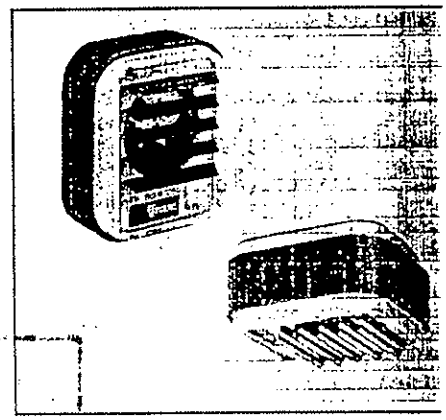
QMARK®
A Division of Marley Electric Heating

TYPE MUH
UNIT HEATERS

...unit models either horizontally or ...ically. Heavy exposure. For factories, warehouses, garages, stores, shipping rooms, power stations, aircraft hangars. Can be used for primary, supplementary, spot, or dual-system heating.

- Wide range of optional control kits are field installable, increasing the MUM adaptability to the specification market.
- Forced air unit heater with 10 power ratings; 3 Kw to 50 Kw heating output; 208, 240, 277, and 480V, 10,230 to 170,500 BTU/hr.
- 32 compatible models (no need to try to assemble a heating system from 70 or 80 models!)
- Heavy gauge die-formed steel housing. Two-toned, smartly styled.
- Advanced pull-through air flow design draws air across heating element for more even air distribution and cooler element operation.
- Specially designed venturi outlet to meet that added throw as required in vertical position
- Built-in circuit fusing (when required).
- Completely enclosed fan motor.
- 1-or 3-phase wiring on 5 through 10 Kw 208/240V and 15 Kw 208V units (field interchangeable).
- Aluminum-finned, copper clad steel sheath heating element has longer useful life, because of cooler sheath temperature and faster heat dissipation.
- 24V control transformer standard on most models, providing a safer and more accurate means of temperature control. 3 Kw and 5 Kw, 208-277V, have line voltage controls as standard. (24V control available on made-to-order basis.)
- Automatic reset linear thermal cut-out, capillary type, provides protection over entire length of element area. (Manual reset protection available on made-to-order basis.)
- 2-speed fan selector switch (25 to 50 Kw models).
- Fan delay feature eliminates cold drafts. Element heats up before fan cuts in, then fan continues to distribute heat after element shuts off.
- Ruggedly built, yet lighter weight for easier installation. No piping flues, valves, or traps.
- Individually adjustable discharge louvers to control air flow.
- Choice of optional diffusers for variety of air patterns, maximizing heat concentration and coverage in the vertical position.
- Meets all UL, NEC, and OSHA requirements. UL File No. E21609.



