PELHAM BAY LANDFILL
BRONX, NEW YORK

Operation and Maintenance Manual
Volume IIa

Prepared for:

City of New York
Department of Environmental Protection

WCC Project No. 92C4087

November 1996

Prepared by:

Woodward-Clyde Consultants, Inc.
363 Seventh Avenue, 11th Floor
New York, New York 10001

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PELHAM BAY LANDFILL
OPERATION & MAINTENANCE MANUAL
VOLUME I

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QUALITY CONTROL PLAN FOR PELHAM BAY LANDFILL CLOSURE BRECO MECHANICAL GROUP, INC. 201 SAW MILL RIVER ROAD YONKERS, NEW YORK 10701	

PELHAM BAY LANDFILL
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2.1 E

Tensar

The Tensar Corporation

1210 Citizens Parkway
Morrow, Georgia 30260
(404) 968-3255

UX 1500 HT Geogrid

JULY 15, 1994

BARBELLA ENVIRONMENTAL
TECHNOLOGY

WHITEHOUSE, NJ 08888

REFERENCE: TENSAR ORDER NUMBER: 400669
PURCHASE ORDER NUMBER: 01
BILL OF LADING NUMBER: 07659

SOLD TO: BARBELLA ENVIRONMENTAL
TECHNOLOGY
PO BOX 273

WHITEHOUSE, NJ 08888

SHIP TO: BARBELLA ENVIRONMENTAL
PELLHAM BAY LANDFILL
3599 BRUCKNER BLVD
SEE DIRECTIONS
BRONX, NY 10464

This is to certify that TENSAR UX150095 geogrid as manufactured by the Tensar Corporation, meets the characteristics and properties per the attached specification sheet. Actual lot number(s) shipped are as indicated:

LOT NUMBER	NO. ROLLS	TENSILE MODULUS (lb/ft)	ULTIMATE TENSILES (lb/ft)	% CR
1-3970	7	106,450	7423.4	2.40
1-3973	9	112,276	7423.4	2.70
1-3974	45	113,236	7567.3	2.60
1-3975	9	110,357	7389.1	2.60

Sincerely,

Ron Humpolick
Manager of Continuous Improvement
and Quality Control

Bill Wright
Notary Public, Clayton County, Georgia
My Commission Expires May 10, 1998

Tensar

The Tensar Corporation

1210 Citizens Parkway
Morrow, Georgia 30260
Tel: (404) 968-3255

SHIP DATE: July 14, 1994

SOLD TO: Barbella Environmental

SHIP TO: Pellham Bay Landfill

BILL OF LADING: 07659

PRODUCT CODE: UX150095

LOT NO.	ROLL NO.			QUANTITY
-				
-				
1-3970-	38+43	45		7
-				
1-3973-	116+124			9
-				
1-3974-	35-43	44+52	62+70	45
-	71-79	89+97		
-				
1-3975-	04+12			9
-				
-				
-				
-				
-				
-				
-				
-				
-				
-				
-				70

UNIAXIAL GEOGRID UX1500HT

The geogrid shall be a regular grid structure formed by uniaxially drawing a continuous sheet of select high density polyethylene material and shall have aperture geometry and rib and junction cross-sections sufficient to permit significant mechanical interlock with the material being reinforced. The geogrid shall have high flexural rigidity and high tensile modulus in relation to the material being reinforced and shall also have high continuity of tensile strength through all ribs and junctions of the grid structure. The geogrid shall have high resistance to deformation under sustained long term design load while in service and shall also be resistant to ultraviolet degradation, to damage under normal construction practices and to all forms of biological or chemical degradation normally encountered in the material being reinforced.

The geogrid shall also conform in all respects to the property requirements listed below.

PROPERTY	TEST METHOD	UNITS	VALUE
Interlock			
• open area	COE Method[1]	%	60 (nom)
Reinforcement			
• creep limited strength[6]	GRI GG3-87[2] or (ASTM D5262)	lb/ft	2,700 (min)
• flexural rigidity	ASTM D1388-64[3]	mg-cm	4,700,000 (min)
• tensile modulus-MD	GRI GG1-87[4]	lb/ft	100,000 (min)
• junctions	GRI GG2-87[5]		
- strength		lb/ft	5,000 (min)
- efficiency		%	90 (min)
Material			
• high density polyethylene	ASTM D 1248 Type III/Class A/Grade 5	%	97 (min)
• carbon black	ASTM 4218	%	2.0 (min)
Dimensions			
• roll length		ft	150
• roll width		ft	4.3
• roll weight		lb	84

Notes:

1. Percent open area measured without magnification by Corps of Engineers Method as specified in CWO2215 Civil Works Construction Guide, November 1977.
2. Long term load capacity measured by through the junction tensile creep testing to 10,000 hours as described in Geosynthetic Research Institute test method GG3-87 "Creep Behavior and Long Term Design Load of Geogrids".
3. ASTM D 1388-64 modified to account for wide specimen testing as described in Tensar test method TTM-5.0 "Stiffness of Geosynthetics".
4. Secant modulus at 2% elongation measured by Geosynthetic Research Institute test method GG1-87 "Geogrid Tensile Strength". No offset allowances are made in calculating secant modulus.
5. Geogrid junction strength and junction efficiency measured by Geosynthetic Research Institute test method GG2-87 "Geogrid Junction Strength".
6. The long-term allowable design strength (LTADS) is determined using the method outlined in GRI-GG4 "Determination of the Long Term Design Strength of Stiff Geogrids." The GRI-GG4 method applies various partial factors of safety to account for construction damage, junction strength, connections, chemical and biological degradation.

The Tensar Corporation
1210 Citizens Parkway
Morrow, GA 30260
1-800-845-4453

Product Name	Manufacturing process	Coating Type	Polymer Type[1]	Dimensional Properties: Mass/Unit Area ASTM D 5261-92 g/m² (oz/yd²)	Dimensional Properties: Aperture Size mm (in) MD	Dimensional Properties: Aperture Size mm (in) XD	Wide Width Strip Tensile Strength ASTM D 4595-86 kN/m (lb/ft)/% Strength 5% strain MD	Strength 5% strain XD	Ultimate Strength/% MD	Ultimate Strength/% XD	Long Term Design Strength GRI GG4[2] lb/ft Tallow (in sand)	Manufacturer's Suggested Applications[3]
Tensar Technologies Inc. (cont.)												
BX1300	PSD[A]	NA	PP	247 (7.3)	46 (1.8)	64 (2.5)	11 (740)	17 (1160)	17 (1160)	29 (1970)	NP	B
BX1400 (AR)	PSD[A]	NA	PP	247 (7.3)	46 (1.8)	64 (2.5)	10 (670)	15 (1010)	17 (1150)	25 (1700)	NP	asphalt reinforcement
BX1500	PSD[A]	NA	PP	473 (13.9)	25 (1)	30 (1.2)	17 (1160)	23 (1560)	29 (1990)	39 (2670)	NP	E
BX4100 (SG1)	PSD[A]	NA	PP	184 (5.4)	36 (1.4)	36 (1.4)	10 (660)	12 (850)	13 (900)	16 (1080)	NP	B, E
BX4200 (SG2)	PSD[A][D]	NA	PP	260 (7.7)	36 (1.4)	36 (1.4)	13 (890)	18 (1230)	18 (1250)	23 (1570)	NP	B, E
GC1400 (ARC)	PSD[A]	NA	PP/PET	383 (11.0)	46 (1.8)	64 (2.5)	10 (670)	15 (1000)	17 (1150)	25 (1700)	NP	asphalt reinforcement, waterproofing
UX1000SB	PSD[A]	NA	HDPE	371 (10.9)	NP	NP	18 (1270)	NA	35 (2400)	NA	810	W, S, E
UX1400SB	PSD[A]	NA	HDPE	510 (15.0)	NP	NP	28 (1920)	NA	61 (4170)	NA	1335	W
UX1400HT	PSD[A]	NA	HDPE	434 (12.8)	NP	NP	31 (2150)	NA	65 (4490)	NA	1525	W, S, E, L, V
UX1500SB	PSD[A]	NA	HDPE	835 (24.6)	NP	NP	53 (3640)	NA	95 (6580)	NA	2190	W
UX1500HT	PSD[A]	NA	HDPE	635 (18.7)	NP	NP	56 (3850)	NA	103 7070	NA	2525	W, S, E, L, V
UX1600SB	PSD[A]	NA	HDPE	1134 (33.4)	NP	NP	70 (4820)	NA	125 (8540)	NA	2855	W
UX1600HT	PSD[A]	NA	HDPE	922 (27.2)	NP	NP	76 (5210)	NA	132 (9040)	NA	3285	W, S, E, L, V
UX1700HT	PSD[A]	NA	HDPE	1220 (36.0)	NP	NP	98 (6600)	NA	168 (11500)	NA	4000	W, S, E, L, V

TENSAR UX 1000SB

[1] PET = Polyester
PP = Polypropylene
PE = Polyethylene

[2] $T_{allow} = T_{ult}\left[\frac{1}{FS_{ID} \times FS_{CR} \times FS_{CD} \times FS_{BD} \times FS_{JNT}}\right]$
where
FS_{ID} = partial factor of safety for installation damage
FS_{CR} = partial factor of safety for creep deformation
FS_{CD} = partial factor of safety for chemical degradation
FS_{BD} = partial factor of safety for biological degradation
FS_{JNT} = partial factor of safety for joints

[3] B = Base Reinforcement
W = Walls
S = Slopes
E = Embankments
[A] Punched sheet drawn laminated NDW geotextile
[B] Punched sheet drawn
NP = Data not provided by manufacturer
NA = Manufacturer determined that this data was not applicable to the product or the data was unavailable

UNIAXIAL GEOGRID UX1000SB

The geogrid shall be a regular grid structure formed by uniaxially drawing a continuous sheet of select high density polyethylene material and shall have aperture geometry and rib and junction cross-sections sufficient to permit significant mechanical interlock with the material being reinforced. The geogrid shall have high flexural rigidity and high tensile modulus in relation to the material being reinforced and shall also have high continuity of tensile strength through all ribs and junctions of the grid structure. The geogrid shall have high resistance to deformation under sustained long term design load while in service and shall also be resistant to ultraviolet degradation, to damage under normal construction practices and to all forms of biological or chemical degradation normally encountered in the material being reinforced.

The geogrid shall also conform in all respects to the property requirements listed below.

PROPERTY	TEST METHOD	UNITS	VALUE
Interlock			
• apertures[1]	I.D. Calipered[8]		
- MD		in	5.70 (nom)
- CMD		in	0.66 (nom)
• open area	COE Method[9]	%	60 (nom)
• thickness	ASTMD1777-64		
- ribs		in	0.020 (nom)
- junctions		in	0.080 (nom)
Reinforcement			
• creep limited strength[5]	GRI GG3-87[1] (or ASTM D5262)	lb/ft	850 (min)
• flexural rigidity	ASTM D1388-64[2]	mg-cm	500,000 (min)
• tensile modulus - MD	GRI GG1-87[3]	lb/ft	35,000 (min)
• junctions	GRI GG2-87[4]		
- strength		lb/ft	2,400 (min)
- efficiency		%	90 (min)
Material			
• high density polyethylene Type III/Class A/Grade 5	ASTM D 1248	%	97 (min)
• carbon black	ASTM 4218	%	2.0 (min)
Dimensions			
• roll length		ft	98
• roll width		ft	4.3
• roll weight		lb	32

Notes:

1. Long term load capacity measured by through the junction tensile creep testing to 10,000 hours as described in Geosynthetic Research Institute test method GG3-87 "Creep Behavior and Long Term Design Load of Geogrids".
2. ASTM D 1388-64 modified to account for wide specimen testing as described in Tensar test method TTM-6.0 "Stiffness of Geosynthetics".
3. Secant modulus at 2% elongation measured by Geosynthetic Research Institute test method GG1-87 "Geogrid Tensile Strength". No offset allowances are made in calculating secant modulus.
4. Geogrid junction strength and junction efficiency measured by Geosynthetic Research Institute test method GG2-87 "Geogrid Junction Strength".
5. The long-term allowable design strength (LTADS) is determined using the method outlined in GRI-GG4 "Determination of the Long Term Design Strength of Stiff Geogrids." The GRI-GG4 method applies various partial factors of safety to account for construction damage, junction strength, connections, chemical and biological degradation.

The Tensar Corporation
1210 Citizens Parkway
Morrow, GA 30260
1-800-848-4453

BIAXIAL GEOGRID BX1100 (SS-1)

The geogrid shall be a regular grid structure formed by biaxially drawing a continuous sheet of select polypropylene material and shall have aperture geometry and rib and junction cross-sections sufficient to permit significant mechanical interlock with the material being reinforced. The geogrid shall have high flexural rigidity and high tensile modulus in relation to the material being reinforced and shall also have high continuity of tensile strength through all ribs and junctions of the grid structure. The geogrid shall maintain its reinforcement and interlock capabilities under repeated dynamic loads while in service and shall also be resistant to ultraviolet degradation, to damage under normal construction practices and to all forms of biological or chemical degradation normally encountered in the material being reinforced.

The geogrid shall also conform in all respects to the property requirements listed below.

PROPERTY	TEST METHOD	UNITS	VALUE
Interlock			
• aperture size[1]	I.D. Calipered[2]		
- MD		in	1.0 (nom)
- CMD		in	1.3 (nom)
• open area	COE Method[3]	%	70 (min)
• thickness	ASTM D 1777-64		
- ribs		in	0.03 (nom)
- junctions		in	0.11 (nom)
Reinforcement			
• flexural rigidity	ASTM D1388-64[4]	mg-cm	250,000 (min)
• tensile modulus	GRI GG1-87[5]	lb/ft	14,000 (min)
• junctions	GRI GG2-87[6]		
- strength		lb/ft	765 (min)
- efficiency		%	90 (min)
Material			
• polypropylene	ASTM D 4101 Group 1/Class 1/Grade 2	%	98 (min)
• carbon black	ASTM 4218	%	0.5 (min)
Dimensions			
• roll length		ft	164
• roll width		ft	9.8 & 13.1
• roll weight		lb	71 & 95

Notes:

1. MD dimension is along roll length. CMD dimension is across roll width.
2. Maximum inside dimension in each principal direction measured by calipers.
3. Percent open area measured without magnification by Corps of Engineers method as specified in CW 02215 Civil Works Construction Guide, November 1977.
4. ASTM D 1388-64 modified to account for wide specimen testing as described in Tensar test method TTM-5.0 "Stiffness of Geosynthetics".
5. Secant modulus at 2% elongation measured by Geosynthetic Research Institute test method GG1-87 "Geogrid Tensile Strength". No offset allowances are made in calculating secant modulus.
6. Geogrid junction strength and junction efficiency measured by Geosynthetic Research Institute test method GG2-87 "Geogrid Junction Strength".

02168
2.1 F

MIRAFI® 140N

RECEIVED
JUN 21 1994
MIRAFI 140N GEOTEXTILE

SUBSURFACE DRAINAGE

Drainage Fabric

Good drainage is essential for soil stability. In order for drainage structures to be effective — along highways, in embankments, under airfields and athletic fields, or anywhere — they must have a properly designed protective filter.

Traditionally, graded-aggregate filter systems have been used with limited success to prevent soil particles from migrating into subsurface drainage structures. However, these aggregate drains have several inherent problems, including high cost and difficult installation.

Mirafi **140N**, a nonwoven filter fabric, provides an effective, cost-efficient alternative to graded-aggregate filters. Among its design features are:

- Easily conforms to the ground or trench surface for fast and trouble-free installation;
- Creates a superior filter media because of its high water flow rate and excellent filtration properties;
- Meets severe stresses of installation with its high puncture and burst resistance.

Mirafi **140N** eliminates many of the problems associated with graded-aggregate filters, including:

- Determining the aggregate gradation required to match soil conditions;
- Finding a convenient and economical source of a specific aggregate gradation;
- Transporting and placing a graded aggregate;
- Assuring that the in-place aggregate gradation provides effective filter performance.

An additional benefit of Mirafi **140N** is that the drain size can often be reduced when Mirafi fabric is installed because the thick, graded-aggregate layer is eliminated. As a result, less excavation and less aggregate will be required.

Mirafi 140N Fabric Properties

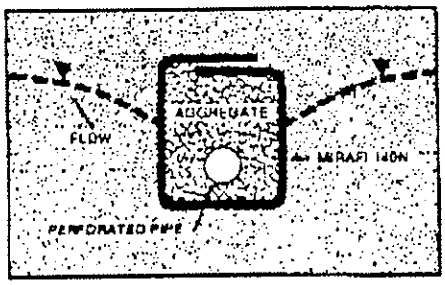
Fabric Property	Unit	Test Method	Typical Values[1]
Grab Tensile Strength	lb	ASTM D-1682-64	120
Grab Tensile Elongation	%	ASTM D-1682-64	55
Burst Strength	psi	ASTM D-3786-80a[2]	210
Trapezoid Tear Strength	lb	ASTM D-1117-80	50
Puncture Strength	lb	ASTM D-3787-80[3]	70
Coefficient of Permeability, k	cm/sec	CFMC GET-2	0.2
Water Flow Rate	gal/min/sf	CFMC GET-2	285

Mirafi 140N Packaging

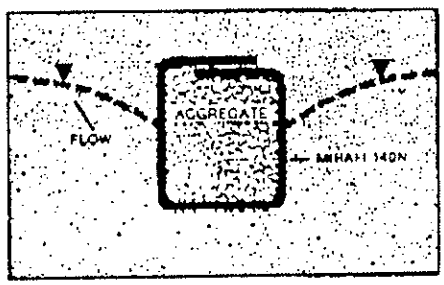
Roll Width (ft.)	Roll Length (ft.)	Roll Wt. (lbs.)
15.0	360	185
12.5	360	175

[1]The values listed are average values. Contact the Mirafi Technical Department for minimum certifiable values.
[2]Diaphragm Bursting Tester.
[3]Tension Testing Machine with ring clamp; steel ball replaced with a 5/16-inch diameter solid steel cylinder centered within the ring clamp.

