent)

Properties	Test Method	Minimum Values
Weight	**ASTM D - 3776**	**3.5 oz./yd^2**
Permeability	**ASTM D - 4491**	**0.2 cm/sec**
Flow Rate	**ASTM D - 4491**	**135 gpm/ft^2**
Opening Size	**ASTM D - 4751**	**US Sieve No. 70**
Grab Tensile Strength	**ASTM D - 4632**	**90 lbs**
Mullen Burst	**ASTM D - 3786**	**225 psi**
Puncture	**ASTM D - 4833**	**65 lbs.**
Trapezoidal Tear	**ASTM D - 4533**	**45 lbs.**
UV Resistance	**ASTM D - 4355**	**70%**

c. The Cultec Contactor Chamber and the Field Drain Panel have the dimensions

shown in Table III.

TABLE III
CULTEC CHAMBER DIMENSIONS

CONTACTOR CHAMBER					
Model	**Length Overall (ft)**	**Height (in)**	**Bottom Width (in)**	**Average Open Bottom Width (in)**	**Invert[1] Height (in)**
Contactor EZ-24	**8.0**	**12.0**	**16**	**14**	**6.0**
Contactor 75	**7.2**	**12.5**	**30**	**26**	**6.0**
Contactor 100	**7.5**	**12.5**	**36**	**31.5**	**6.0**
Contactor 125	**7.5**	**18.0**	**30**	**26**	**12.0**
FIELD DRAIN PANEL (FDP)					
FDP C-1	**8.5**	**8.5**	**12**	**10**	**3.0**
FDP C-2	**8.5**	**8.5**	**24**	**20**	**3.0**
FDP C-3	**8.5**	**8.5**	**36**	**30**	**3.0**
FDP C-4[2]	**8.5**	**8.5**	**48**	**40**	**3.0**

[1] Invert height is for a 4 in. diam. sch. 40 PVC pipe.
[2] FDP C-4 shall only be used in bed-type nitrification systems.

d. The Cultec Contactor and FDP chamber systems are designed to overlap ribs that interlock with the downstream chamber forming a complete nitrification trench that consists of a starter unit with effluent dispersion located below the inlet on the trench bottom and a solid end plate to be located at the distal end of any chamber nitrification line. The chamber assembly is covered with a manufacturer required geotextile fabric (Cultec 410).

III. SITING CRITERIA

The Contactor Models EZ-24, 75, 100, 125 and Field Drain Panels chambered assembly may be utilized on sites which meet the following criteria:

a. Sites which are classified Suitable or Provisionally Suitable for a conventional nitrification field system in accordance with 15A NCAC 18A. 1948(a) or (b).

b. Sites which have been classified as Provisionally Suitable in accordance with 15A NCAC 18A.1956(1),(2),(4),(5), and (6).

c. Sites which meet the criteria for new or existing fill in accordance with 15A NCAC 18A.1957(b).

d. The required vertical separation shall be measured from the bottom edge of the chamber.

IV. CULTEC SYSTEM SIZING

a. The maximum long-term acceptance rate (LTAR) shall be as follows:

		LTAR (gpd/ft²)	
		Natural Soil	**Saprolite***
Group I	Sands	0.8 - 1.0	0.5 - 0.8
Group II	Coarse Loams	0.6 - 0.8	0.1 - 0.6
Group III	Fine Loams	0.3 - 0.6	--
Group IV	Clays	0.1 - 0.4	--

*See 15A NCAC 18A .1957(6) for specific sizing requirements

b. The LTAR shall be based on the most hydraulically limiting naturally occurring soil horizon within three feet of the ground surface or to a depth of one foot below trench bottom, whichever is deeper.

c. To determine the total trench bottom area (ft ²) required, the design daily sewage flow shall be divided by the applicable long-term acceptance rate (gpd/ft ²) shown in (a) above. The selected Cultec chamber system shall be sized in accordance with Table IV below.

TABLE IV
MINIMUM SIZING REQUIREMENTS
CULTEC CHAMBER SYSYEM

Model	Effective Open Bottom Width (Ft^2/Ft)	Design[2] Width (ft)	Lay Up[3] Length (ft)	Units per 100 ft
Contractor EZ-24	**1.33**	**2.0**	**8.00**	**13**
Contactor 75	**2.17**	**3.5**	**6.25**	**15**
Contactor 100	**2.6**	**4.0**	**6.50**	**15**
Contactor 125	**2.17**	**3.5**	**6.25**	**15**
FIELD DRAIN PANEL (FDP)				

FDP C-1	**0.83**	**1.0**	**8.0**	**12.5**
FDP C-2	**1.66**	**2.0**	**8.0**	**12.5**
FDP C-3	**2.49**	**3.0**	**8.0**	**12.5**
FDP C-4[1]	**3.32**	**4.0**	**8.0**	**12.5**

[1] **The Field Drain Panel C-4 may only be installed in Bed-Type Nitrification Fields in accordance with 15A NCAC 18A .1955(d) except that the FDP system is installed from excavation sidewall to sidewall.**

[2] **The "Design Width" shall be used for the selected Cultec model to determine the length of the disposal system.**

[3] **The "Lay Up Length" is the length of the chambers minus the required overlap and shall be used to determine the number of units required.**

No reduction in area is allowed for chamber systems installed in bed or fill systems or chamber systems receiving non-domestic wastewater including food service facilities, meat markets, and other facilities that typically discharge wastewater with a higher strength than domestic sewage.