SELECTION CHART

MUH03-1	208	10	3.0	10.2	11.5	24	4A	650	970	37°	208	1600	1/6	6	9	12	AWG 12	2
MUH03-2	208/240	10	3.0/3.6	10.2/12.3	11.5/13.8	24	4A	650	970	37°	208/240	1600	1/6	6	9	12	AWG 12	2
MUH03-71	277	10	3.0	10.2	11.5	24	4A	650	970	37°	277	1600	1/6	6	9	12	AWG 14	2
MUH03-41	480	30	3.0	10.2	11.5	24	4A	650	970	37°	480	1600	1/6	6	9	12	AWG 14	2
MUH05-61	208	1-30	5.0	17.0	19.2	24	5A	650	970	37°	208	1600	1/6	9	14	18	AWG 10	2
MUH05-21	208/240	1-30	3.7/5.0	12.6/17.0	14.2/19.2	24	5A	650	970	37°	208/240	1600	1/6	9	14	18	AWG 10	2
MUH05-71	277	10	5.0	17.0	19.2	24	5A	650	970	37°	277	1600	1/6	9	14	18	AWG 10	2
MUH05-41	480	30	5.0	17.0	19.2	24	5A	650	970	37°	480	1600	1/6	9	14	18	AWG 14	2
MUH-07-6	208	1-30	7.5	25.6	28.8	24	5A	650	970	37°	208	1600	1/6	9	14	18	AWG 6	3
MUH-07-2	208/240	1-30	5.6/7.5	19.1/25.6	21.6/28.8	24	5A	650	970	37°	208/240	1600	1/6	9	14	18	AWG 8	3
MUH-07-7	277	10	7.5	25.6	27.0	24	5B	650	970	37°	277	1600	1/6	9	14	18	AWG 8	3
MUH-07-4	480	30	7.5	25.6	9.0	24	5B	650	970	37°	480	1600	1/6	9	14	18	AWG 14	3
MUH-10-6	208	1-30	10.0	34.1	38.0	24	5A	650	970	37°	208	1600	1/6	9	14	18	AWG 4	3
MUH-10-2	208/240	1-30	7.5/10.0	25.6/34.1	30.0/42.0	24	5A	650	970	37°	208/240	1600	1/6	9	14	18	AWG 6	3
MUH-10-7	277	10	10.0	34.1	36.0	24	5A	650	970	37°	277	1600	1/6	9	14	18	AWG 6	3
MUH-10-4	480	30	10.0	34.1	12.0	24	5B	650	970	37°	480	1600	1/6	9	14	18	AWG 14	3
MUH-15-6	208	1-30	15.0	51.2	72.0	24	5A	910	1640	52°	208	1530	1/4	11	20	35	AWG 2	5
MUH-15-2	208/240	30	11.2/15.0	38.2/51.2	31.3/36.1	24	5C	910	1640	52°	208/240	1530	1/4	11	20	35	AWG 6	5
MUH-15-4	480	30	15.0	51.2	18.0	24	5C	910	1640	52°	480	1530	1/4	11	20	35	AWG 10	5
MUH-20-6	208	30	20.0	68.2	96	24	5A	1320	2060	48°	208	1500	1/3	12	24	41	AWG 4	6
MUH-20-2	208/240	30	15.0/20.0	51.2/68.2	41.8/48.0	24	5A	1320	2060	48°	208/240	1500	1/3	12	24	41	AWG 4	6
MUH-20-4	480	30	20.0	68.2	24.0	24	5C	1320	2060	48°	480	1500	1/3	12	24	41	AWG 10	6
MUH-25-2	208/240	30	18.7/25.0	63.8/85.2	52.0/60.0	24	5A	2100/1320	2100/2060	58°/48°	208/240	1500/1050	1/3	15	30	50	AWG 3	9
MUH-25-4	480	30	25.0	85.2	30.0	24	5C	2100/1320	2100/2060	58°/48°	480	1500/1050	1/3	15	30	50	AWG 8	9
MUH-30-6	208	30	30.0	102.3	144.0	24	5A	2100/1320	2100/2060	48°/58°	208	1500/1050	1/3	15	30	50	AWG 1	9
MUH-30-2	208/240	30	22.5/30.0	76.7/102.3	63.2/72.0	24	5A	2100/1320	2100/2060	48°/58°	208/240	1500/1050	1/3	15	30	50	AWG 2	9
MUH-30-4	480	30	30.0	102.3	36.0	24	5C	2100/1320	2100/2060	48°/58°	480	1500/1050	1/3	15	30	50	AWG 6	9
MUH-40-2	208/240	30	30.0/40.0	102.3/136.4	83.4/96.0	24	5A	3260/2600	3260/2930	58°/48°	208/240	1525/1420	1/2	15	25	60	AWG 1/0	11
MUH-40-4	480	30	40.0	136.4	48.0	24	5C	3260/2600	3260/2930	58°/48°	480	1525/1420	1/2	15	25	60	AWG 4	11
MUH-50-6	208	30	50.0	170.5	139.2	24	5A	3260/2600	3260/2930	58°/48°	208	1525/1420	1/2	15	25	60	AWG 4/0	11
MUH-50-2	208/240	30	37.5/50.0	127.8/170.5	104.2/120.4	24	5A	3260/2600	3260/2930	58°/48°	208/240	1525/1420	1/2	15	25	60	AWG 3/0	11
MUH-50-4	480	30	50.0	170.5	60.0	24	5C	3260/2600	3260/2930	58°/48°	480	1525/1420	1/2	15	25	60	AWG 3	11

NOTE:

1. All standard units are supplied with a low voltage control transformer and contactor (24V) except MUH-03 & 05, 208, 240, & 277 volt models. Low voltage control on these units is available on made to order. All units are also available on special order for 120 volt control: internal with transformer or external without transformer.
2. Airflow is CFM at ESP and RPM at ESP with ... filter in place.
3. On dual phase units, maximum amp draw is listed for respective voltage.
4. 25 thru 50 Kw models have two speed motors and dual CFM ratings.