Type of Fabric Wrapped Drains

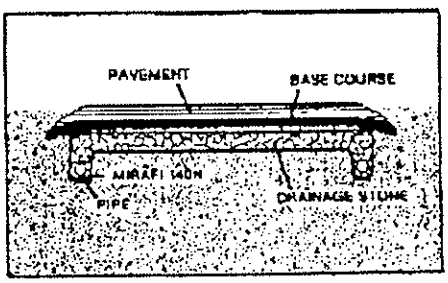


Conventional Drain (with pipe)

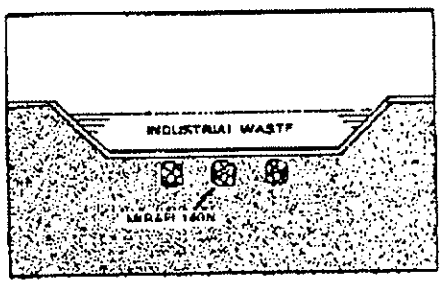


French Drain (without pipe)

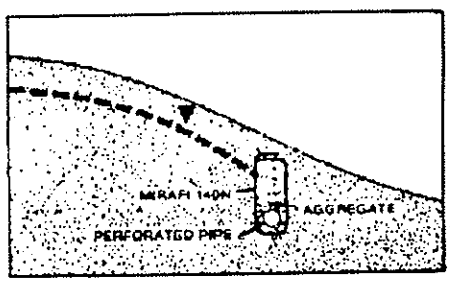
Typical Drain Applications



Blanket Drain & Edge Drain



Pond Underdrain



Interceptor Drain

MIRAFI® INC

A member of the DOMINION TEXTILE group

MIRAFI INC. P.O. BOX 240967/CHARLOTTE, N.C. 28224
(704) 523-7477 or (800) 438-1855/TELEX 216903 MRFI

404 ~ 447 - 6272

Hoechst Celanese

TREVIRA 1150

Product Description
Trevira® Spunbond Type 011/350

Technical Fibers Group
Hoechst Celanese Corporation
Spunbond Business Unit
Post Office Box 5650
Spartanburg, SC 29304-5650
803 579 5007
Toll Free 1 800 845 7597
Fax 803 579 5930

Trevira® Spunbond Type 011/350 is a 100% continuous filament polyester nonwoven needlepunched engineering fabric. The fabric is resistant to biological and naturally encountered chemicals, alkalies, acids, and ultraviolet light exposure. Trevira® Spunbond Type 011/350 conforms to the property values listed in the following table:

FABRIC PROPERTY	UNIT	TEST METHOD	TYPICAL VALUE[1]	MINIMUM TEST VALUES[2]
Fabric Weight	oz/yd²	ASTM D-5261	10.5	10.0
Fabric Thickness, t	mils	ASTM D-5199	140	125
Grab Strength (MD/CD)	lbs	ASTM D-4632	420/350	305
Grab Elongation (MD/CD)	%	ASTM D-4632	75/80	60
Trapezoid Tear Strength (MD/CD)	lbs	ASTM D-4533	140/125	100
Puncture Resistance	lbs	ASTM D-4833	155	130
Mullen Burst Strength	psi	ASTM D-3786	560	510
Water Flow Rate	gpm/ft²	ASTM D-4491	120	80
Permittivity, Ψ	sec⁻¹	ASTM D-4491	1.6	1.07
Permeability, k = Ψxt	cm/sec	ASTM D-4491	.57	.34
AOS	Sieve Size mm	ASTM D-4751	100-120 .149-.125	70 .210
Standard Roll Widths[3]	ft	12.5 and 15.0		
Standard Roll Lengths[3]	ft	300		

MD = Machine Direction CD = Cross Machine Direction

[1] The values listed are average values.
[2] These minimum values represent minimum test values as determined from Quality Control (QC) testing.
[3] Other width and length rolls are available upon request.

GEOCON [illegible]

SYNTHETIC INDUSTRIES
CONSTRUCTION PRODUCTS DIVISION
"Smart Solutions in Synthetics"

Synthetic Industries 801
Nonwoven Geotextile

Synthetic Industries 801 is a polypropylene, staple fiber, needlepunched nonwoven geotextile. The fibers are needled to form a stable network that retain dimensional stability relative to each other. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils. Synthetic Industries 801 conforms to the property values listed below:

PROPERTY	TEST METHOD	MINIMUM AVERAGE ROLL VALUES[1]	
		English	Metric
Mechanical			
Grab Tensile Strength	ASTM D4632	200 lbs	890 N
Grab Elongation	ASTM D4632	50 %	50 %
Puncture Strength	ASTM D4833	130 lbs	580 N
Mullen Burst	ASTM D3786	400 psi	2756 kPa
Trapezoidal Tear	ASTM D4533	85 lbs	380 N
Hydraulic			
Apparent Opening Size (AOS)	ASTM D4751	80 US Std. Sieve	0.180 mm
Permittivity, Ψ	ASTM D4491	1.50 sec^{-1}	1.50 sec^{-1}
Permeability, $k = \Psi \cdot t$	ASTM D4491	0.38 cm/sec	0.38 cm/sec
Water Flow Rate	ASTM D4491	110 gpm/ft^2	4482 $l/min/m^2$
Endurance			
UV Resistance (% retained @ 500 hours)	ASTM D4355	70 %	70 %

Notes:

1 Values shown are in weaker principal direction. Minimum average roll values represent a 95 percent confidence level, calculated as 1 mean minus two standard deviations.

Standard Roll Size Information: 15.0' x 300' = 500 sq. yds.

GOSI01-3-02.03.94

4019 Industry Drive • Chattanooga, TN 37416 • 615/899-0444 FAX 615/899-7619

RDB PLASTOTECNICA SpA
Via Dell'Industria, 3
22060 Vigano (CO) Italy
Telefono 039/92191
Telefax 039/9219290
Telegrammi RDB - VIGANO

Cap. Soc. 10.000.000.000 i.v.
CCIAA Como 176025
Reg. Trib. Lecco Soc. 6071 v. 20
Pos. Meccanografico n. CO 024471
Codice Fiscale 04868870157
Partita IVA 01283300137

7 December 1994
FMgf

Messrs
NICOLON / MIRAFI GROUP
3500 Parkway Lane, Suite 500
Norcross, GEORGIA 30092

Fax n° 001-404-7291829

Attention Mr. Tom Stephens

DECLARATION OF CONFORMITY # 071294/2

Goods — TENAX MS 1000 / MIRAFI MIRAGRID MX-1
TENAX MS 2000 / MIRAFI MIRAGRID MX-2

TO WHOM IT MAY CONCERN

We hereby certify that the above mentioned goods are manufactured using the following components:

Polypropylene Group 1 - Class 1 - Grade 2 (ASTM D 4101): 98 % min. in weight
Carbon Black (ASTM D 4218): 0.5 % min. in weight

The manufacturing process is controlled to guarantee the above properties according to our Quality System procedures, that have been implemented and certified in accordance to ISO 9002.

Best regards.

Quality Assurance Manager
Eng. Ellipse

TENAX

University of Alaska Fairbanks
Fairbanks Alaska
Torsional Rigidity Test Results
12/17/94

907- 474-6126

Client:
Material:

Data
Sample #

Load	Moment	1	2	3	Average
Kg	cm-kg	Rotation on Initial Loading - Deg			
0	0	0	0	0	0
0.67	3.98	1.9	1.4	2	1.77
1.67	9.91	6.4	4.2	5.9	5.50
2.67	15.85	11.9	10.7	10	10.87
3.67	21.77	17.4	13.4	14.7	15.17
4.67	27.7	22.4	18.5	19.9	20.27
5.67	33.63	26.3	21.4	26.5	24.73

Secant Modulus
Sample #

Load	Moment	1	2	3	Average
Kg	cm-kg	Secant Modulus on Initial Loading - cm-kg/deg			
0	0				
0.67	3.98	2.09	2.84	1.99	2.31
1.67	9.91	1.55	2.36	1.68	1.86
2.67	15.85	1.33	1.48	1.59	1.47
3.67	21.77	1.25	1.62	1.48	1.45
4.67	27.7	1.24	1.50	1.39	1.38
5.67	33.63	1.28	1.57	1.27	1.37

Interpolated Average Secant Modulus @ 20 cm-kg: 1.456 cm-kg/deg

Miragrid MX 1 Technical Data

Product Description

Miragrid **MX 1** is a bi-directional grid with comparable strength in both the machine direction and cross-machine direction. Miragrid **MX 1** is manufactured by extruding and orienting U.V. stabilized polypropylene to form a monolithic grid structure. Miragrid **MX 1** features high tensile strength and modulus with excellent resistance to construction and environmental damage. Miragrid **MX 1** conforms to the property values listed in the following table.

Grid Property	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Ultimate Tensile Strength	GRI GG-1	lb/ft	950	1,350
Secant Modulus @ 2% Strain	GRI GG-1	lb/ft	14,000	21,000
Junction Strength	GRI GG-2	lb/ft	855	1,215
Junction Efficiency	GRI GG-2	%	90	90
Flexural Rigidity	ASTM D 1388	mg-cm	750,000	
Open Area	COE-02215	%	80	
Rib Thickness	ASTM D 1777	in	0.10	0.08
Junction Thickness	ASTM D 1777	in	0.17	
Grid Aperture Size	Measured	in	1.2	1.6
Weight	ASTM D 3776	oz/yd^2	7	

Miragrid MX 1 Packaging

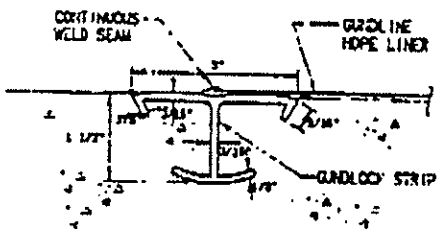
STYLE NUMBER	832690
ROLL DIMENSIONS	13.1' x 164'
SQUARE YARDS PER ROLL	238.7
ESTIMATED ROLL WEIGHT	125 lbs

MD - Machine Direction
CD - Cross-machine Direction

GUNDLOCK INSTALLATION GUIDE

Gundlock is a High Density Polyethylene (HDPE) extruded shape designed to provide a mechanical anchor attachment for Gundline HD (High Density Polyethylene liner). Gundlock is designed to embed in any face of new cast-in-place or precast concrete construction and can be fabricated to maneuver around shapes and corners.

Any thickness of Gundline HD can be welded to the Gundlock. If unexpectedly high tensile loads are experienced by the liner, the liner is designed to yield before the Gundlock yields or pulls out of the concrete. The Gundlock profile is detailed in Figure 1.



GUNDLOCK
NOT TO SCALE

FIGURE-1

Attachment of Gundline HD to Gundlock is performed by grinding the Gundlock and Gundline HD and then extrusion welding the Gundline HD to the Gundlock.

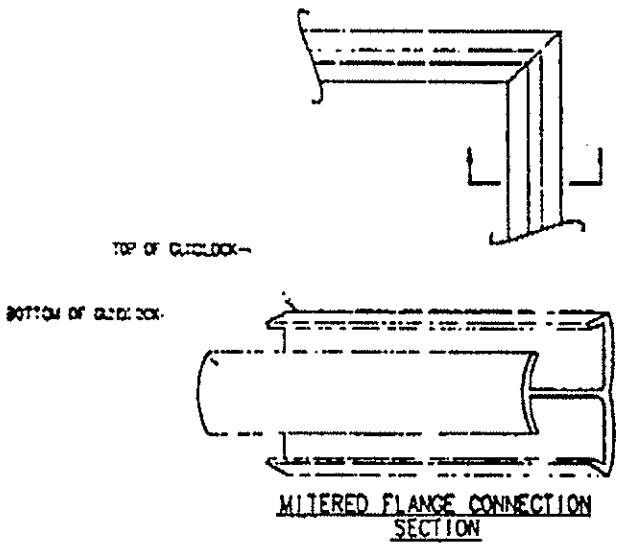
Gundlock should not be used as a waterstop for most installations although it may be utilized as such in special

applications. Please consult Gundle Lining Construction for further information.

Proper installation techniques must be observed to insure a secure embedment of the Gundlock and a sound weld to the Gundline HD sheeting.

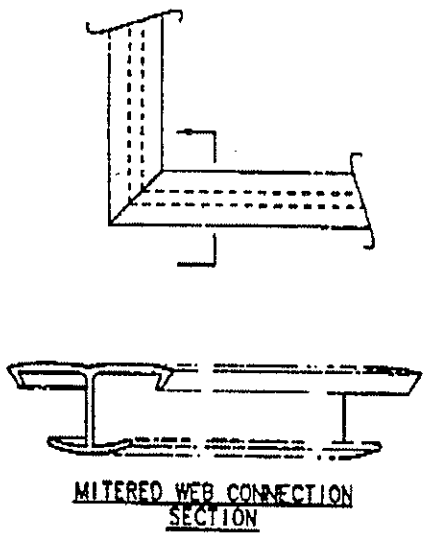
GUNDLOCK INSTALLATION

Gundlock must be cut and butt welded together to fit corners and shapes. (Figures 2 - 4) This cutting and welding, if performed correctly will provide a continuous support for the liner, and secure a seal. Suggested procedures can be found on page 5. Corners and "T" connections can be supplied pre-fabricated.



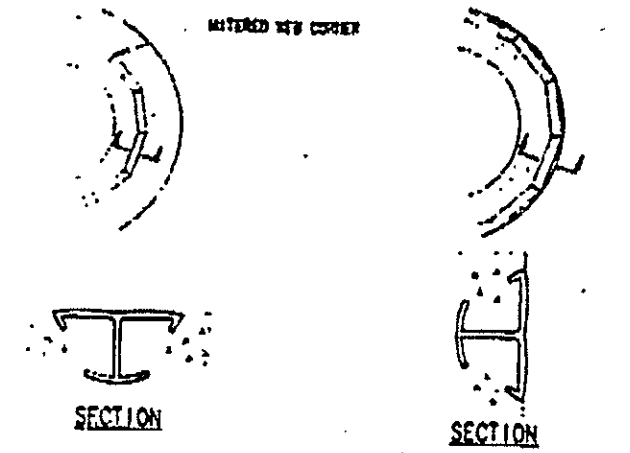
MITERED FLANGE CONNECTION SECTION

FIGURE-2



MITERED WEB CONNECTION SECTION

FIGURE-3

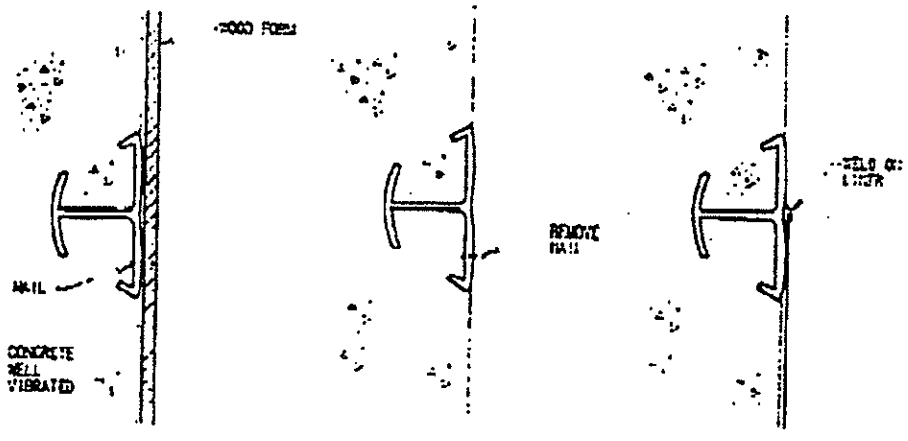


MITERED WEB CORNER MITERED FLAGE CORNER

FIGURE 4

ATTACHMENT OF GUNDLOCK TO FORMS

Gundlock is attached to the inside of a concrete form by finishing nails prior to concrete placement. (Figure 5). The size of the finishing nails must be 1" long or shorter. The nails must be driven flush with the back of the Gundlock to allow for their easy removal when the forms are wrecked. The Gundlock should be attached at sufficient points to insure a flush fitting with the form. Alternate methods of



STEP 1 STEP 2 STEP 3

FIGURE-5

attachment are staples or shot in anchors. Examples are shown in figures 6 and 7. Any of the aforementioned methods will provide a proper attachment of the Gundlock to wood, steel, concrete, or plastic. Other materials may require special methods of attachment.

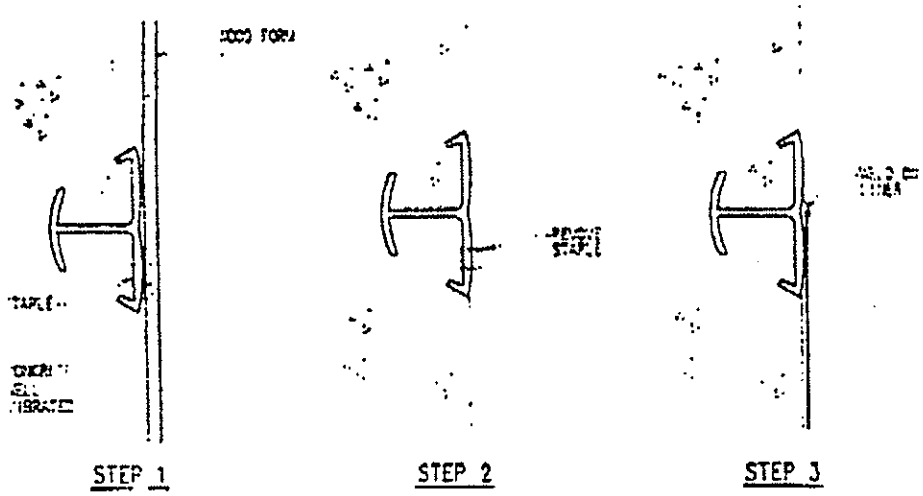


FIGURE-6

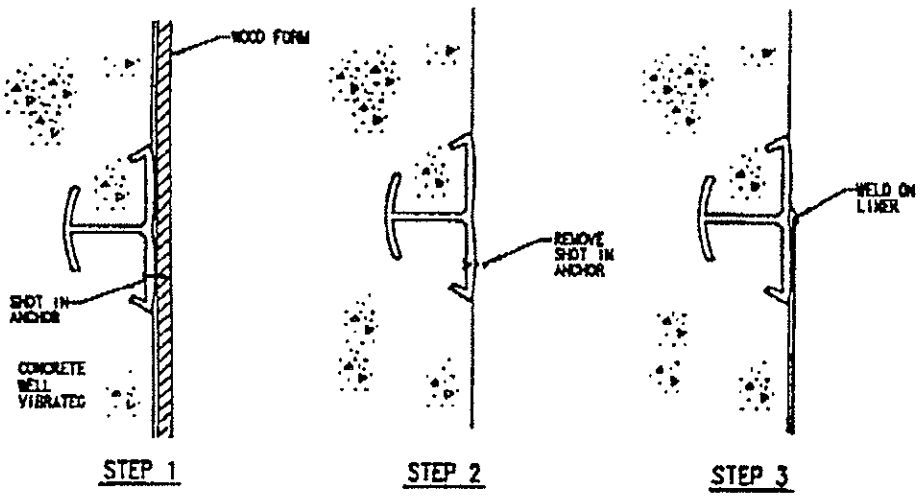


FIGURE-7

EMBEDMENT OF GUNDLOCK

Proper embedment of the Gundlock requires careful attention. The "T" shape of the section can entrap air if sufficient consolidation of the concrete is not achieved. Concrete placed around Gundlock must be properly vibrated to ensure

the concrete fills void spaces. Caution: If the concrete surrounding the Gundlock is not consolidated (vibrated), the Gundlock cannot develop the full pull out strength of the lock.