EXAMPLE:

Assume: Three bedroom residence with a design daily sewage flow of 360 gallons on a sandy clay loam (Group III) soil.

Then: Total computed trench bottom area is:
360 gpd/0.5 LTAR = 720 ft²

Select Cultec Model and corresponding "design width" from Table IV above.

The required linear footage of the Contactor Model 100 chamber is: 720 ft² /4.0 ft. = 180 linear ft.
(Where 4.0 ft. is the equivalency factor for the standard unit Contactor Model 100 chamber system.)

The required linear footage of the Contactor Model 75 and 125 chamber is: 720 ft² /3.5 ft. = 206 linear ft.
(Where 3.5 ft. is the equivalency factor for the Contactor Model 75 and 125 chamber system.)

d. To determine the minimum number of Cultec Contactor or FDP chamber units required in a nitrification trench, divide the linear footage by the "Lay Up Length" from Table IV and round to the nearest whole number.

EXAMPLE:

180 L.F (Contactor Model 100)/6.5 ft. per unit = 28 units
206 L.F (Contactor Model 75 or 125)/6.25 ft per unit = 33 units

e. The minimum area (without reduction or equivalency factor) for a bed system shall be determined as required in 15A NCAC 18A.1955(d) except that the Cultec Contactor EZ-24, 75, 100, 125 or Field Drain Panel chambers shall be placed in rows or panels next to each other.

f. The available space requirements of 15A NCAC 18A.1945 shall apply. Also this approved innovative system may be designated as the required replacement system.

V. CONSTRUCTION AND INSTALLATION CRITERIA

a. The Cultec Contactor Models EZ-24, 75, 100, 125 and FDP chamber system shall be a constructed in accordance with Table V below.

TABLE V

CULTEC CHAMBER SYSYEM INSTALLATION REQUIREMENTS

Model	Excavation Width (in)	Minimum[1] Trench Spacing (Ft^2 OC)	Minimum[2] Soil Cover (in)	Required[3] Fabric Width (ft)
Contractor EZ-24	**18**	**6.0**	**6.0**	**2.5**
Contactor 75	**30-32**	**7.5**	**6.0**	**3.5**
Contactor 100	**36-40**	**9.0**	**6.0**	**4.0**
Contactor 125	**30-32**	**7.5**	**6.0**	**4.0**
FIELD DRAIN PANEL (FDP)				
FDP C-1	**12-14**	**5.0**	**6.0**	**2.0**
FDP C-2	**24-28**	**6.0**	**6.0**	**4.0**
FDP C-3	**36-40**	**9.0**	**6.0**	**2.0 x 2**
FDP C-4[1]	**48+**	**Bed System**	**6.0**	**2.0 x 2**

[1] **The minimum trench center to center spacing must be increased on non-linear slopes.**

[2] **The minimum soil cover assumes no traffic over the chambers during or after installation other than normal lawn maintenance with light weight equipment. No vehicular traffic.**

[3] **The fabric covers the sides and top of the chambers except the fabric covers only the outside panels of the Field Drain Panel System C-3 and C-4.**

b. The inlet to the Cultec Contactor or FDP chamber shall be in the uppermost portion of the specially prepared inlet panel with effluent dispersion below the inlet utilizing the Cultec Splash Deflector or equivalent.

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c. The Cultec No 410 geotextile fabric of the minimum width shown on Table V shall be used and installed in accordance with the manufacturer's specifications.

d. Clean Group I, II, or III soil backfill (soil normally found in the upper 10 inches of the trench excavation) shall be placed along the chamber sidewall area to a minimum compacted (walked in) height of 6 inches above the trench bottom with the approved filter fabric in place. Additional backfill (Group I, II, III, or IV) shall be placed to a minimum compacted height of 6 inches above the chamber. No equipment shall travel over the chamber system. It is critical to note that the Cultec chamber systems have various heights and inlet inverts as shown on Table III and that the design and installation shall be adjusted to meet the siting and construction requirements.

e. Individual chamber trenches shall be constructed level in all directions (both across and along the trench bottom) and shall follow the contour of the ground surface elevation at a uniform depth with continuous interlocking chambers without any dams, stepdowns, or other water stops.

f. The Cultec Contactor Model EZ-24, 75, 100, 125, FDP C-1, C-2 and C-3 chamber system installed on a sloping site may use distribution devices or stepdowns as described in 15A NCAC 18A.1955(j) and (l) when it is necessary to change level nitrification line segments from upper to lower elevations.

g. Manufacturer's installation instructions for the Cultec Contactor and FDP chamber system used in septic tank systems shall be followed except as required herein or 15A NCAC 18A.1900 et.seq.

h. The system shall be installed by a contractor trained and authorized by Cultec, Inc. Cultec, Inc. shall provide the authorized installer appropriate documentation and provide this office with a directory of authorized installers including the name, address and telephone number of the installer and a list of counties where services are provided.

VI. OPERATION AND MAINTENANCE REQUIREMENTS

The Contactor Model EZ-24, 75, 100, 125, and Field Drain Panel gravity feed chamber system shall have a minimum classification as a Type III g. System (other non-conventional trench systems) in accordance with Table V9a) of 15A NCAC 18A.1961(b).

VII. REPAIR OF SYSTEMS

The provisions of 15A NCAC 18A.1961(c) shall apply to the use of the Contact Model 75 or 100

chamber system for repairs to existing malfunctioning septic tank systems.

2nd Revision Approved by: :_____ Date: 4-5-99