5A. Standard

5B. Optional - made to order - amp load unbalanced on 3 Phase

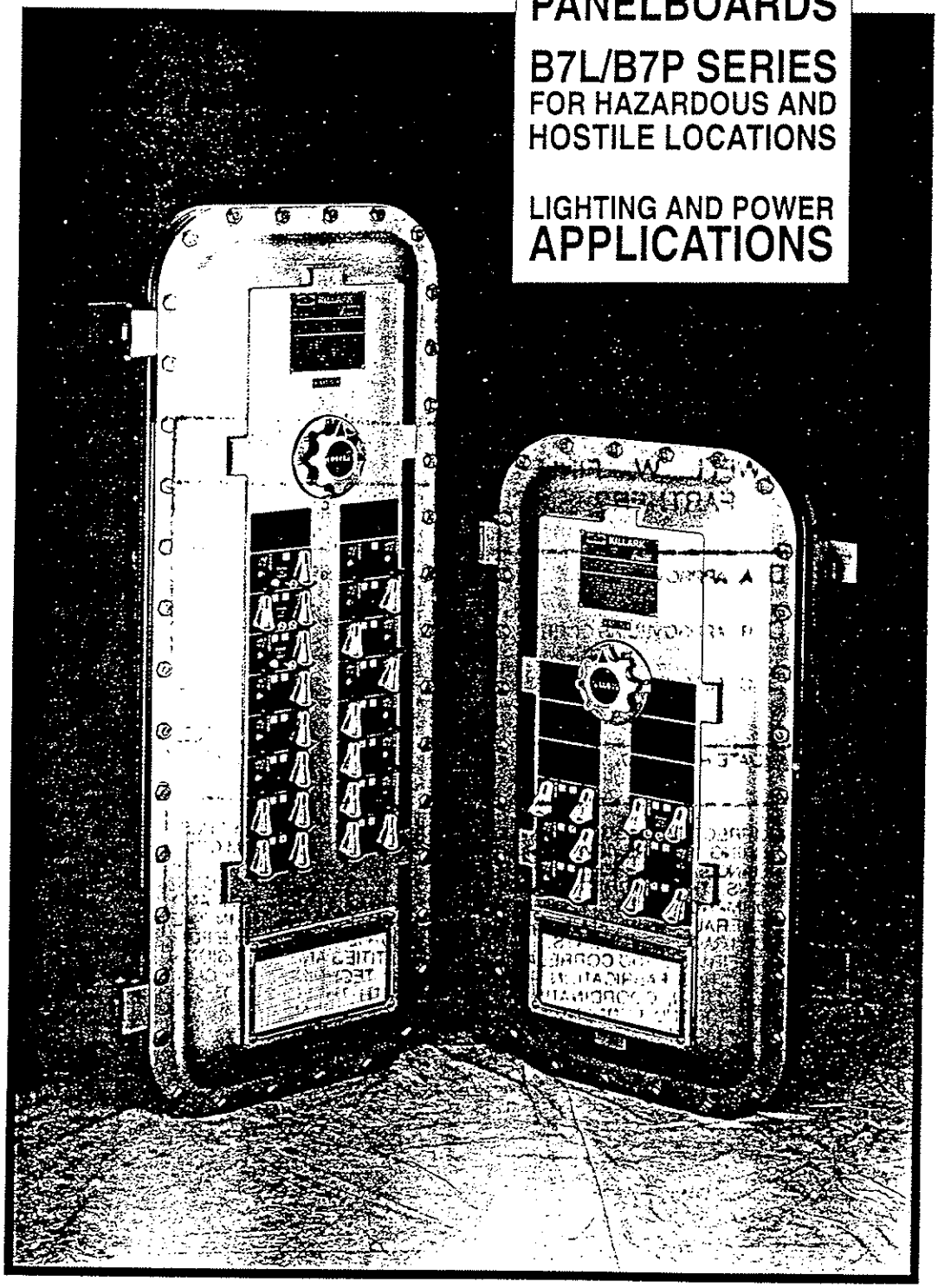
5C. Optional - made to order - amp load balanced on 3 Phase

PRISM®

PANELBOARDS

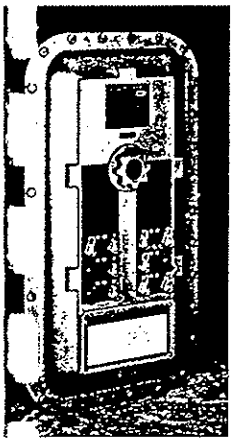
B7L/B7P SERIES
FOR HAZARDOUS AND HOSTILE LOCATIONS

LIGHTING AND POWER
APPLICATIONS



HUBBELL KILLARK

PRISM®



Circuit breaker panelboards from Killark fill a wide range of explosion-proof and weather-proof installation requirements for circuit protection and equipment control.