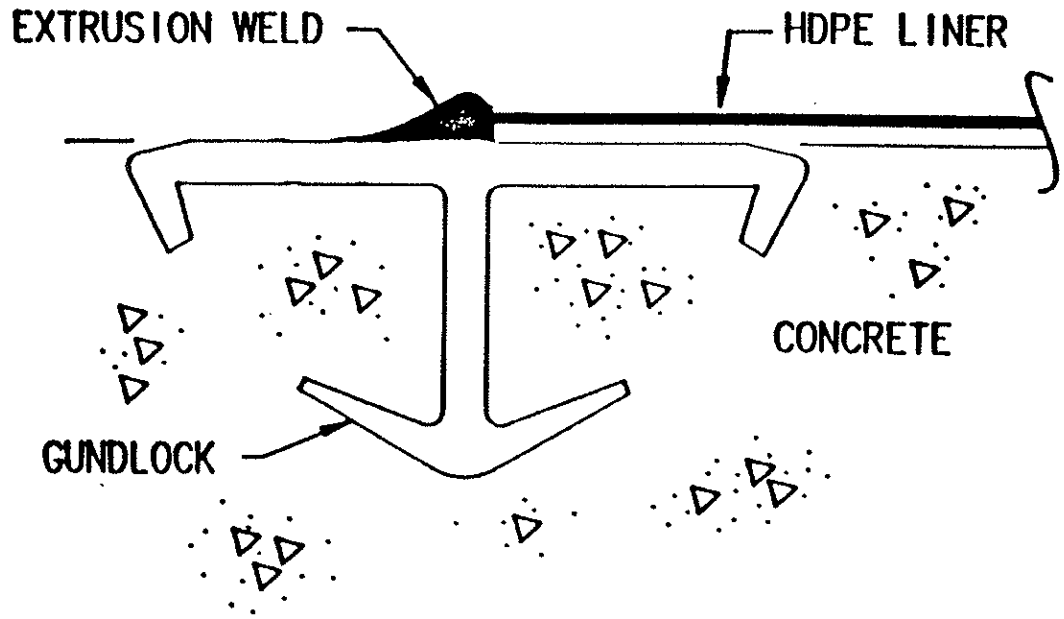
GUNDLOCK PREPARATION

After the concrete has set and the forms wrecked, the finising nails, staples or anchors can be removed. Occasionally concrete will get between the Gundlock and the form and must be chipped away to reveal the Gundlock. The sharp edges thus created by the chipping back of the concrete must be beveled to prevent possible cutting or puncturing of the liner.

SUGGESTED METHOD: HEAT FUSION WELDING OF GUNDLOCK

The recommended method of butt welding HDPE Gundlock is the heat fusion welding method which yields a continuous strip of material. The following is a list of tools and procedures required to perform the heat fusion welding method:

1. Carpenters Power Chop Saw or any saw which can cut material squarely. (Note: A handsaw or hacksaw will not cut it squarely.)
2. Utility Knife
3. 110V Leister Triac
4. 135MM Welding Mirror

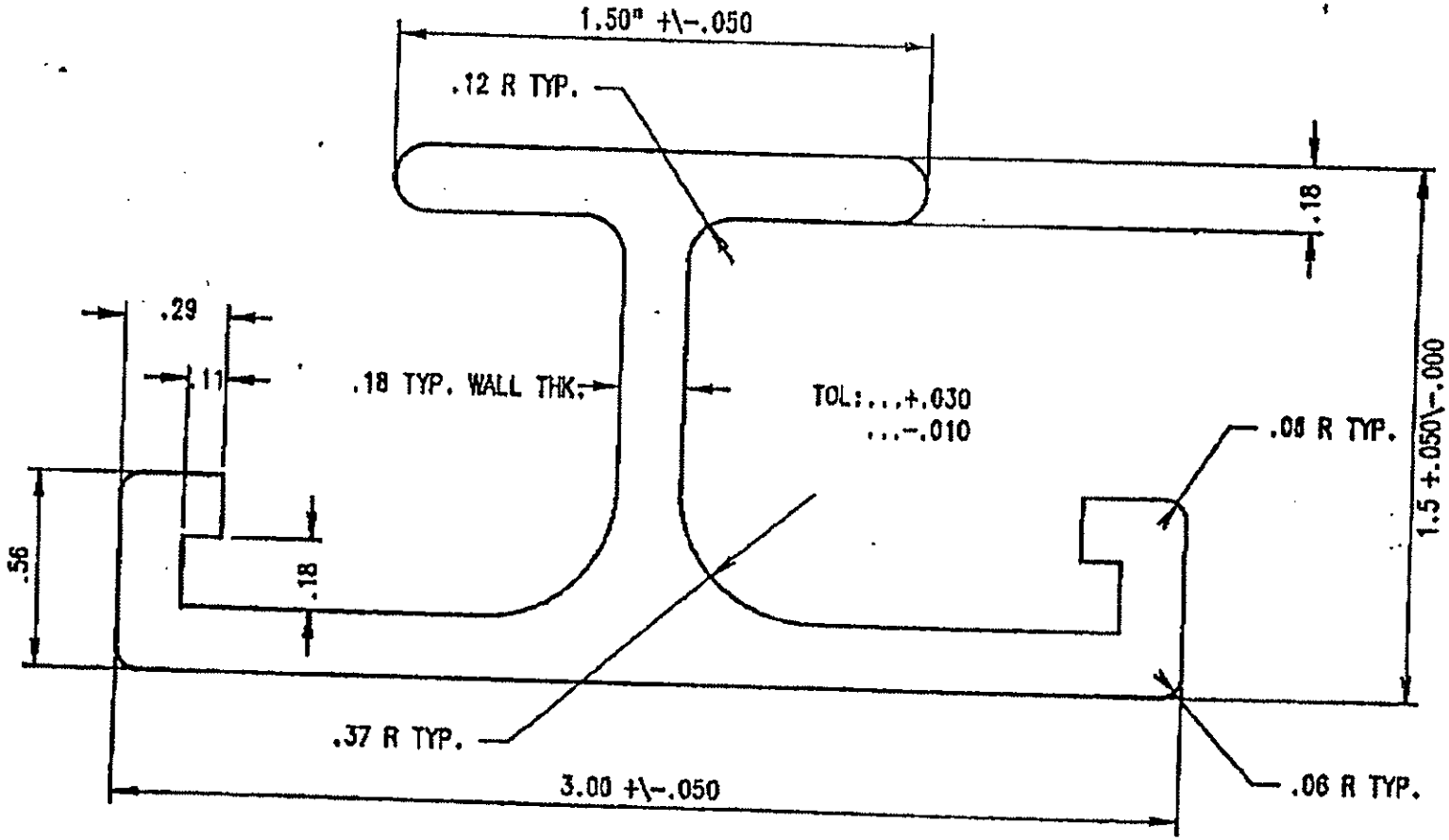


TYPICAL GUNDLOCK DETAIL

(not to scale)

Gundle

DATE: 10-23-89	
DRAWING No. STDR-82	
APPROVED BY: PSP	
GUNDLOCK STRIP	BY: PP



Gundle

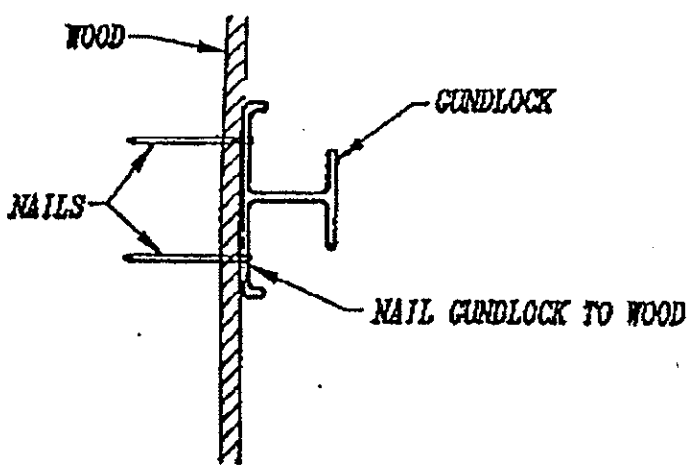
GUNDLE LINING CONSTRUCTION CORP.
HOUSTON, TEXAS 77078

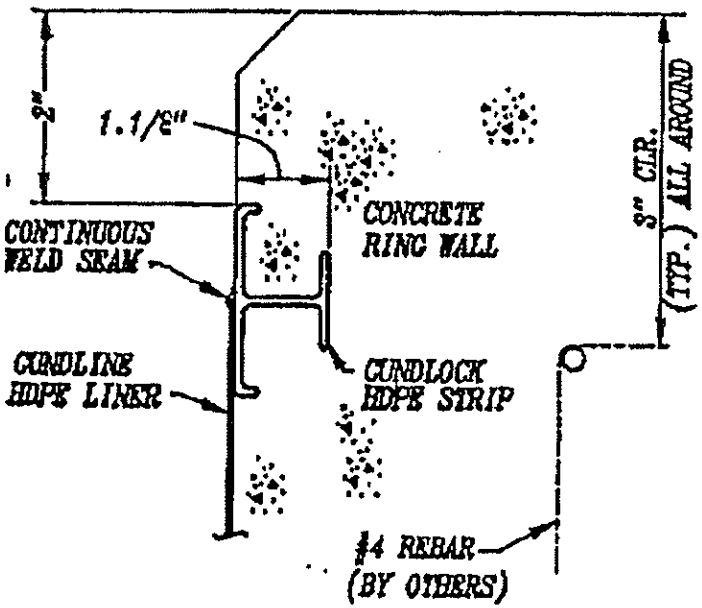
DATE: 09-20-89

DRAWING No. STDR-15

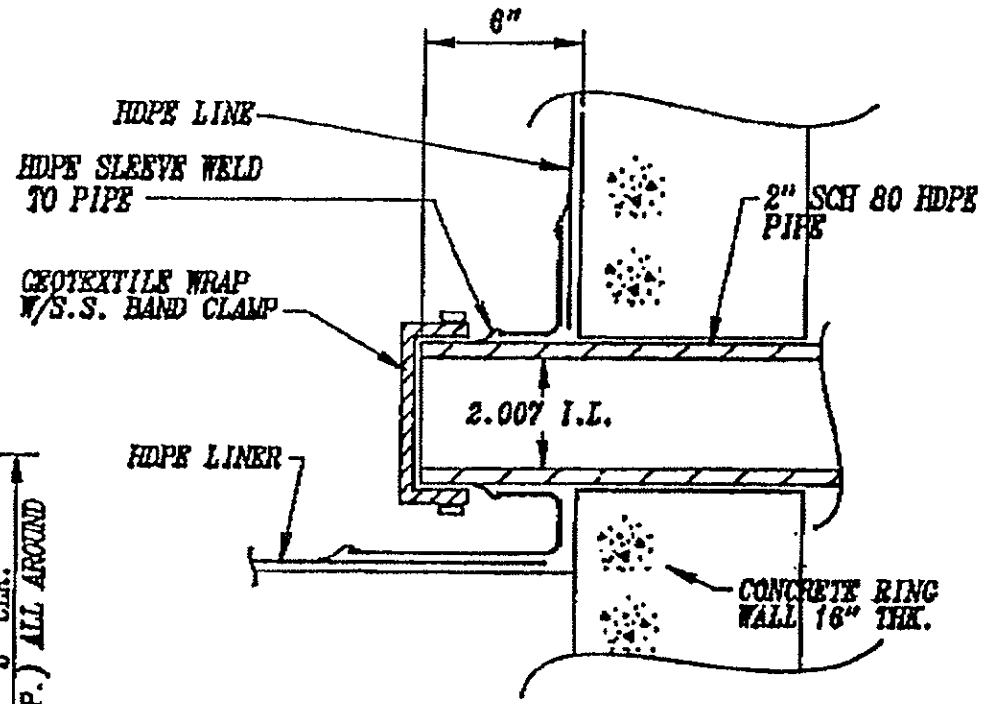
APPROVED BY: PSP

project / owner CINDLOCK SPRING APTS. LOT





GUNDLOCK
(not to scale)
DETAIL-1



DETAIL-2
(not to scale)

PREPARED BY:
GUNDLE LINING CONSTRUCTION
HOUSTON, TEXAS
FOR: ROCK DRIVING

DATE	REV.	DESCRIPTION	APPROVED BY	BY
04-12-89	2	GENERAL		PP
04-11-89	1	GENERAL		PP

Gundle
GUNDLE ENVIRONMENTAL SYSTEMS
HOUSTON, TEXAS 77074

DATE: 02-10-89
DRAWING No. STDR-24
APPROVED BY:

SECTION 2

NEW YORK TRAP ROCK CORPORATION
162 OLD MILL ROAD
WEST NYACK, NY 10994
U.S.A.
914-358-4500

120194

Aggregate Blend

WEST NYACK DIABASE

AGGREGATE BLEND -- MANUAL

CRUSHED STONE BASE

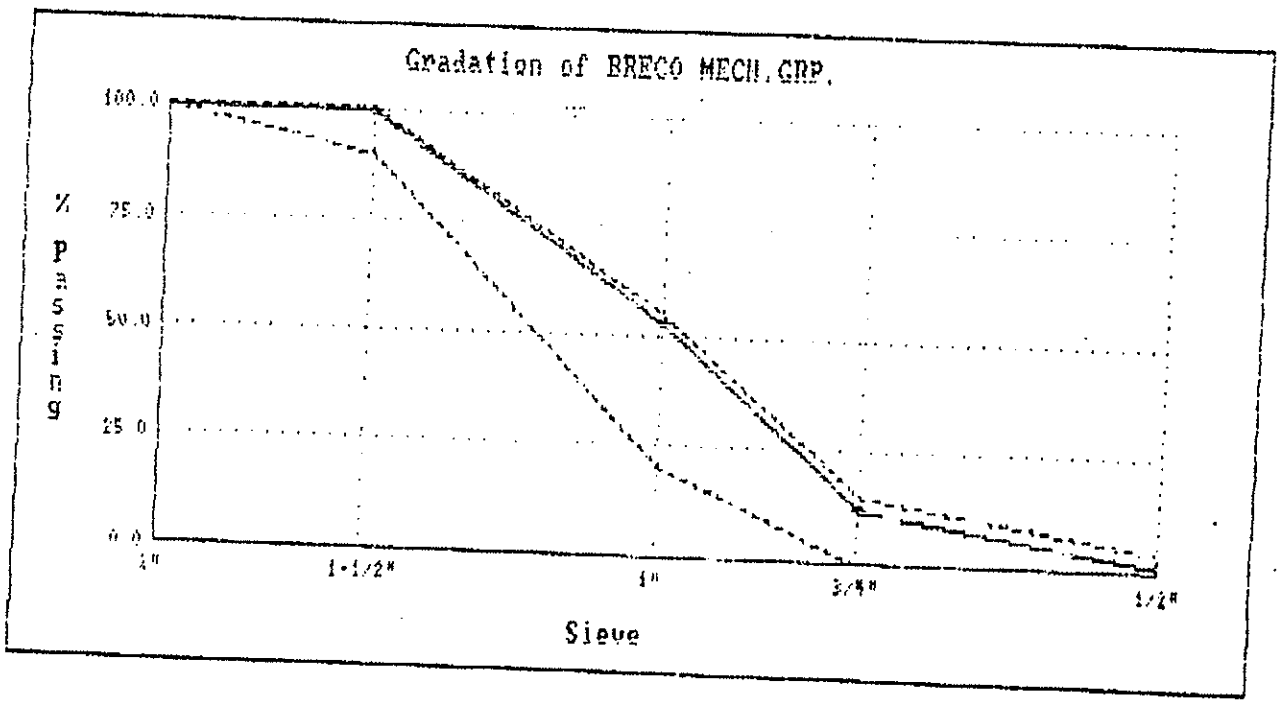
Specification ID : CRUSHED.ST.BASE Blend ID : BRECO MECH.GRP.