B7L/B7P SERIES

CLASS I, DIV 1&2 GROUPS B,C,D
CLASS II, DIV 1&2 GROUPS E,F,G
CLASS III, DIV 1&2
NEMA 3, 4, 4X, 7BCD, 9EFG
EXPLOSION-PROOF
DUST-TIGHT
WEATHERPROOF

APPLICATIONS

PRISM Panelboards are for use in:

- Hazardous locations due to the presence of flammable gasses or vapors, combustible dust, or easily ignitable fibers and flyings, and areas which are subject to corrosion, weather and dampness.
- Petroleum Refineries, Chemical and Petrochemical plants with indoor and outdoor processes.
- Applications requiring overcurrent and short circuit protection of lighting, appliances, heating and motor circuits.

PANELBOARD ORDERING INFORMATION

1 - Select basic panelboard with the following criteria in mind:
  a) Number of poles (spaces) required.
  b) Type of breaker desired.
  c) Type wiring system needed.
  d) If Main Breaker is desired.
2 - Select branch breakers from page 6 based on frame, number of poles, amperage and type. Make sure breakers selected are compatible with panelboard selected.
3 - Refer to page 6 for additional options.
4 - See page 7 for detailed ordering instructions and example.

Panelboard Series	Type	Circuit Breaker Frame Type	Maximum Voltage
B7L	Lighting	Westinghouse Quicklag	240 Volt
B7P	Power	Westinghouse Series C	600 Volt

STANDARD MATERIALS

- Enclosure - Copper Free Aluminum (less than 4/10 of 1% copper).
- Main Breaker Handle - Copper Free Aluminum.
- Cover bolts - 316 Grade Stainless Steel.
- Flange Gasket "O" Ring - Buna-N Nitrile.
- Branch Breaker Operators - Valox Thermoplastic Polyester handle molded onto 316 stainless steel shaft with neoprene "O" ring.
- Hinges are Copper Free Aluminum with stainless steel pin and hardware.
- Mounting Lugs 1/4" thick 6061-T651 Aluminum.

STANDARD FINISH

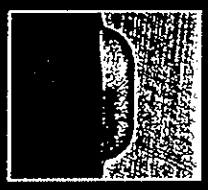
- Grey Silver Lacquer Paint.

THIRD PARTY CLASSIFICATIONS

UL Classified CSA Certified (CSA Cert. Est.9/93)

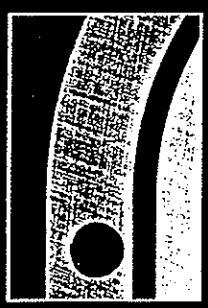
B7L/B7P SERIES QUALITY FEATURES

Take a closer look . . .



Recessed Notches in Flange

Open cover easier with prying instrument without flange damage.

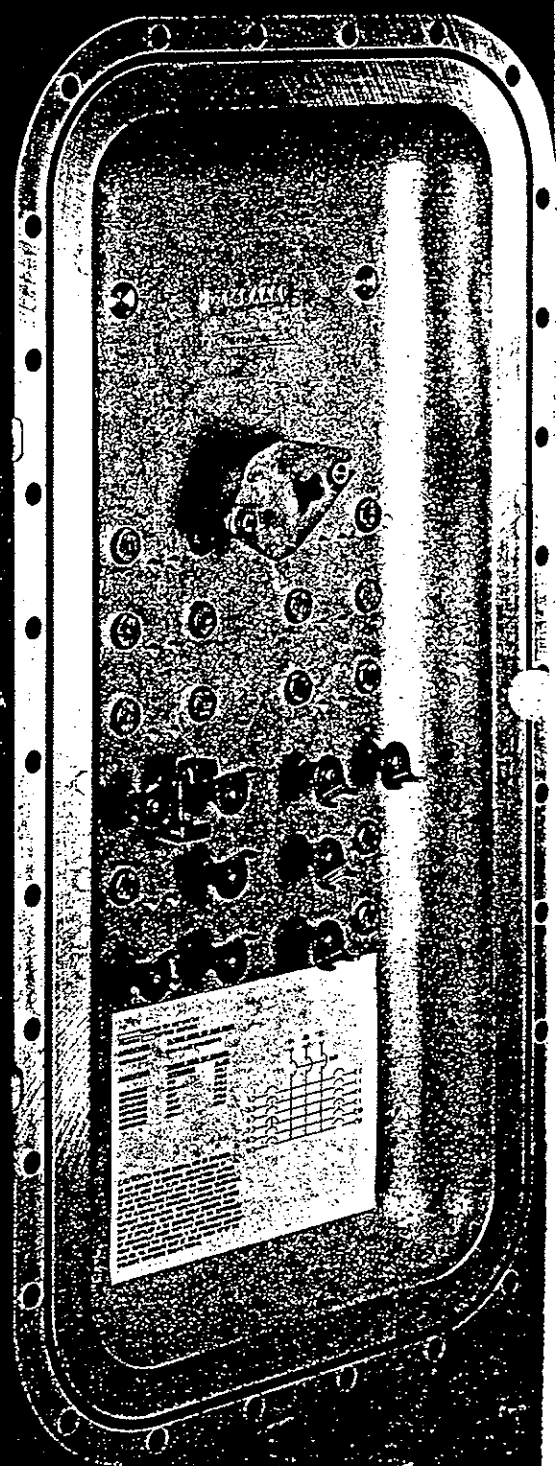


Gasketed Flange

Nitrile (Buna-N) Gasket located inside cover bolts to prevent water from seeping into enclosure.

Quick Release, Captivated Cover Bolts of 316 Grade Stainless Steel

Triple-lead bolts require only 3 1/2 turns to disengage. Stainless steel (316) for maximum protection from corrosion.

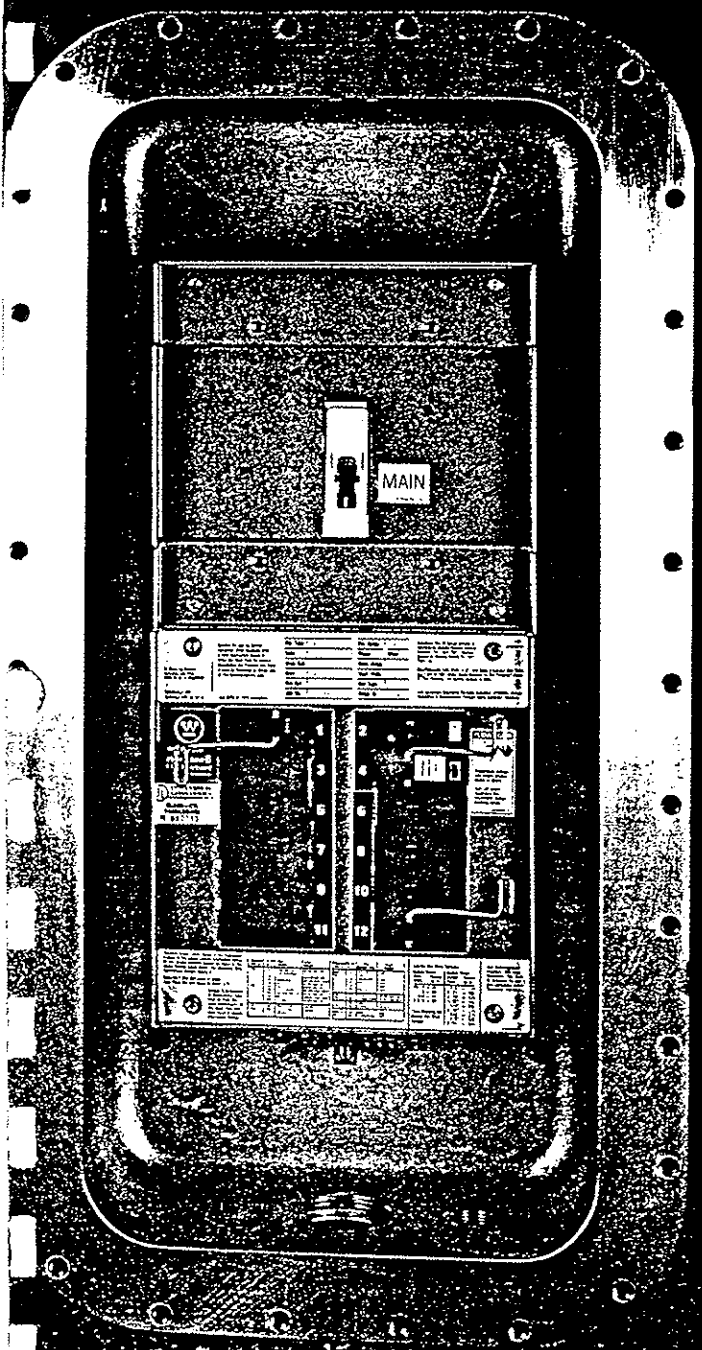


Wiring Room
To meet latest NEC wire bend requirements.

Top Feed Panel
Standard. With bottom feed optional.

UL Classified and CSA Certified
CLASS I, DIVISIONS 1&2, GROUPS B,C,D
CLASS II, DIVISIONS 1&2, GROUPS E,F,G
CLASS III, DIVISIONS 1&2

Rated For Hostile Corrosive Environments; Indoors and Outdoors
NEMA 3- Protection from falling rain.
NEMA 4-4x - Protection from hose directed water and corrosion.



Hinged Cover
Installed as standard providing an extra measure of safety and convenience.