Sieve	Low	High	% Pass	Aggregate	Pct
2 "	100.0	100.0	100.0	0400W	100.0
1-1/2 "	90.0	100.0	99.7		
1 "	20.0	55.0	53.1		
3/4 "	-	15.0	11.8		
1/2 "	-	5.0	1.6		

1 1/4"

Approx. Average Grading

Cost - Fineness modulus 7.88



WEST NYACK QUARRY
N. Y. S. D. O. T. SOURCE NO. ((8-8R)
N. Y. S. D. O. T. TEST NO. = 93AR9
SPECIFIC GRAVITY = 2.91

162 OLD MILL ROAD
WEST NYACK, NY 10994
U.S.A.
914-358-4500

Gas Extraction Well
1½ Crushed Stone

120194

WEST NYACK
DIABASE

Aggregate Blend

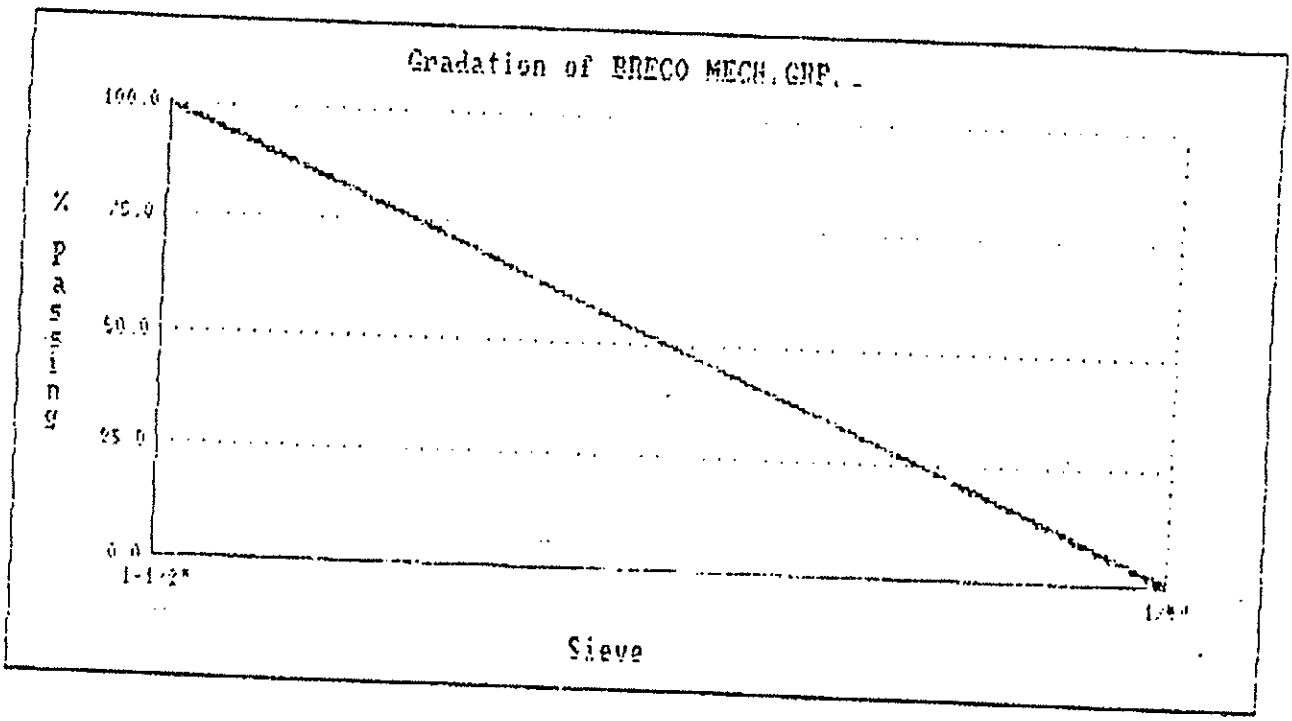
AGGREGATE BLEND -- MANUAL.

Specification ID : STONE BEDDING Blend ID : BRECO MECH.GRP.

Sieve	Low	High	% Pass	Aggregate	Pct
1-1/2 "	100.0	100.0	99.8	0400W	100.0
1/4 "	-	-	1.4		
Cost	-		Fineness modulus	-	

1 1/4"

Approx. Average Grading



WEST NYACK QUARRY
N. Y. S. D. O. T. SOURCE NO. ((8-8R)
N. Y. S. D. O. T. TEST NO. = 93AR2
SPECIFIC GRAVITY = 2.91

FAIRWAY

Quality Assurance

November 7, 1994

CRUSHED STONE BASE COURSE

client ConAgg Recycling Corp.
980 East 149th Street
Bronx, NY 10455
Attn: Ed Cicalese

project Barbella Environmental
Pelham Landfill

subject Gradation Analysis

On this date, three samples of special blend material was delivered to this laboratory by the client. Test results are shown below.

Sieve Size	Percent Passing by Weight 1	2	3	Spec
2"	100	100	100	100
1/4"	60	57	62	30-60
No. 40	35	25	27	
No. 200	7.8	7.7	7.6	10-20

OL

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

NEW YORK TRAP ROCK CORPORATION
162 OLD MILL ROAD
WEST NYACK, NY 10994
U.S.A.
914-358-4500

120194

WEST NYACK DIABASE

Aggregate Blend

AGGREGATE BLEND -- MANUAL

RIP RAP BEDDING

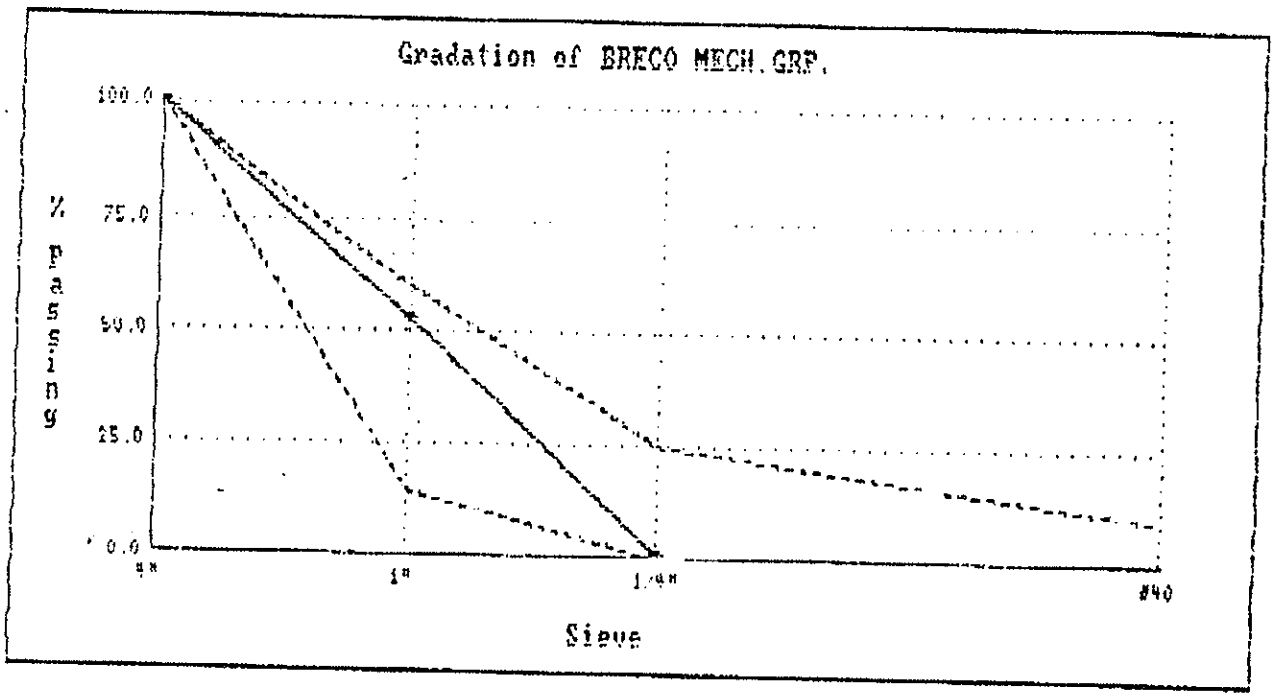
Specification ID : BEDDING MATER. Blend ID : BRECO MECH.GRP.

Sieve	Low	High	% Pass	Aggregate	Pct
4 "	100.0	100.0	100.0	0400W	100.0
1 "	15.0	60.0	53.1		
1/4 "	-	25.0	1.4		
# 40	-	10.0	0.7		

1 1/4

Approx. Average Grading

Cost - Fineness modulus -



WEST NYACK QUARRY
N. Y. S. D. O. T. SOURCE NO. ((8-8R)
N. Y. S. D. O. T. TEST NO. = 93AR9
SPECIFIC GRAVITY = 2.91

NEW YORK TRAP ROCK CORPORATION
162 OLD MILL ROAD
WEST NYACK, NY 10994
U.S.A.
914-358-4500

RECEIVED DEC 5 1994

120194

WEST NYACK DIABASE

Aggregate Blend

AGGREGATE BLEND -- MANUAL

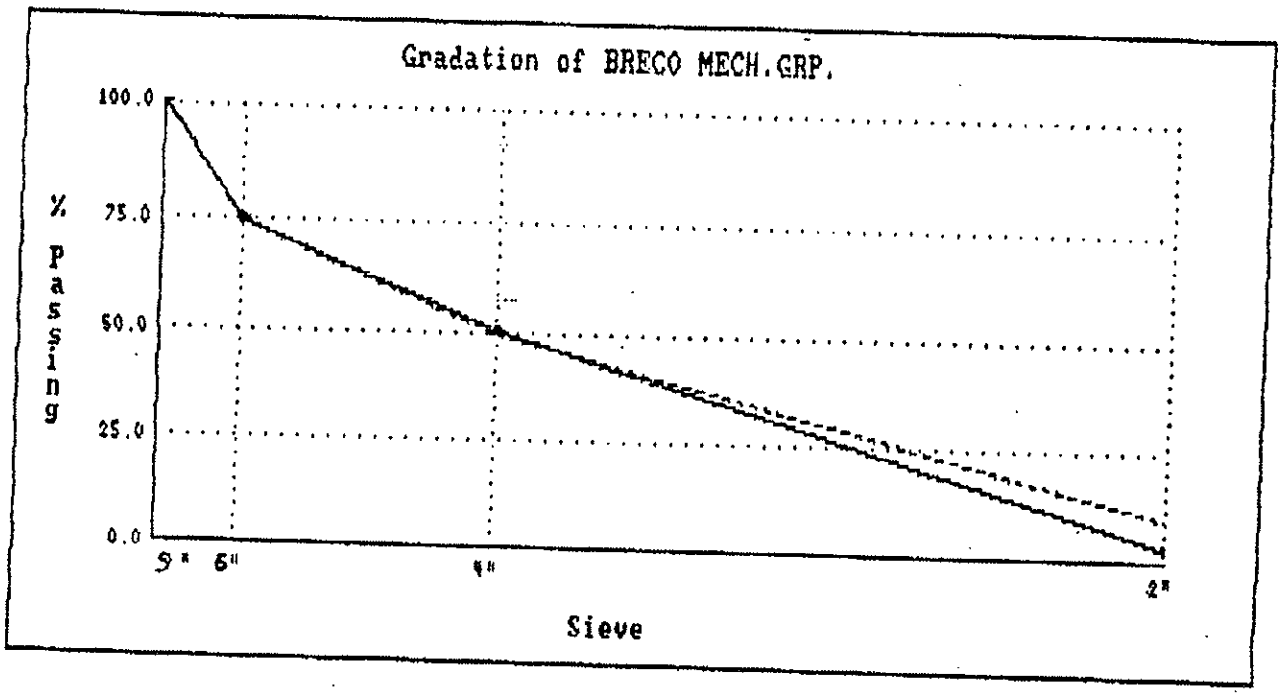
RIP RAP-CLASS I

Specification ID : RIP RAP CLASS 1 Blend ID : BRECO MECH.GRP.

Sieve	Low	High	% Pass	Aggregate	Pct
9 "	100.0	100.0	100.0	SMALL SURGE	100.0
6 "	75.0	75.0	75.0		
4 "	50.0	50.0	51.0		
2 "	10.0	10.0	3.0		

Approx Average Grading

Cost - Fineness modulus -



WEST NYACK QUARRY
N. Y. S. D. O. T. SOURCE NO. ((8-8R)
N. Y. S. D. O. T. TEST NO. = 93AR9
SPECIFIC GRAVITY = 2.91

FAIRWAY

Quality
Assurance

RECEIVED MAR 13 1996

March 8, 1996

client Breco Mechanical Group, Inc.

project Pelham Landfill

On March 5, 1996 a representative from this firm visited the jobsite and picked-up a soil sample labeled "3" Minus Star Recycling, 5000 cy". Test results are shown below.

Sieve Size	Percent Passing by Weight Sample	Spec.02210-3.C.1
3"	100	100
1"	100	
3/4"	97	
3/8"	92	
No. 4	85	
No. 10	73	
No. 40	45	
No. 200	19.1	
Plasticity Index	NP	
Classification	SM ✓	

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

FAIRWAY

Quality
Assurance

March 8, 1996

client Breco Mechanical Group, Inc.

project Pelham Landfill

On March 5, 1996 a representative from this firm visited the jobsite and picked-up a soil sample labeled "3" Minus, Morris Park". Test results are shown below.

Sieve Size	Percent Passing by Weight Sample	Spec.02210-3.C.1
3"	100	100
1"	100	
3/4"	93	
3/8"	87	
No. 4	82	
No. 10	75	
No. 40	37	
No. 200	13.2	
Plasticity Index	NP	
Classification	SM	

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

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Quality
Assurance

March 8, 1996

client Breco Mechanical Group, Inc.

project Pelham Landfill

On March 5, 1996 a representative from this firm visited the jobsite and picked-up a soil sample labeled "3" Minus Durante, 5000 cy". Test results are shown below.

Sieve Size	Percent Passing by Weight Sample	Spec.02210-3.C.1
3"	100	100
1"	100	
3/4"	96	
3/8"	90	
No. 4	85	
No. 10	78	
No. 40	53	
No. 200	23.0	
Plasticity Index	NP	
Classification	SM ✓	

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

FAIRWAY

Quality
Assurance

March 8, 1996

client Breco Mechanical Group, Inc.

project Pelham Landfill

On March 5, 1996 a representative from this firm visited the jobsite and picked-up a soil sample labeled "3" Minus ConAgg". Test results are shown below.

Sieve Size	Percent Passing by Weight Sample	Spec.02210-3.C.1
3"	100	100
1"	95	
3/4"	93	
3/8"	87	
No. 4	82	
No. 10	75	
No. 40	51	
No. 200	22.3	
Plasticity Index	NP ✓	
Classification	SM	

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

FAIRWAY

Quality
Assurance

March 8, 1996

client Breco Mechanical Group, Inc.

project Pelham Landfill

On March 5, 1996 a representative from this firm visited the jobsite and picked-up a soil sample labeled "3" Minus Star Recycling, 10,000 cy". Test results are shown below.

Sieve Size	Percent Passing by Weight Sample	Spec.02210-3.C.1
3"	100	100
1"	100	
3/4"	98	
3/8"	93	
No. 4	86	
No. 10	74	
No. 40	44	
No. 200	17.3	
Plasticity Index	NP	
Classification	SM ✓	

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

FAIRWAY

Quality
Assurance

March 8, 1996

client Breco Mechanical Group, Inc.

project Pelham Landfill

On March 5, 1996 a representative from this firm visited the jobsite and picked-up a soil sample labeled "3" Minus Durante Loamy Soil, 10,000 cy". Test results are shown below.

Sieve Size	Percent Passing by Weight Sample	Spec.02210-3.C.1
3"	100	100
1"	100	
3/4"	97	
3/8"	91	
No. 4	85	
No. 10	78	
No. 40	53	
No. 200	23.3	
Plasticity Index	NP	
Classification	SM	

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

FAIRWAY

Quality
Assurance

March 8, 1996

client Breco Mechanical Group, Inc.

project Pelham Landfill

On March 5, 1996 a representative from this firm visited the jobsite and picked-up a soil sample labeled "1" Minue Durante, 30,000 cy". Test results are shown below.

Sieve Size	Percent Passing by Weight Sample
1"	100
3/4"	95
3/8"	90
No. 4	83
No. 10	72
No. 40	41
No. 200	15.2
Plasticity Index	NP
Classification	SM

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

FAIRWAY

Soils Test Report

February 14, 1996

client Breco Mechanical Group

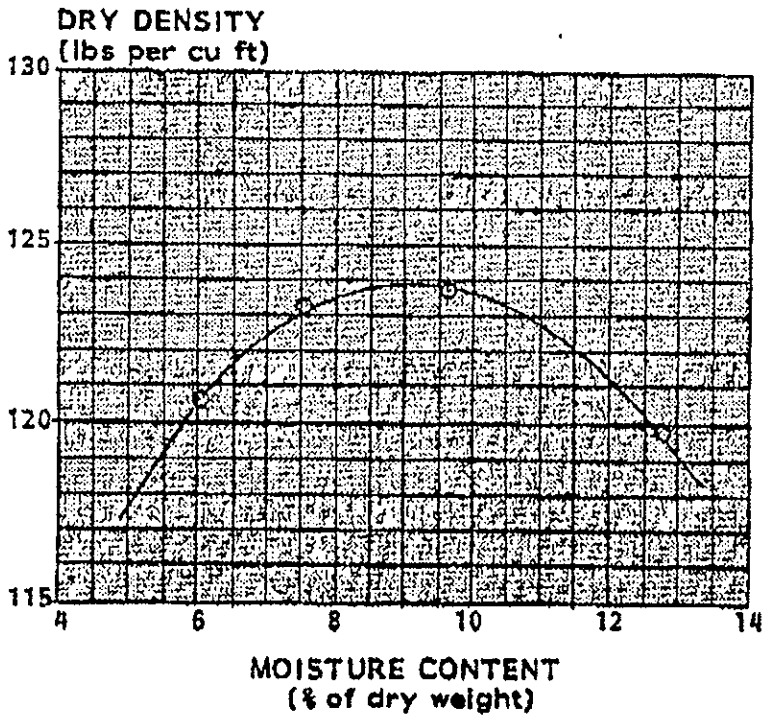
project Pelham Landfill

Compaction ASTM Method D698

subject Moisture-Density Curve Analysis and Gradation Analysis

Maximum Dry Density 123.9 pcf
Optimum Moisture Content 9.1 %

On February 12, 1996 a 3" minus soil sample was delivered to this laboratory by the client. The sample was labeled "Preconstruction: Morris Park", with test results shown below.



Sieve Size	% Passing by Weight 3"
Actual	100
Specification	100

FAIRWAY TESTING CO., INC.

C. J. Aguanno, P. E.

RECEIVED AUG 25 1995

FAIRWAY

Soils
Test Report

August 23, 1995

client Breco Mechanical Group, Inc.