Standard Electrical Components
B7L - Westinghouse Quicklag Breakers
B7P - Westinghouse Series C Breakers

Buss Bars
- *B7L - Main buss is tinplated aluminum. Copper available as option.*
- *B7P - Copper standard.*

Main Lugs
Mechanical solderless type, approved for CU or AL conductors.

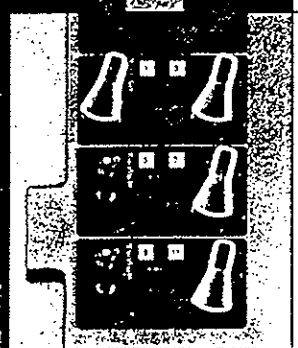
Ductile Mounting Lugs
High strength yet ductile aluminum alloy.
Can adjust to irregular surface.
Slotted for easier mounting.

Copper-Free Aluminum Construction
High strength, light weight, corrosion resistant.

Conduit Openings Supplied Standard
Sufficient quantity and size for incoming power and branch circuits.
Optional sizes and locations available.
Suitable for field installation of drain and breather.

Solid Neutral Standard
Single phase 3 wire.
Three phase 4 wire.

MAIN BREAKER HANDLE
- Provisions for lock "on" or "off" positions.
- Minimum number of parts for trouble free operation.
- Spring-loaded to prevent breakage of breaker toggle.
- "O" ring on shaft.

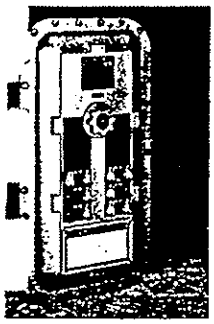


BRANCH BREAKER HANDLE
- Provisions to lock all branch breakers in "on" or "off" positions.
- "O" ring gasket on all shafts.
- Spring-loaded so that cover can be closed regardless of breaker/handle position.
- Lifts and rotates into place.
- Identification of On-Trip-Reset-Off is positive.
- B7L lighting panel predrilled and factory plugged for maximum number of branch circuits. Permits addition of breaker handles and spaces plus changing of 1-2-3 pole breakers in field.

HUBBELL KILLARK

PRISM®

B7L SERIES LIGHTING PANELBOARDS



B7L SERIES

CLASS I, DIV 1&2 GROUPS B,C,D
CLASS II, DIV 1&2 GROUPS E,F,G
CLASS III DIV 1&2
NEMA 3, 4, 4X, 7BCD, 9EFG
EXPLOSION-PROOF
DUST-TIGHT
WEATHERPROOF

Westinghouse type BA circuit breaker 1,2 or 3 pole.

Catalog numbers on this page are for the basic panelboard enclosure only with a panel interior chassis containing main lugs or main breaker as illustrated. Internal branch breakers and external handles are NOT included in basic enclosure catalog number and must be ordered as separate items. Refer to pages 6 & 7 for part numbers of branch breakers and detailed ordering instructions.

BRANCH CIRCUIT LOADS

The interior panel chassis supplied in B7L panel is limited to a maximum of 140 amperes at any one connection point. Breakers of 50 thru 100 amps must be installed opposite breakers of smaller amperage so as not to exceed the 140 ampere limitation.

CIRCUIT BREAKER RATINGS

BAB	1 2 3	120 120/240 240	10,000 AIC
BABSWN	1 2	120/240 120/240	10,000 AIC
QBGF	1 2	120 120/240	10,000 AIC
QBGFEP	1 2	120 120/240	10,000 AIC

PANEL WITHOUT MAIN BREAKER (MAIN LUGS ONLY)

BASIC PANELBOARD ENCLOSURE LESS BRANCH BREAKERS

Electrical Rating	Number of Branch Poles	Main Lug Rating	Basic Enclosure and Chassis Catalog Number	Enclosure Box Size	Main Wire Range
Single Phase 3 Wire with Solid Neutral 120/240 VAC	12	100	B7L20 - 112 - ML100	A	E
	18	100	B7L29 - 118 - ML100	B	G
	18	225	B7L41 - 118 - ML225	C	F
	24	100	B7L29 - 124 - ML100	B	G
	24	225	B7L41 - 124 - ML225	C	F
	30	100	B7L41 - 130 - ML100	C	G
	30	225	B7L41 - 130 - ML225	C	F
	36	225	B7L41 - 136 - ML225	C	F
	42	225	B7L50 - 142 - ML225	D	F
Three Phase 4 Wire with Solid Neutral 120/208 VAC	12	100	B7L20 - 312 - ML100	A	E
	18	100	B7L29 - 318 - ML100	B	G
	18	225	B7L41 - 318 - ML225	C	F
	24	100	B7L29 - 324 - ML100	B	G
	24	225	B7L41 - 324 - ML225	C	F
	30	100	B7L41 - 330 - ML100	C	G
	30	225	B7L41 - 330 - ML225	C	F
	36	225	B7L41 - 336 - ML225	C	F
	42	225	B7L50 - 342 - ML225	D	F

PANEL WITH MAIN BREAKER

Electrical Rating	Number of Branch Poles	Main Breaker AMP Rating	Main Breaker Frame	Basic Enclosure and Chassis Catalog Number	Enclosure Box Size	Main Wire Range
Single Phase 3 Wire with Solid Neutral 120/240 VAC	12	100	EHD	B7L29 - 112 - MBE100	B	H
	18	100	EHD	B7L41 - 118 - MBE100	C	H
	24	100	EHD	B7L41 - 124 - MBE100	C	H
	24	225	CA	B7L41 - 124 - MBC225	C	I
	30	100	EHD	B7L41 - 130 - MBE100	C	H
	30	225	CA	B7L50 - 130 - MBC225	D	I
	36	225	CA	B7L50 - 136 - MBC225	D	I
	42	225	CA	B7L50 - 142 - MBC225	D	I
Three Phase 4 Wire with Solid Neutral 120/208 VAC	12	100	EHD	B7L29 - 312 - MBE100	B	H
	18	100	EHD	B7L41 - 318 - MBE100	C	H
	24	100	EHD	B7L41 - 324 - MBE100	C	H
	24	225	CA	B7L41 - 324 - MBC225	C	I
	30	100	EHD	B7L41 - 330 - MBE100	C	H
	30	225	CA	B7L50 - 330 - MBC225	D	I
	36	225	CA	B7L50 - 336 - MBC225	D	I
	42	225	CA	B7L50 - 342 - MBC225	D	I

PANEL WITH BACK FEED MAIN BREAKER

Single Phase 3 Wire with Solid Neutral 120/240 VAC	12	100	BAB	B7L29 - 112 - MBB100	B	J
	18	100	BAB	B7L29 - 118 - MBB100	B	J
	24	100	BAB	B7L41 - 124 - MBB100	C	J
	30	100	BAB	B7L41 - 130 - MBB100	C	J
Three Phase 4 Wire with Solid Neutral 120/208 VAC	12	100	BAB	G1 B7L29 - 312 - MBB~~100~~40	B	J
	18	100	BAB	B7L29 - 318 - MBB100	B	J
	24	100	BAB	B7L41 - 324 - MBB100	C	J
	30	100	BAB	B7L41 - 330 - MBB100	C	J

Main Breaker Panel includes main breaker and its price in basic enclosures part number.

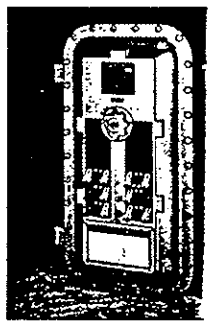
***Note:** Refer to Page 6 - For branch breaker. Page 6 - For options. Page 7 - For order information. Page 8 - For dimensions and wire sizes.*

B7P SERIES POWER PANELBOARDS

Westinghouse Series "C" Circuit Breakers 1-2 or 3 pole.

Catalog numbers on this page are for the basic panelboard enclosure only with a panel interior chassis containing main lugs or main breaker as illustrated. Internal branch breakers and external handles are NOT included in the basic enclosure catalog number and must be ordered as separate items. Refer to pages 6 & 7 for part numbers of branch breakers and detailed ordering instructions.

B7P SERIES
CLASS I, DIV 1&2 GROUPS B,C,D
CLASS II, DIV 1&2 GROUPS E,F,G
CLASS III, DIV 1&2
NEMA 3, 4, 4X, 7BCD, 9EFG
EXPLOSION-PROOF
DUST-TIGHT
WEATHERPROOF



CIRCUIT BREAKER RATINGS

Type	No. Pole	Maximum Volts		Amperes Symmetrical					
		AC	DC	240AC	277AC	480AC	600AC	125DC	250DC
EHD	1	277	125	--	14000	--	--	10000	--
	2&3	480	250	18000	--	14000	--	--	10000
FDB	2&33	250	250	18000	--	14000	14000	--	10000

PANEL WITHOUT MAIN BREAKER (MAIN LUGS ONLY)

Electrical Rating	Number of Branch Poles	Main Lugs Ratings Amps	Basic Enclosure and Chassis Catalog Number	Enclosure Box Size	Main Wire Range
3 Phase 4 Wire with Solid Neutral Up to 600 VAC	6	100	B7P20 - 306 - ML100	A	K
	12	100	B7P29 - 312 - ML100	B	K
	12	225	B7P29 - 312 - ML225	B	L
	18	225	B7P41 - 318 - ML225	C	L
	21	100	B7P41 - 321 - ML100	C	K
	27	225	B7P50 - 327 - ML225	D	M