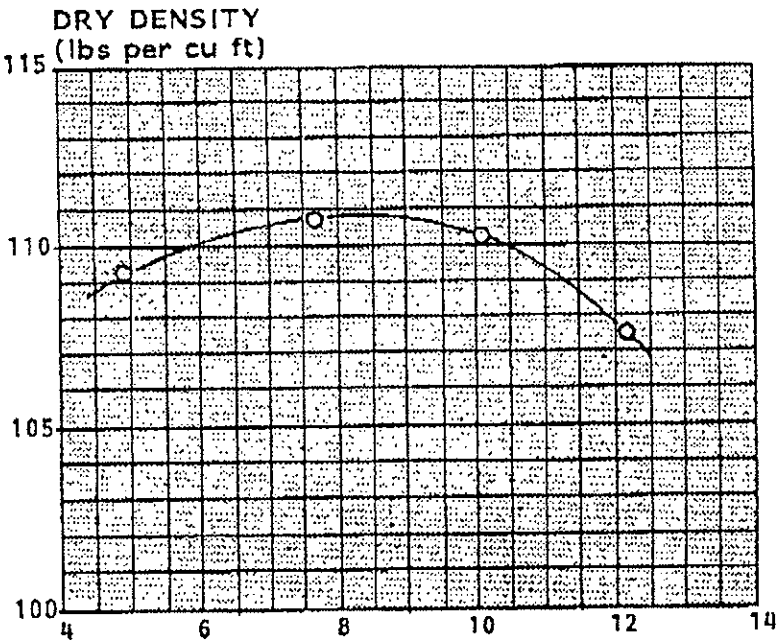
project Pelham Landfill

Compaction ASTM Method D698

Maximum Dry Density 110.9 pcf
Optimum Moisture Content 8.5 %

subject Moisture-Density Curve Analysis

On this date, a representative from this firm visited the jobsite and picked-up a sample of material labeled, Santilli #2 1" minus sampled 8-22-95. Test results are shown below.



100% passing 1" sieve.

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P. E.

FAIRWAY

Soils
Test Report

March 6, 1995

client Breco Mechanical

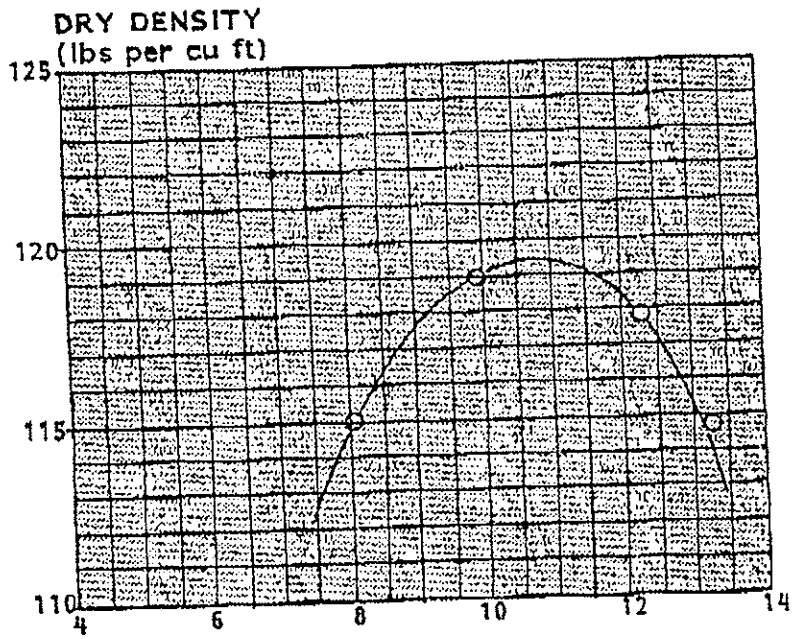
project Pelham Landfill

subject Moisture-Density Curve Analysis and Gradation Analysis

Compaction Method ASTM D698

Maximum Dry Density 119.4 pcf
Optimum Moisture Content 8.8 %

On March 3, 1995 a representative from this firm visited the jobsite and selected an in-place soil sample taken on the slope face. Test results are shown below. This was ConAgg material.



Sieve Size	Percent Passing by Weight 1"	3/4"	3/8"	No.4	No.10	No.40	No.200
Actual	100	99	90	76	63	42	14.6

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P. E.

Smith Street • Stony Point, N.Y. 10980 • 914-942-2088

FAIRWAY

Quality
Assurance

September 1, 1995

1" minus Durante

client Breco Mechanical Group

project Pelham Landfill

On August 31, 1995, a representative from this firm visited the jobsite and picked-up two soil samples labeled Durante. Test results are shown below.

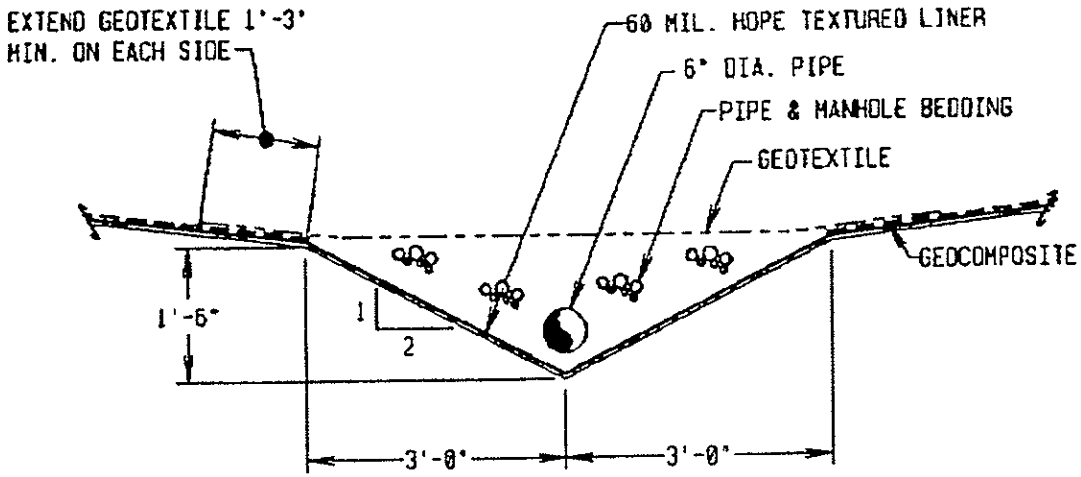
Sample	Identification
1	1" minus, 60,000 cy
2	3" minus, 60,000 cy

	Percent Passing by Weight	
Sieve Size	1	2
3"	100	100
1"	100	100

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

Smith Street • Stony Point, N.Y. 10980 • 914-942-2088



TYPICAL INFILTRATION DRAINAGE TRENCH

(NOT TO SCALE)

Gundle®
19103 GUNDLE ROAD
HOUSTON, TEXAS 77073

TITLE: PROPOSED ALTERNATE TO BID ITEM #73

DWN: BAK	DATE: 9-21-94	SCALE: NTS	DWG: A479-01

STRUCTURAL BACKFILL

FAIRWAY

Quality Assurance

December 27, 1994

client Briarwood Contracting Corp.

project Pelham Landfill

On this date, a representative from this firm visited Tilcon NY and picked-up two aggregate samples. Test locations and results are shown below.

PIPE and MANHOLE BEDDING - Tomkins Cove, NY

Sieve Size	Percent Passing by Weight Sample	Spec
1/2"	100	100
3/8"	79	90-100
No. 8	1	0-15
No. 30	0.3	0-30

STRUCTURAL BACKFILL - Haverstraw, NY

Sieve Size	Percent Passing by Weight Sample	Spec
3/4"	100	100
No. 4	99	70-95
No. 16	51	30-70
No. 50	28	20-50
No. 200	12.3	2-20

Soil Classification: SP, poorly graded sand

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P.E.

Smith Street • Stony Point, N.Y. 10980 • 914-942-2088

- Testing

TRENCH
BACKFILL

STAR RECYCLING INC.

50 - 04 73RD PLACE
WOODSIDE, NY 11377

QUALITY CONTROL LABORATORY

PRODUCT NAME: CLEANFILL

SIEVE ANALYSIS

Passing sieve	Percent by weight
1 "	100.0
1/2 "	97.7
3/8 "	95.5
1/4 "	90.4
# 4	87.0
#10	67.2
#40	46.3
#100	19.4
#200	14.7

Stan Fernandes
Lab. Director

Starr

(Trench Backfill)

123 Varick Avenue Brooklyn, New York 11237 Facsimile 718 628 7090 Telephone 718 386 7900

FAIRWAY

Soils
Test Report

April 26, 1995

client Breco Mechanical

project Pelham Landfill

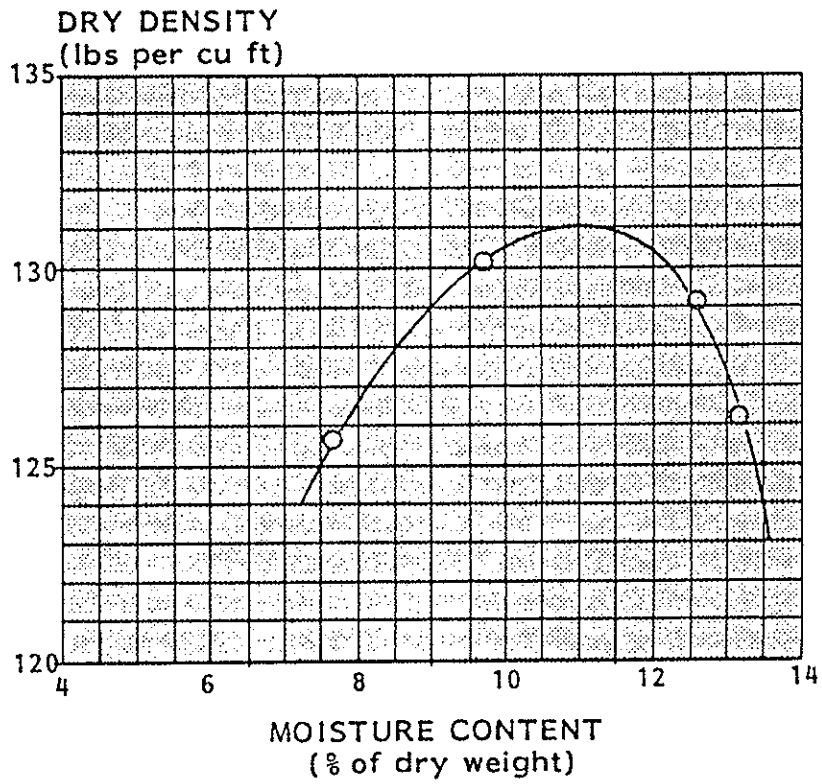
subject Moisture-Density Curve Analysis

Compaction Method ASTM D695

Maximum Dry Density 131.0 pcf
Optimum Moisture Content 11.1 %

On April 21, 1995 a representative from this firm visited the jobsite and picked-up an on-site soil sample from the trench backfilling operations. Test results are shown below.

ON-SITE SAMPLE



GRADATION ANALYSIS (D422)

Sieve Size	Percent Passing by Weight 3"	2"	1-1/2"	1"	3/4"	3/8"	No.4	No.10	No.35	No.200
Sample	100	91	84	82	79	71	65	58	38	14.1

SOIL CLASSIFICATION (ASTM D2487): GM, silty gravel with sand

FAIRWAY TESTING CO., INC.

P. J. Aguanno, P. E.

FAIRWAY

Quality
Assurance

January 31, 1995

client Breco Mechanical

project Pelham Landfill

On this date, a representative from this firm visited Tilcon Quarries, Tompkins Cove, NY and picked-up an aggregate sample. Test results are shown below.

Pipe and Manhole Bedding

Sieve Size	Percent Passing by Weight Sample	Spec
1/2"	100	100
3/8"	92	90-100
No. 8	2	0-15
No. 30	1.1	0-30

FAIRWAY TESTING CO., INC.

P. J. Agnanno, P.E.

WORTHINGTON
SUBMITTAL REVIEW

NO EXCEPTIONS TAKEN ☑

FURNISH AS NOTED ☐

REVISE & RESUBMIT ☐

This review has been only for conformance with the design concept of the project and compliance with the information given in the Contract Documents. Contractor is responsible for verifying dimensions, fabrication processes, quantities, and for coordination of the work with all trades. Review by Worthington does not relieve Contractor of responsibility for any deviation from the requirements of the Contract Documents unless such deviation has been brought to the attention of Worthington in writing and Worthington has signed a separate acceptance of such deviation.

Date 2/3/95 By SMM

SUBMITTAL NUMBER 43A

WORTHINGTON PROJECT NO 92C4037

BRECO MECHANICAL GROUP, INC.

DATE: 1-31-95
CONTACT 876-HP 5
ITEM: —
SPEC. SECTION: 02225
PARAGRAPH: 2.1A
SHEET NO.: 02225-2
DRAWING NO.: —
LOCATION: —
SUBMITTAL NO.: 876-HP-43A
APPROVED BY: B. Dyc

Smith Street • Stony Point, N.Y. 10980 • 914-942-2088

TILCON NEW YORK INC. P.O. Box 362 Haverstraw, NY 10927 914 838 1300

December 6, 1994

Mr. Brian Dyer
Breco Mechanical Group, Inc.
Breco Field Office
Pelham Bay Landfill
3599 Bruckner Boulevard
Bronx, NY 10464

Re: Pelham Bay Landfill Closure

Dear Sirs:

The following are the gradational analyses of the materials being submitted for use at the above referenced site, as compared with the specifications given.

Pipe & MH Bedding

Sieve Size	Tomkins Cove 3/8"	Spec. Given
1/2"	100 ✓	100
3/8"	87.8	90-100
#8	1.2 ✓	0-15
#30	0 ✓	0-3

Structural Backfill

Sieve Size	Haverstraw Screenings	
3/8"	100	
#4	99.2	(90-95)
#8	74.4	
#16	52.0 ✓	(30-72)
#30	35.9	
#50	24.2 ✓	(20-50)
#100	14.6	
#200	7.7 ✓	(2-20)

The Rip/Rap material produced at the Tilcon New York Inc. Haverstraw plant is made to conform to N.Y. State D.O.T. specifications.

The items submitted for Rip/Rap Class II is Light Stone Fill, for Rip/Rap Class IV, Medium Stone Fill and 18" top size material for Rip/Rap Class III.

Rip/Rap Class II

Light Stone Fill	% Of Total By Weight
Lighter than 100 lbs.	90-100
Larger than 6 inches	50-100
Smaller than 1/2 inch	0-10

Rip/Rap Class IV

Medium Stone Fill	% of Total By Weight
Heavier than 100 lbs.	50-100
Smaller than 4 inches	0-10

It is advised that all Rip/Rap items be visually inspected by the customer prior to shipment.

If you have any questions, please call me.

Sincerely,

Morsia Thomas

Morsia Thomas
Director, Quality Control

FAIRWAY

Quality
Assurance

September 27, 1995

TOPSOIL 18 ARTA

client Breco Mechanical Group

project Pelham Landfill

Subject Topsoil Analysis

On September 26, 1995, a representative from this firm visited the jobsite and took a topsoil sample. Test results are shown below.

Percent Passing by Weight

Sieve Size	Sample
1"	100
3/4"	100
3/8"	96
No. 4	86
Sand { No. 10	74
Sand { No. 35 — (.5 sieve)	56
Sand { No. 270	23.2
Silt, %	21.2
Clay, %	2.0
Combined Silt and Clay, %	23.2
pH	6.9
Organic Content, %	7.7
Nitrogen, ppm	50
Potash, ppm	100
Phosphorous, ppm	200
Specific Conductance Micro MHO/cm	150

FAIRWAY TESTING CO., INC.

E. J. Aguanno, P.E.

Total % Sand

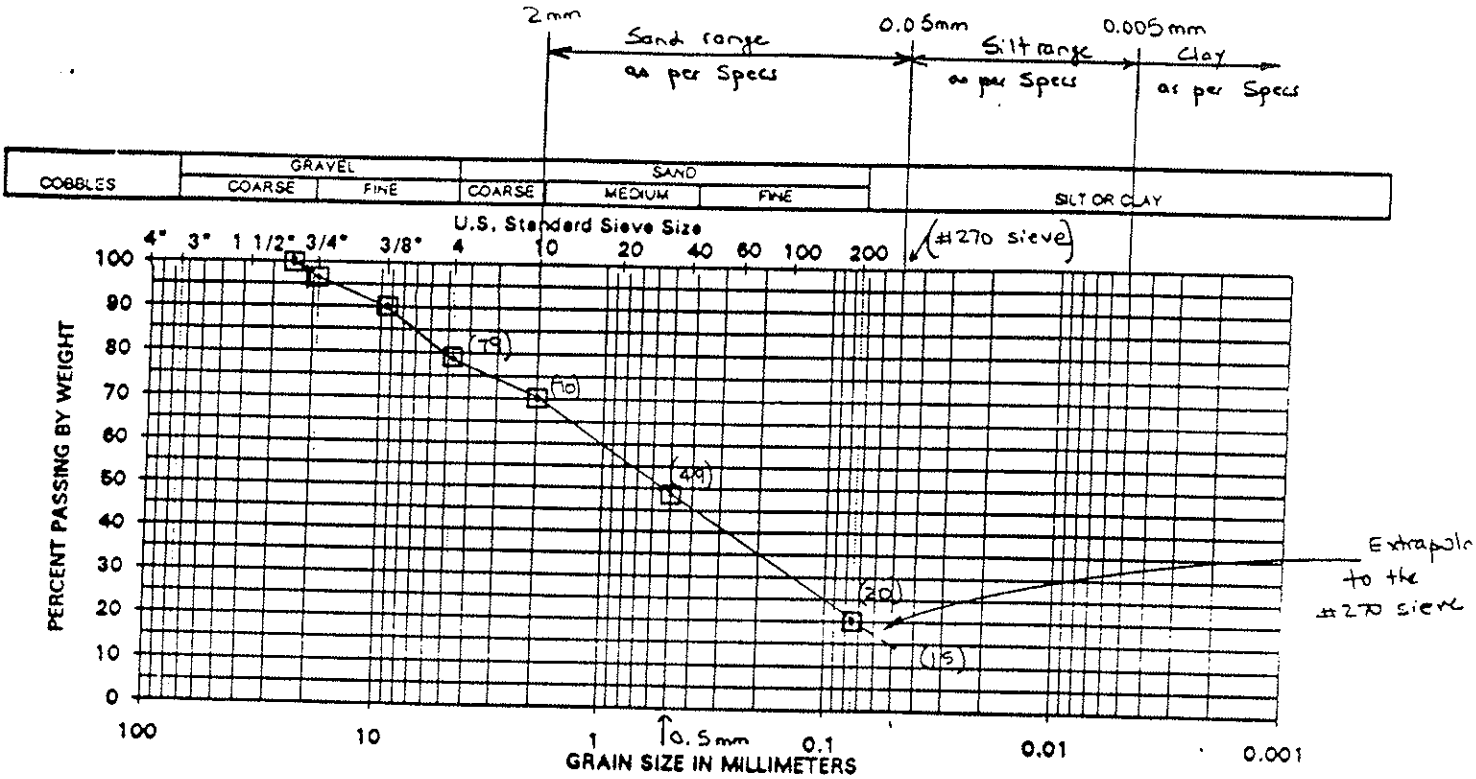
74
- 23.2
50.8 %

% Sand > .5 mm

74
56
18 %

$\frac{18\%}{50.8\%} = 35\%$

Less than 1/2 the sand is greater than .5, therefore the minimum combined silt and clay content shall be 20%



BORING	SAMPLE	DEPTH (FT)	SYMBOL	DESCRIPTION	w (%)	LL	PL
—	—	—	□		—	—	—
—	—	—	■		—	—	—

Spec review, Section 02920, 2.1

(1A) Spec: 2" max. size
Sample: 100% passing 1" } ⇒ OK ✓

(1B) Spec: Organic content ≥ 3.75%
Sample: Organic content = 13.9% } meets specs, OK ✓

(? 1C)

Gradation	Range	If "% larger than 0.5mm" is < 50% of sand content (1)	If "% larger than 0.5mm" is > 50% of sand content (2)	Sample	Status
Sand	2mm - 0.05mm	40 - 80%	40 - 75%	55%	OK
Silt	0.05mm - 0.005 mm	10 - 30%		12%	OK
Clay	0.005mm and smaller	10 - 30%	15 - 30%	8%	
Silt + Clay		≥ 20%	≥ 25%	20%	OK

Extrapolating gradation curve to the #270 sieve, % passing #270 sieve = 15%
⇒ Sand content of sample = 70 - 15 = 55%
⇒ 50% of sand content = 55/2 = 22.5%
⇒ % Larger than 0.5mm = 70 - 49 = 21%
} ⇒ "% larger than 0.5mm" is < 50% sand content
⇒ column (1) applies
⇒ gradat of sample is OK ✓

(D) Spec: pH = 6.0 - 7.0
Sample: pH = 7.0 } meets specs, OK ✓

Alfredo Alfredo Fax
328-4176

FAIRWAY

Quality Assurance

February 8, 1996

TOPSOIL - ALFREDO NURSERY

client Breco Mechanical Group

project Pelham Landfill

subject Topsoil Analysis

On February 7, 1996, a representative form this firm visited the Labriolla composting yard and picked up two soil samples. Test results are shown below.

	Sample	Location
	~~A~~	~~On-site soil, (South pit face)~~
*	B	Blended topsoil, (on-site soil with mulch)

Percent Passing by Weight

Sieve Size	A	B
1"	100	100
3/4"	94	92
3/8"	91	81
No. 4	84	78
Sand { No. 10	77	75
Sand { No. 35 — .5 Sieve	63	64
Sand { No. 270	26.7	28.4
Silt, %	24.6	25.9
Clay, %	2.1	2.5
Combined Silt & Clay	26.7	28.4 ✓
pH	7.1	6.6
Organic Content, %	2.0	7.5
Nitrogen, ppm	50	150
Potash, ppm	200	150
Phosphorus, ppm	150	125
Specific Conductance Micro MHO/cm	350	400

Total % Sand

75
- 28.4
46.6 %

% Sand > .5 mm

75
64
11 %

11% / 46.6% = 23.6%

less than ½ the sand is greater than .5, therefore the minimum combined silt and clay content shall be 20%

FAIRWAY TESTING CO., INC.

R. J. Aguanno, P.E.

SECTION 3

(914) 692-6060
FAX (914) 692-2003

TRUFFA SEED COMPANY

Manufacturers of *"VALLEY FARMS"* Brand
Grass Seed & Wild Bird Food

SEED MIX - PELHAM BAY

FAX TRANSMITTAL

Date 3/29/96

Time _____

# of Pages _____
(Including This One)

To: Walt - GPA

From: Tom T.

SUBJECT: Please verify this mixture with final substitutions * thanks

PELHAM BAY LANDFILL REMEDIATION SEED

Grass Seed Type	Application
Asclepias Syriaca (Milkweed)	3.0
* Cassia Fasciculate (Partridge Pea)	0.5
Euthamia graminifolia (Lance-leaf Goldenrod)	0.25
Solidago rugosa (Rough-stemmed Goldenrod)	0.25
Aster Pilosus (White Heath Aster)	0.25
Solidago Canadensis (Canadian Goldenrod)	0.25
Andropogon gerardii (Big Bluestem)	5.0
Schizachyrium scoparius (Little Bluestem)	4.5
Sorghastrom nutans (Indiangrass)	3.5
Panicum virgatum (Switchgrass)	1.5
Rudbeckia hirta (Black-eyed Suman)	0.25
	19.25 LBS/acre

31 INDUSTRIAL DRIVE, MIDDLETOWN, N.Y. 10940

ROCKLAND

Covers up to 15,000 Sq. Ft.

SOLUBLE HYDRO-STARTER

18-20-10

20% Organic Powder Blue

GUARANTEED ANALYSIS

Total Nitrogen (N)	18%
2.8% W.I.N.	
3.7% Ammoniacal Nitrogen	
11.5% Urea	
Available Phosphoric Acid (P_2O_5)	20%
Soluble Potash (K_2O)	10%

Rockland Soluble Hydro-Starter, containing the Premium Nitrogen source, Powder Blue Nitroform® is a suspension type formula which will not leach or volatilize. Hydro-Starter is formulated to give the grass seedling a balanced feeding of required nutrients for maximum results. Hydro-Starter's powder-like consistency contains quick and slow release Nitrogen that will not damage seed in the slurry mix. Equipment wear and tear is significantly reduced. Hydro-Starter may also be used for improved rooting of sod, either before of after planting.

APPLICATION RATES AND YIELDS:

	Coverage	N/1000 sq. ft.	Phosphorus/1000 sq. ft.
40 Lb. Bag	10,000 sq. ft.	.72 lbs.	.8 lbs.
	12,500 sq. ft..	.58 lbs.	.64 lbs.
	15,000 sq. ft.	.48 lbs.	.53 lbs

Pre-Plant Sod Rates: Mix 40 lbs. in 160 to 200 gallon tank with Mechanical agitation and apply to 10,000 Sq. Ft.

B916240

#B918240048

Net Weight 40 Lbs.

® Nitroform is a Registered Trademark of Nor-Am Agricultural Products.

SEED AND FERTILIZER MULCH

TERRA-MULCH

TACKING AGENT III

TERRA-MULCH TACKING AGENT III IS A COMBINATION OF ORGANIC POLYMERS DESIGNED TO STABILIZE SOIL BY SUSPENDING WATER WITHIN THE FIBER MULCH MATRIX, REDUCING EROSION, WHILE INCREASING WATER ABSORPTION INTO THE SEED BED. THIS UNIQUE PRODUCT PROVIDES FOR A BETTER ENVIRONMENT FOR SEED TO GERMINATE IN WHILE INCREASING THE SURFACE TENSION OF ALL TYPES OF HYDRO-SEEDING MULCH MATERIALS - WOOD FIBER, PAPER FIBER AND COMBINATIONS OF WOOD AND PAPER. TACKING AGENT III IS A HIGH VISCOSITY POLYMER TACKIFIER THAT EXCEEDS MINIMUM REQUIREMENTS FOR NON-ASPHALTIC EMULSIONS. A STANDARD APPLICATION OF TACKING AGENT III TREATS AN EQUIVALENT OF 100 LBS OF GRASS SEED WITH AN ACRYLIC CO-POLYMER GEL SEED TREATMENT IMPROVING STRESS TOLERANCE OF YOUNG SEEDLINGS.

PHYSICAL PROPERTIES

NET WEIGHT	8-25-50 LB / BAGS
pH RANGE	7.0 +- .2
VISCOSITY (SAYBOLT)^	102 CPS +- 2
VISCOSITY (SAYBOLT)*	197 CPS +- 2
SURFACE TENSION*	73.9 DYNES / CM
SPECIFIC GRAVITY	.7281

^ VALUE BASED ON 30 LBS PER 1000 GALLONS OF WATER
* VALUE BASED ON 60 LBS PER 1000 GALLONS OF WATER

VISCOSITY AND SURFACE TENSION TESTING BASED ON SIMULATED FIELD APPLICATION AFTER 5 MINUTES OF MECHANICAL AGITATION.

APPLICATION RATES

MULCH BINDING

6 / 1 TO 4 / 1 SLOPE	20 LBS PER ACRE
4 / 1 TO 2 / 1 SLOPE	30 LBS PER ACRE
2 / 1 TO 1 / 1 SLOPE	40 LBS PER ACRE
>THAN 1 / 1 SLOPE	60 LBS PER ACRE

STRAW & HAY MULCH BINDING

30 LBS TACK III & 150 LBS CELLULOSE FIBER AND 1000 GALLONS OF WATER PER ACRE OR 50 LBS OF TACK III PER 1000 GALLONS OF WATER PER ACRE.

TERRA-MULCH TACKING AGENT III CONTAINS THE KNOWN FLOCCULANT POLYACRYLAMIDE (PAM). IN 1994 TACKING AGENT III WAS EVALUATED BY A MAJOR TURF UNIVERSITY TO DETERMINE ITS VALUE AS A SOIL STABILIZER. TACK III WAS APPLIED ALONE AT A RATE 60 LBS PER ACRE ON A 45% SLOPE. THE TEST PLOTS WERE SUBJECTED TO SIMULATED RAINFALL OF 12 INCHES PER HOUR FOR 30 MINUTES, THE SIMULATION TOOK PLACE WITHIN 2 HOURS OF SEEDING. TACKING AGENT III REDUCED EROSION VERSUS THE CONTROL BY 68.6% AND REDUCED WATER RUNOFF BY 21.7%. TACKING AGENT III CONTAINS A MARKER DYE FOR EASY METERING OF THE SPRAYED AREA WHEN TACKING HAY AND STRAW MULCHES. TACKING AGENT III BECOMES SLIPPERY WHEN WET. CLEAN UP ALL SPILLS THOROUGHLY. ASK YOUR DEALER ABOUT OUR *TERRA-MULCH SATISFACTION GUARANTEE.*

MANUFACTURED BY

SPITTLE ENTERPRISES, INC
PO BOX 1918
HUNTERSVILLE, NC 28078

DISTRIBUTED BY

REFIBER WEST
WOOD RECYCLING INC
3 WHEELING AVENUE
WOBURN, MA 01801
800-982-8732

MULCH FOR HYDROSEEDING

RE FIBER™ Wood

100% Recycled Wood Fiber

RE-FIBER Wood is a wood fiber mulch designed for hydraulic seeding and erosion protection that's manufactured using wood that is 100% recycled. It is engineered for discriminating landscape professionals and is created in harmony with today's environmental concerns.

▶ **RE-FIBER Wood** is university-tested.

In field and laboratory tests, Re-Fiber Wood allowed significantly less soil runoff and produced greater plant size and bulk than its competitors. Its custom-designed fiber length assures rapid and efficient absorption of water for a homogeneous mixture in hydraulic mulching equipment. Hydroseeders can count on easy handling and a uniform application.

▶ **RE-FIBER Wood** is 100% biodegradable.

It is specially formulated to protect the seed and soil from wind and heavy rainfall and gradually decompose as the lush carpet of lawn is established. The mulch contains no germination or growth-inhibiting materials.

▶ **RE-FIBER Wood** SPECIFICATIONS

Moisture Content (total weight basis)	12%±3%
pH (average)	5.4
Organic Content (minimum)	99%
Inorganic (ash) Content (maximum)	1%
Water Holding Capacity (minimum)	1 gal./lb.
Bag Net Weight	50 lb.-22.6 kg

RE-FIBER Wood is packaged in 50 pound color-coded bags for easy measurement and convenience. The durable bags are constructed from recyclable plastic and are suitable for outside storage.

RE-FIBER Wood
manufactured by
Wood Recycling, Inc.

Distributed by

For further information, call Wood Recycling, Inc • (800) 982-8732

3 WHEELING AVENUE • WOBURN, MA 01801 • (617) 937-0855 • FAX (617) 932-0945

Printed on Recycled Paper

SECTION 4

SERIES 4
Versare Primers

PRODUCT PROFILE

GENERIC DESCRIPTION Modified Alkyd

COMMON USAGE Rust inhibitive primer for shop and field coating of structural and miscellaneous steel, tanks and machinery. Used under alkyd and water base acrylic topcoats.

COLORS 55 Red, 56 Gray, 57 White

PERFORMANCE CRITERIA Extensive test data available. Contact your Tnemec representative for specific test results.

COATING SYSTEMS

TOPCOATS Series 2H, 6, 7, 23, 43-38, 82, 113, 114. **Note:** Some systems are not for use on surfaces that are continually wet or sweat frequently. Reference the applicable topcoat data sheet for additional information.

SURFACE PREPARATION

STEEL SSPC-SP2 Hand Tool or SSPC-SP3 Power Tool Cleaning
SSPC-SP6 Commercial Blast Cleaning when extended field exposure is expected.

ALL SURFACES Must be clean, dry and free of oil, grease and other contaminants.

TECHNICAL DATA

VOLUME SOLIDS* 54.0 ± 2.0%

RECOMMENDED DFT 2.0 to 3.5 mils (50 to 90 microns) per coat.

CURING TIME

Temperature	*To Handle*	*To Recoat*
75°F (24°C)	4 hours	12 hours

Curing time varies with air & substrate temperature, air movement, humidity and film thickness.

VOLATILE ORGANIC COMPOUNDS

Unthinned	*Thinned 10%*
2.88 - 3.05 lbs/gallon (345 - 366 grams/litre)	3.20 - 3.36 lbs/gallon (384 - 403 grams/litre)

THEORETICAL COVERAGE* 866 mil sq ft/gal (21.3 m²/L at 25 microns). See APPLICATION for coverage rates.

NUMBER OF COMPONENTS One

PACKAGING 55 gallon (208.2L) drums, 5 gallon (18.9L) pails and 1 gallon (3.79L) cans.

NET WEIGHT PER GALLON* 12.14 ± 0.25 lbs (5.51 ± .11 kg)

STORAGE TEMPERATURE Minimum 20°F (-7°C) Maximum 110°F (43°C)

SHELF LIFE 24 months at recommended storage temperature.

FLASH POINT - SETA 100°F (38°C)

HEALTH & SAFETY Paint products contain chemical ingredients which are considered hazardous. Read container label warning and Material Safety Data Sheet for important health and safety information prior to the use of this product. **Keep out of the reach of children.**

Centrifugal Blower
Color Selection

APPLICATION

COVERAGE RATES*

	Dry Mils (Microns)	Wet Mils (Microns)	Sq Ft/Gal (m^2/Gal)
Suggested	2.5 (65)	4.5 (115)	346 (32.2)
Minimum	2.0 (50)	3.5 (90)	433 (40.2)
Maximum	3.5 (90)	6.5 (165)	247 (23.0)

Allow for overspray and surface irregularities. Film thickness is based upon closest 0.5 mil (5 microns). Application of coating below minimum or above maximum recommended dry film thicknesses may adversely affect coating performance.

MIXING Stir thoroughly, making sure no pigment remains on the bottom of the can.

THINNING Use No. 1 Thinner or mineral spirits. For air spray, thin up to 10% or ¾ pint (380 mL) per gallon. For airless spray, brush or roller, thin up to 5% or ¼ pint (190 mL) per gallon.

SURFACE TEMPERATURE Minimum 40°F (4°C) Maximum 120°F (49°C)
The surface should be dry and at least 5°F (3°C) above the dew point.

APPLICATION EQUIPMENT

Air Spray

Gun	Fluid Tip	Air Cap	Air Hose ID	Mat'l Hose ID	Atomizing Pressure	Pot Pressure
DeVilbiss MBC or JGA	E	765 or 78	5/16" or 3/8" (7.9 mm or 9.5 mm)	3/8" or 1/2" (9.5 mm or 12.7 mm)	60-80 psi (4.2-5.5 bar)	10-20 psi (0.7-1.4 bar)

Low temperatures or longer hoses require higher pot pressure.

Airless Spray

Tip Orifice	Atomizing Pressure	Mat'l Hose ID	Manifold Filter
0.015"-0.019" (380-485 microns)	1800-3000 psi (124-207 bar)	1/4" or 3/8" (6.4 mm or 9.5 mm)	60 mesh (250 microns)

Use appropriate tip/atomizing pressure for equipment, applicator technique and weather conditions.

Roller: Use high quality synthetic nap covers. Use 1/4" to 1/2" (6.4 mm to 12.7 mm) nap depending on surface roughness.

Brush: Use high quality natural or synthetic bristle brushes.

CLEANUP Flush and clean all equipment immediately after use with the recommended thinner or mineral spirits.

* Values may vary with color.

SERIES 23 Enduratone

TNEMEC

PRODUCT PROFILE

GENERIC DESCRIPTION Alkyd

COMMON USAGE Semi-gloss industrial enamel. Good flow, hiding and protection for most surfaces in mild to moderately severe exposures. Not for use on surfaces that are continually wet or sweat frequently.

COLORS Refer to Tnemec ColorBook.

FINISH Semi-gloss

SPECIAL QUALIFICATIONS Certain colors meet **USDA** requirements for use in federally inspected meat and poultry plants.

PERFORMANCE CRITERIA Extensive test data available. Contact your Tnemec representative for specific test results.

COATING SYSTEMS

PRIMERS

Steel: Series 4, 10, 37H, 50-330, 59
Galvanized Steel and Non-Ferrous Metal: Series 27. **Note:** Apply an intermediate coat of Series 27 or scarify the surface of Series 27 that has been exterior exposed for 3 weeks or longer prior to topcoating with 23. Brush blasting with fine abrasive is the preferred method of scarification.
Interior Drywall: 51-792
Wood: 36-603

SURFACE PREPARATION

ALL SURFACES Must be clean, dry and free of oil, grease and other contaminants. Remove rust and paint not tightly bonded. Spot prime.

TECHNICAL DATA

VOLUME SOLIDS* 55.5 ± 2.0%

RECOMMENDED DFT 1.5 to 3.0 mils (40 to 75 microns) per coat. **Note:** Number of coats required will vary depending on color, substrate (surface) and other variables. Contact your Tnemec representative for specific recommendations.

CURING TIME

Temperature	*To Touch*	*To Handle*	*To Recoat*
75°F (24°C)	5-7 hours	9-13 hours	12-18 hours

Curing time varies with air & substrate temperature, air movement, humidity and film thickness.
Water Tank Exteriors: Five days or more curing time required before filling with water.

VOLATILE ORGANIC COMPOUNDS

Unthinned	*Thinned 10%*
2.88 - 3.04 lbs/gallon (345 - 364 grams/litre)	3.20 - 3.35 lbs/gallon (384 - 401 grams/litre)

THEORETICAL COVERAGE* 890 mil sq ft/gal (21.8 m²/L at 25 microns). See APPLICATION for coverage rates.

NUMBER OF COMPONENTS One

PACKAGING 55 gallon (208.2L) drums, 5 gallon (18.9L) pails and 1 gallon (3.79L) cans.

NET WEIGHT PER GALLON* 11.70 ± 0.25 lbs (5.31 ± .11 kg)

STORAGE TEMPERATURE Minimum 20°F (-7°C) Maximum 110°F (43°C)

SHELF LIFE 24 months at recommended storage temperature.

FLASH POINT - SETA 100°F (38°C)

HEALTH & SAFETY Paint products contain chemical ingredients which are considered hazardous. Read container label warning and Material Safety Data Sheet for important health and safety information prior to the use of this product. **Keep out of the reach of children.**

COLOR - PA-39 Polar Morn

APPLICATION

COVERAGE RATES*

	Dry Mils (Microns)	Wet Mils (Microns)	Sq Ft/Gal (m^2/Gal)
Suggested	2.0 (50)	3.5 (90)	445 (41.3)
Minimum	1.5 (40)	2.5 (65)	593 (55.1)
Maximum	3.0 (75)	5.5 (140)	297 (27.6)

Allow for overspray and surface irregularities. Film thickness is based upon closest 0.5 mil (5 microns). Application of coating below minimum or above maximum recommended dry film thicknesses may adversely affect coating performance.

MIXING Stir thoroughly, making sure no pigment remains on the bottom of the can.

THINNING Use No. 1 Thinner or mineral spirits. For air spray, thin up to 10% or ¾ pint (380 mL) per gallon. For airless spray, brush or roller, thin up to 5% or ¼ pint (190 mL) per gallon.

SURFACE TEMPERATURE Minimum 40°F (4°C) Maximum 120°F (49°C)
The surface should be dry and at least 5°F (3°C) above the dew point.

APPLICATION EQUIPMENT

Air Spray

Gun	Fluid Tip	Air Cap	Air Hose ID	Mat'l Hose ID	Atomizing Pressure	Pot Pressure
DeVilbiss MBC or JGA	E	765 or 78	5/16" or 3/8" (7.9 mm or 9.5 mm)	3/8" or 1/2" (9.5 mm or 12.7 mm)	60-80 psi (4.2-5.5 bar)	10-20 psi (0.7-1.4 bar)

Low temperatures or longer hoses require higher pot pressure.

Airless Spray

Tip Orifice	Atomizing Pressure	Mat'l Hose ID	Manifold Filter
0.013"-0.017" (330-430 microns)	1800-3000 psi (124-207 bar)	1/4" or 3/8" (6.4 mm or 9.5 mm)	60 mesh (250 microns)

Use appropriate tip/atomizing pressure for equipment, applicator technique and weather conditions.

Roller: Use high quality synthetic nap covers. Use 1/4" to 1/2" (6.4 mm to 12.7 mm) nap, depending on surface roughness.

Brush: Use high quality natural or synthetic bristle brushes.

CLEANUP Flush and clean all equipment immediately after use with the recommended thinner or mineral spirits.

* Values may vary with color.

SECTION 5

11200 -
2.1 B

The Fleet Companies

G. A. Fleet Associates, Inc.

P. O. Box 616
Harrison, NY 10528
G. A. Fleet Assoc.
(914) 835 - 4000
Fax (914) 835 - 1331
Fleet Pump & Service
(914) 835 - 3801
Fax (914) 835 - 2946

Important:
This drawing is not to scale-use dimensions shown. Do not fix foundation bolts rigidly until equipment is in place, since castings vary slightly in dimensions.

FLYGT Submersible Pump and Accessories

Sold To:
Barbella Environment Tech, Inc.
P. O. Box 273
Salem Industrial Park, Bldg #8
Whitehouse, NJ 08888
Contact: Thomas Jackson

Ship To:
BET c/o Pelham Bay Landfill
Pelham Bridge Road
Hunt's Point Area
Bronx, NY

Engineer: _____ **Date:** 3/15/94 **Customer Order No.** 1547

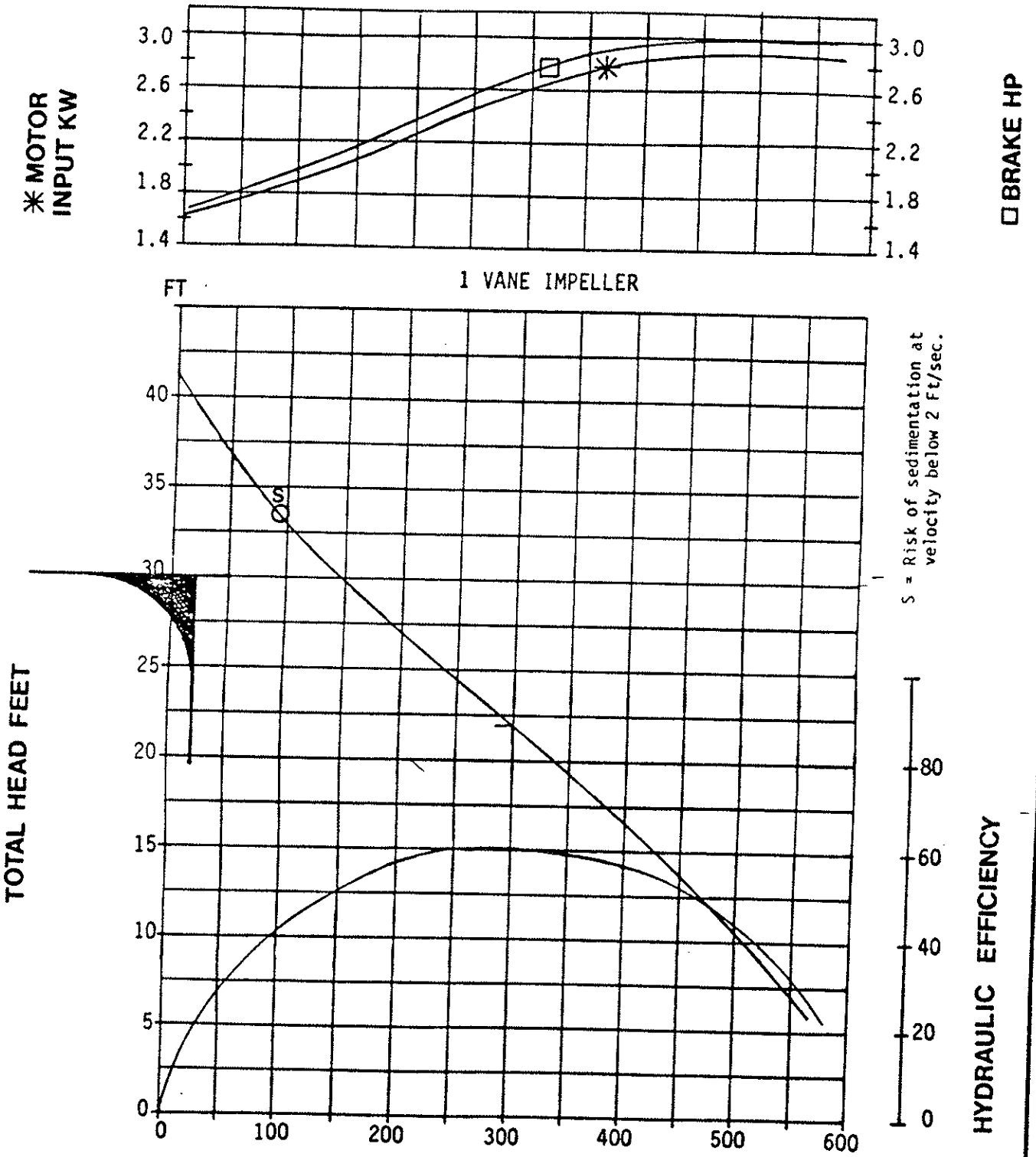
Equipment Serial No: _____ **Distr. Order No.** E18811

Marks: Pelham Landfill, Bronx, NY **Sheet:** 1 **Of:** 2 **By:** _____

QTY	DESCRIPTION
6	**Unit or Frame:** Flygt Model 3" **CP-3085X** with FLS Leak Detection **Impeller:** 434 **Installation:** **GPM** 20 USGPM **TDH** 30' TDH
6	**Motor:** Flygt Submersible **HP** 3 **RPM** 1800 **Volts** 460 **Phase** 3 **Cycle** 60 **Description:** TENV - Air Filled - Class F Insulation - FM Listed - Nema B Type - 1.15 S. F. **Control Voltage:** 24 Volt
	Control & Accessories
6	40 ft. SUBCAP, 14 AWG/7 19 MM Submersible Power Cables with Kellems Cable Grips
6	3" Cast Iron Discharge Elbows with Integral Lower Guide Bar Brackets and Sparkproof Discharge Adapters
6	Upper Guide Bar Brackets
6	20' Galvanized Lifting Chain
6	Certified Performance Tests. Curves to be Supplied for Engineer's Approval Prior to Shipment
3	Aluminum Access Covers (ϕ5' M. H.) w/ Pump Access Hatch (30" x 48")
3	Firetrol Model FTA620-HGO3B-X2275*001 Duplex Control Panel with options as follows: 3 by 3 HP, 440-480/3/60 Power Output NEMA 3R Exterior Enclosure NEMA 7 XP Interior Enclosure Two (2) Motor Starters HOA Selector Switches Pump Run Pilot 120V Space Heater and Thermostat Automatic Alternator with P1 Auto P2 Selector Switch Audible and Visible High Water Alarm Motor Start Counter Convenience Outlet 120V Industrial Relays for Start, Stop, and Alarm (HWA) Mini-CAS Relays B & W Electrode Probes

DWG: No. D-10

3.0 HP - 4 Pole Motor 3ϕ: 200, 230/460, 575V	**CP/CS 3085** Wastewater Impeller 434	SECTION 3085 SUPERSEDES	PAGE 8/434 ISSUED 4/86



FLOW GPM

NOTE: THE C3085 IS AVAILABLE IN CP AND CS TYPES ONLY. FOR CT TYPE USE MODEL 3085/82.

PERFORMANCE CURVES ARE BASED ON TESTS WITH CLEAR WATER AT AMBIENT TEMPERATURE.

FLYGT CORPORATION
A SUBSIDIARY OF ITT
129 GLOVER AVE., NORWALK, CT. 06856

CP-3085

Outline Dimensions

SECTION	PAGE
4	1
SUPERSEDES	ISSUED
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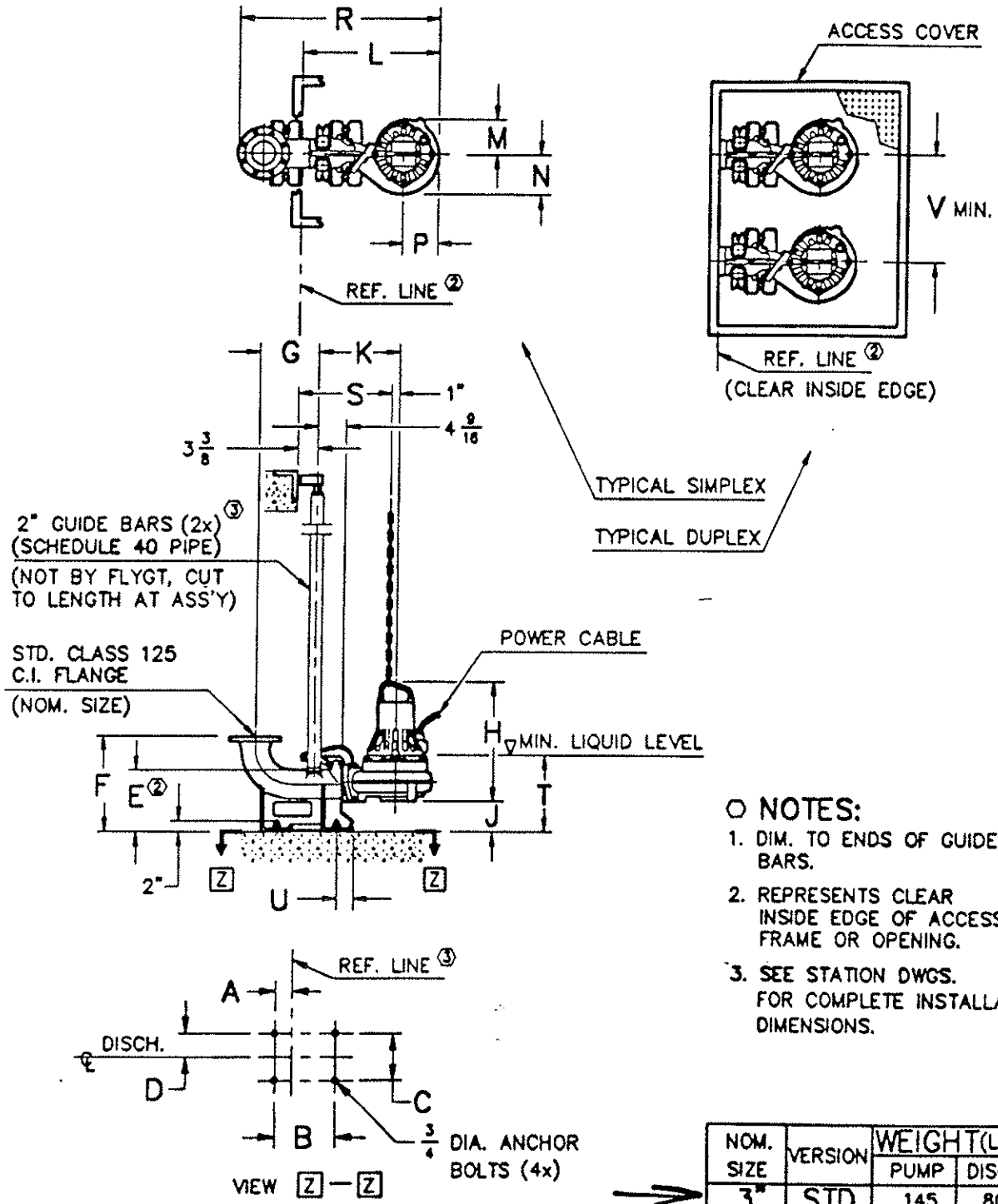

NOTES:

1. DIM. TO ENDS OF GUIDE BARS.
2. REPRESENTS CLEAR INSIDE EDGE OF ACCESS FRAME OR OPENING.
3. SEE STATION DWGS. FOR COMPLETE INSTALLATION DIMENSIONS.

NOM. SIZE	VERSION	WEIGHT (LBS)	
		PUMP	DISCH
3"	STD	145	80
~~4"~~	~~STD~~	~~145~~	~~80~~

ALL DIMENSIONS IN INCHES

NOM. SIZE	VERSION	DIMENSIONAL CHART																			
		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V
3"	STD	2 5/16	9 7/8	7 3/4	3 3/8	10 1/4	15 3/4	9 3/8	20	4 5/8	13 3/4	23 1/4	5 3/4	6 3/4	6 5/8	33 1/4	15 3/4	12 1/4	2 3/4	17 3/4
~~4"~~	~~STD~~	~~2 3/4~~	~~9 7/8~~	~~7 3/4~~	~~3 3/8~~	~~10 1/4~~	~~15 3/4~~	~~9 3/8~~	~~20~~	~~5~~	~~13 3/4~~	~~23 1/4~~	~~5 3/4~~	~~6 3/4~~	~~6 5/8~~	~~33 1/4~~	~~15 3/4~~	~~12 1/4~~	~~2 3/4~~	~~17 3/4~~

FLYGT

FLYGT CP3085 ~~AND 3102~~ SUBMERSIBLE PUMPS MATERIALS OF CONSTRUCTION

CASING	-	Cast Iron, Class 30
IMPELLER	-	Cast Iron, Class 30*
SHAFT	-	Stainless Steel, AISI 420
MECHANICAL SEAL	-	Double Type
UPPER	-	Carbon Rotating/Carbon Ceramic Stationary
LOWER	-	Tungsten Carbide Rotating/Tungsten Carbide Stationary
FASTENERS	-	Stainless Steel, AISI 304
"O" RINGS	-	Nitrile Rubber

*INDICATES: Bronze not available

(b:flymtcon.mw)

C/D-3085

Electrical Data

SECTION	MODEL
6	3085
SUPERSEDES	ISSUED
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MOTOR DATA

RATED OUTPUT POWER HP (KW)	Ø	VOLTS NOM.	FULL LOAD AMPS	LOCKED ROTOR AMPS	LOCKED ROTOR KVA	LOCKED ROTOR CODE LETTER KVA/HP	RATED INPUT POWER KW	POLES/RPM
1.6 (1.2)	1	230	7.1	23.0	5.3	B	1.6	4/1700
2.0 (1.6)	3	200 230 460 575	7.4 6.4 3.2 2.6	33.8 29.4 14.7 11.8	11.7	G	2.2	4/1700
2.4 (1.8)	1	230	10.0	46.0	10.6	D	2.3	4/1700
*2.9 (2.2)	1	230	12.0	47.0	11.0	C	2.8	2/3450
3.0 (2.4)	3	~~200~~ ~~230~~ 460 ~~575~~	~~10.0~~ ~~9.0~~ 4.5 ~~3.0~~	~~55.2~~ ~~46.0~~ 24.0 ~~19.2~~	19.1	H	3.0	4/1700
*4.0 (3.0)	3	200 230 460 575	11.0 10.0 5.0 4.0	69.9 60.8 30.4 24.2	24.2	G	3.6	2/3450

Pump Motor HP	EFFICIENCY			POWER FACTOR		
	100% LOAD	75% LOAD	50% LOAD	100% LOAD	75% LOAD	50% LOAD
1.6	75.0	76.6	74.1	0.98	0.99	0.97
2.0	73.5	74.5	72.5	0.82	0.75	0.64
2.4	80.0	81.7	79.0	0.98	0.99	0.97
~~*2.9~~	~~80.5~~	~~82.2~~	~~79.5~~	~~0.99~~	~~0.99~~	~~0.98~~
3.0	77.5	78.5	76.5	0.82	0.75	0.64
~~*4.0~~	~~81.5~~	~~82.5~~	~~81.5~~	~~0.92~~	~~0.89~~	~~0.89~~

CABLE DATA

HP	VOLTS	MAX. LENGTH FT.	CABLE SIZE	NOMINAL DIA.	CONDUCTORS (IN ONE CABLE)
1.6 (1Ø)	230	320	#14/7	19.0mm (0.75")	(3) #14AWG (PWR) (2) #14AWG (CTRL) (1) #14AWG (GND) (1) #14AWG (GC)
2.0 (3Ø)	200 230 460 575	265 350 1400 2180			
2.4 (1Ø)	230	225			
~~*2.9 (1Ø)~~	~~230~~	190			
3.0 (3Ø)	~~200~~ ~~230~~ 460 ~~575~~	~~195~~ ~~290~~ 1000 ~~4560~~			
*4.0 (3Ø)	200 230 460 575	~~180~~ 225 900 1400			

* FOR VORTEX IMPELLER PUMPS

FLIGHT

MASTER SPEC LIST FOR CP-PUMP CABLES

SUBMERSIBLE PUMPS - FLYGT CP-3085

CABLE SPEC'S:

JACKET:	Dupont Hypalon (Chlorosulfinated)
INSULATION:	Dupont Nordel (Ethylene)
CABLE DIAMETER:	0.75" dia.
CONDUCTOR SIZES:	3-# 14 (Power Leads), 2-# 14 (Thermal Switches), 1-# 14 (Ground Lead), 1-# 14 Ground Check)
COLOR CODES FOR LEADS:	**Red, White & Black** - (POWER LEADS) **Green** - (GROUND LEAD) **Yellow/Green** - (GROUND LEAD) **Blue & Orange** - (THERMAL SWITCHES)

D:b
(speccppc)

Special Purpose Pumps

SECTION	PAGE
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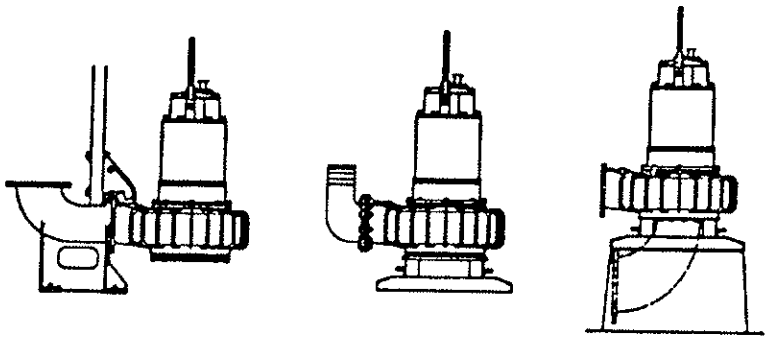
EXPLOSIONPROOF PUMPS

These units are special versions, model number suffix (X), of ITT Flygt's standard wastewater pumps constructed to meet explosionproof requirements and are Factory Mutual Systems approved for use in hazardous locations defined as Class 1, Division 1, Groups C and D (gasses and vapors) Class 2, Div.1, Groups E & G (dusts), Class 3, Div. 1, (fibers and flyings).
To achieve this approval, pumps are assembled from selected castings that are redesigned with longer flame paths and closer tolerences. Cable entries are specially designed as well.

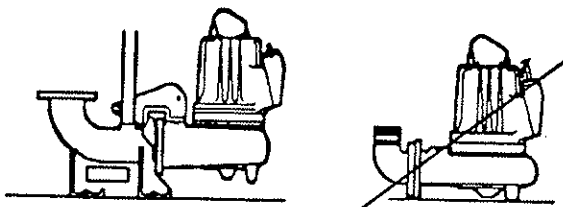
Model	Horsepower
3085 (X)	1.6 - 3
3102 (X)	5.0 - 5
3127 (X)	6.4 - 10
3152 (X)	14.0 - 25
3170 (X)	25.0 - 30
3201 (X)	29.0 - 47
3230 (X)	120.0 - 214
3300 (X)	32.0 - 120
3085 (X)	100.0 & 140
3311 (X)	104.0 - 328
3355 (X)	74.0 - 448
3500 (X)	100.0 - 280
3530 (X)	100.0 - 600
3531 (X)	100.0 - 800
3601 (X)	100.0 - 800
3602 (X)	100.0 - 600



FIBROUS WASTE CUTTER PUMPS

These units, FP and FS prefix to model number, are constructed of cast iron and have non-clogging type impellers with cutter attachment for pumping wastewater containing stringy or fibrous materials or agricultural waste.

Model	Horsepower
F-3085	2.3 - 3
F-3102	4.0 - 5
F-3127	7.6 - 7.6
F-3152	16.0 - 20

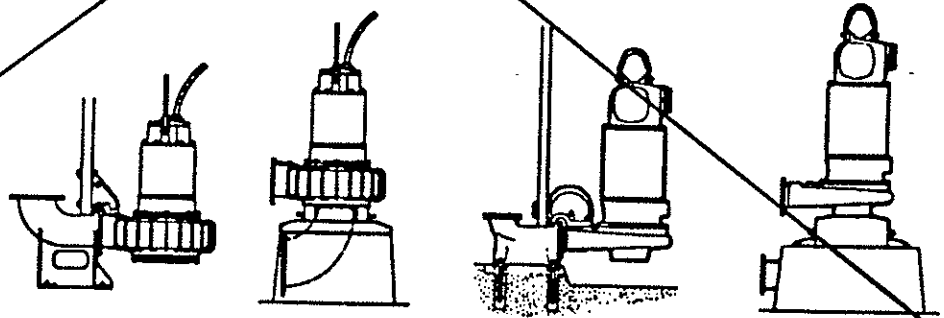


RAW WATER PUMPS

These submersible pumps are for use in clean or raw water applications with capacities exceeding 2,500 GPM and total dynamic heads up to 320 feet. Motor output ranges from 32 to 214 HP. Hydraulic efficiencies of between 71% and 77% are obtained at the best efficiency points.

Impellers are of multi-vane design.

Model	Horsepower
3230	120 - 214
3300	32 - 120

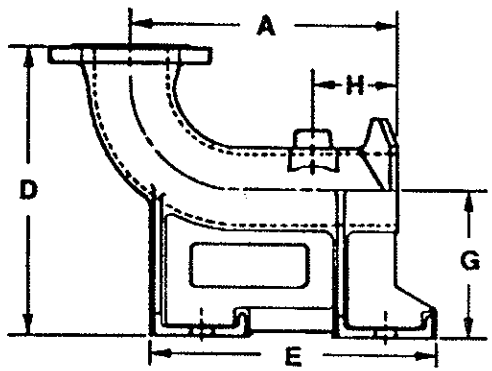


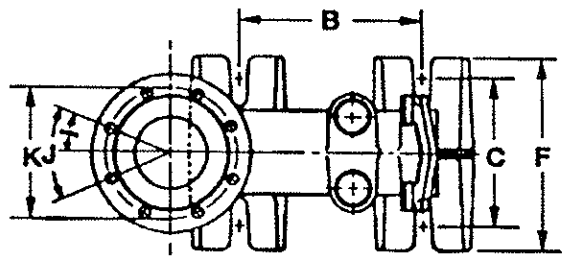
RP 3300 RT 3300 RP 3230 RT 3230

Standard Discharge Connection
Dimensions

Pump Model	Discharge Conn.	Discharge Inlet	Conn. Outlet	A	B	C	D	E	F	G	H	I	J	K
~~2 1/2" - 3067~~	~~490 17 06~~	~~2 1/2"~~	~~2 1/2"~~	~~11 5/8~~	~~7 7/8~~	~~5 3/4~~	~~9 7/8~~	~~11 1/2~~	~~7 7/8~~	~~6 1/2~~	~~4 9/16~~	~~45°~~	~~90° X 4~~	~~5 1/2~~
3" - ~~3060~~, 3085, ~~3085/82~~,	444 68 05	3"	3"	14	9 7/8	7 3/4	15 3/4	15 3/8	10 5/8	7 7/8	"	"	"	6
~~4" - 3060, 3085, 3085/82~~, 3102, 3127, 3140, 3152	~~540 13 05~~	~~4"~~	~~4"~~	~~14 5/8~~	"	"	"	"	"	"	"	~~22.5°~~	~~45° X 8~~	~~7 1/2~~
4" - 3170	540 13 05	4"	4"	"	"	"	"	"	"	"	"	"	"	"
6" - 3102, 3127, 3140, 3152, 3201, 3170	444 70 06	5 1/2"	6"	15 9/16	11	9 1/2	17 3/4	"	12 3/16	9 7/8	"	"	"	9 1/2
8" - 3127, 3152, 3170, 3201, 3300	444 71 06	6"	8"	16 3/4	"	"	"	15	"	10 1/8	"	"	"	11 3/4
8" - 3230	388 24 06	8"	8"	21 5/8	19 11/16	16 3/4	"	23 5/8	19 3/4	8 7/8	6 7/8	"	"	"
10" - 3140, 3201	444 73 05	8"	10"	18 3/4	"	9 1/2	"	24	12 3/16	"	4 9/16	15°	30° X 12	14 1/4
10" - 3152, 3170	481 76 05	10"	10"	18 11/16	"	7 7/8	"	"	"	"	"	"	"	"
12" - 3152, 3170,3300	481 75 05	10"	12"	21 5/8	"	20 3/4	31 1/2	25 5/8	24 7/16	19 11/16	"	"	"	17
12" - 3201	481 77 05	12"	12"	"	"	20 13/16	"	25 9/16	"	"	"	"	"	"
12" - 3305, 3311	373 92 05	12"	12"	24 5/8	25 9/16	24 1/2	23 5/8	29 1/2	27 9/16	10 13/16	6 7/8	"	"	"
14" - 3201, 3300	320 15 05	12"	14"	22 5/8	19 11/16	21	33 1/2	25 5/8	24 7/16	19 11/16	4 9/16	"	"	18 3/4
14" - 3311	442 16 05	12"	14"	25 9/16	25 9/16	24 1/2	23 5/8	29 1/2	27 9/16	11 13/16	6 7/8	"	"	"
14" - 3355	388 27 05	14"	14"	"	"	"	"	"	"	"	"	"	"	"
20" - 3500, 3530, 3531	387 90 05	20"	20"	30 1/2	31 1/2	28 1/2	33	35 7/16	31 1/2	15 3/8	8 7/8	9°	18° X 20	25
24" - 3601, 3602	388 65 05	24"	24"	33	35 7/16	32 5/8	37 3/8	39 3/8	35 7/16	17 3/4	"	"	"	29 1/2

ALL DIMENSIONS ARE IN INCHES





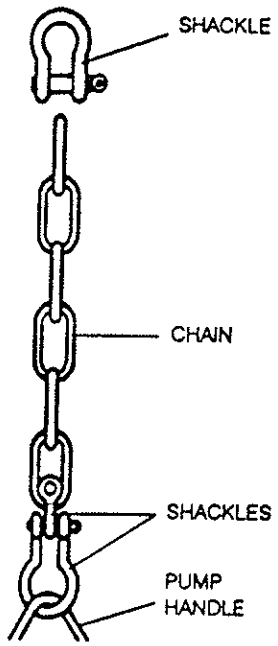
Note:
Discharge connection shown is typical for all sizes. Note the actual discharge connection may vary from that shown.

Lifting Chain & Cable

CHAIN

Chain is hot dipped galvanized carbon steel and may be ordered in any length. Fittings consist of two end shackles and are available in kits.

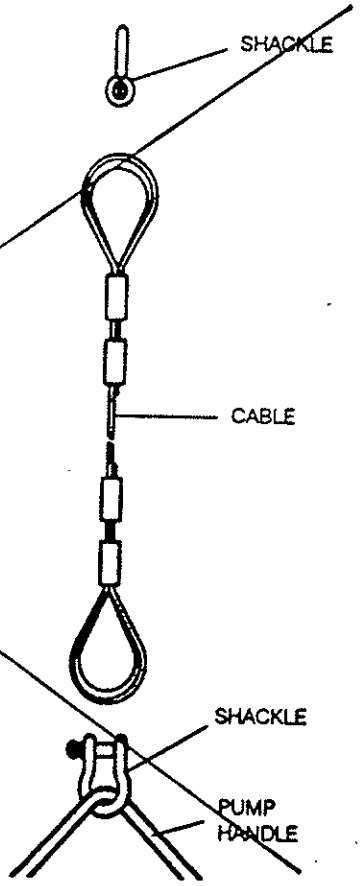
PUMP MODELS:	CHAIN SIZE:
3067, 3080, 3085, 3085/82, 3102, 3127.	5/0 Straight Coil
3140, 3152	5/16" Proof Coil
3170, 3201	3/8" Proof Coil
3230, 3300, 3305, 3355	7/16" Hi-Test
3311	1/2" Hi-Test
3351,3500,3530,3531,3601, 3602	Contact ITT Flygt Engineering



CABLE

Cable is stainless steel and may be ordered in the lengths shown below. For other lengths, contact ITT Flygt Application Engineering. Fittings consist of two end shackles and are available in kits.

PUMP MODELS:	CABLE SIZE:
3067 Thru 3152	1/4" – (316 stainless steel)
3170, 3201, 3230, 3300, 3305, 3355	3/8" – (304 stainless steel)
3311, 3351,3500, 3530, 3531, 3601, 3602	Contact ITT Flygt Engineering



LENGTHS:

For Models 3067 Thru 3152 -- 316 stainless steel cable is available in 20 to 55 foot lengths (in 5 foot increments).

All other models -- 304 stainless steel cable is available in 20, 25, and 30 foot lengths.

SECTION	PAGE
10	6
SUPERSEDES	ISSUED
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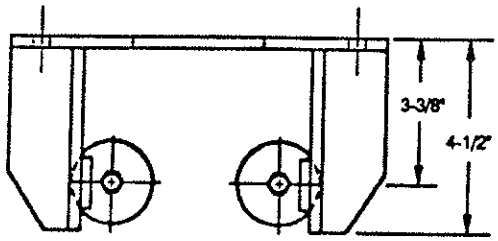
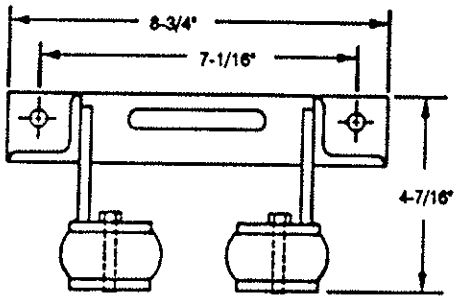
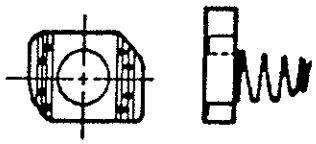
Upper Guide Bar Brackets

UPPER GUIDE BAR BRACKET



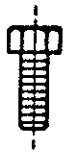




LATERAL NUT WITH SPRING

PLAIN WASHER

LOCK WASHER



HEX. HEAD BOLT

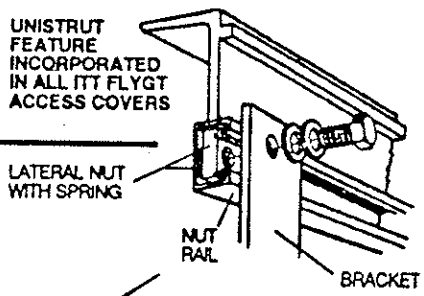
KIT NO. 14 58 93 15
(Galvanized Steel)

Standard for the following "CP" pumps:

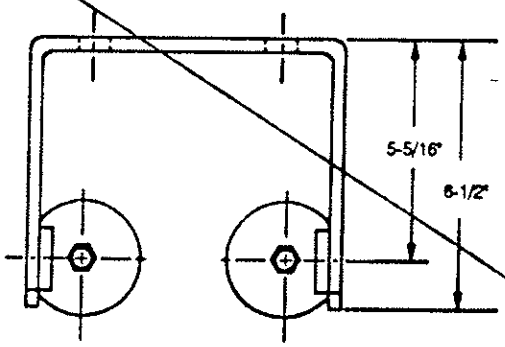
3067
~~3080~~
3085
~~3102~~
3126
3127
3140
3152

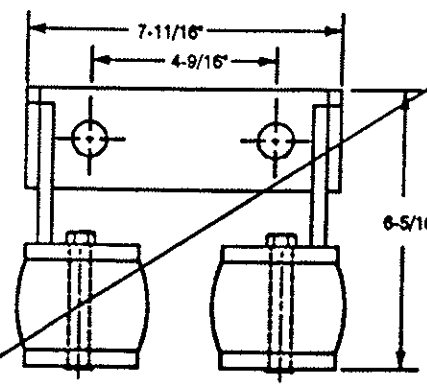
Also available in 304 stainless steel - KIT NO. 14 58 93 06

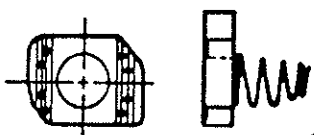
Note: use with 2" nominal guide bars



UPPER GUIDE BAR BRACKET







LATERAL NUT WITH SPRING

PLAIN WASHER

LOCK WASHER

HEX. HEAD BOLT

KIT NO. 14 58 93 25
(Galvanized Steel)

Standard for the following "CP" pumps:

3170
3201
3230
3300
3305
3311
3351
3355
3500
3530
3531
3601
3602

Also available in 304 stainless steel - KIT NO. 14 58 93 08

Note: use with 3" nominal guide bars