PANEL WITH MAIN BREAKER

Electrical Rating	Number of Branch Poles	Main Breaker Max Volts	Main Breaker Amps	Main Breaker Frame	Basic Enclosure and Chassis Catalog Number	Enclosure Box Size	Main Wire Range
3 Phase 4 Wire with Solid Neutral Up to 600 VAC	6	480	100	EHD	B7P29 - 306 - MBE100	B	K
	6	600	100	FDB	B7P29 - 306 - MBF100	B	K
	12	600	225	JDB	G B7P41 - 312 - MBJ~~225~~ 200	C	L
	15	480	100	EHD	B7P41 - 315 - MBE100	C	K
	15	600	100	FDB	B7P41 - 315 - MBF100	C	K
	18	600	225	JDB	B7P50 - 318 - MBJ225	D	L
	21	480	100	EHD	B7P50 - 321 - MBE100	D	N
	21	600	100	FDB	B7P50 - 321 - MBF100	D	N
PANEL WITH BACK FEED MAIN BREAKER							
3 Phase 4 Wire with Solid Neutral Up to 600 VAC	9	480	100	EHD	B7P29 - 309 - MBE100	B	K
	9	600	100	FDB	B7P29 - 309 - MBF100	B	K
	18	480	100	EHD	B7P41 - 318 - MBE100	C	K
	18	600	100	FDB	B7P41 - 318 - MBF100	C	K
	24	480	100	EHD	B7P50 - 324 - MBE100	D	K
	24	600	100	FDB	B7P50 - 324 - MBF100	D	K

BASIC PANELBOARD ENCLOSURE LESS BRANCH BREAKERS

Main Breaker Panel includes main breaker and its price in basic enclosures part number.
***Note:** Refer to Page 6 - For branch breaker. Page 6 - For options. Page 7 - For order information. Page 8 - For dimensions and wire sizes.*

POWER PANEL AVAILABLE OCTOBER 1993

PRISM

B7L/B7P SERIES PANELBOARDS

BRANCH CIRCUIT BREAKERS

Number & Type of 2" Spaces	Number of Circuits & Breaker Rating						
(1) Single Phase	SPACE	B7BLA1000		B7BLC1000	B7BLE1000	B7BPK1000	
	15	B7BLA1015	G-I	B7BLC1015	B7BLE1015	B7BPK1015	
	20	B7BLA1020	G-I	B7BLC1020	B7BLE1020	B7BPK1020	
	30	B7BLA1030		B7BLC1030	B7BLE1030	B7BPK1030	
	40	B7BLA1040				B7BPK1040	
	50	B7BLA1050				B7BPK1050	
	60	B7BLA1060				B7BPK1060	
	70	B7BLA1070				B7BPK1070	
	90	-				B7BPK1090	
	100	B7BLA1100				B7BPK1100	
(2) Double Pole	SPACE	B7BLA2000	B7BLF2000	B7BLC2000	B7BLE2000	B7BPK2000	B7BPL2000
	15	B7BLA2015	B7BLF2015	B7BLC2015	B7BLE2015	B7BPK2015	B7BPL2015
	20	B7BLA2020	B7BLF2020	B7BLC2020	B7BLE2020	B7BPK2020	B7BPL2020
	30	B7BLA2030		B7BLC2030	B7BLE2030	B7BPK2030	B7BPL2030
	40	B7BLA2040		B7BLC2040	B7BLE2040	B7BPK2040	B7BPL2040
	50	B7BLA2050				B7BPK2050	B7BPL2050
	60	B7BLA2060				B7BPK2060	B7BPL2060
	70	B7BLA2070				B7BPK2070	B7BPL2070
	90	B7BLA2090				B7BPK2090	B7BPL2090
	100	B7BLA2100				B7BPK2100	B7BPL2100
(3) Three Pole	SPACE	B7BLB3000	B7BLF3000			B7BPK3000	B7BPL3000
	15	B7BLB3015	B7BLF3015			B7BPK3015	B7BPL3015
	20	B7BLB3020	B7BLF3020			B7BPK3020	B7BPL3020
	30	B7BLB3030				B7BPK3030	B7BPL3030
	40	B7BLB3040				B7BPK3040	B7BPL3040
	50	B7BLB3050				B7BPK3050	B7BPL3050
	60	B7BLB3060				B7BPK3060	B7BPL3060
	70	B7BLB3070				B7BPK3070	B7BPL3070
	90	B7BLB3090				B7BPK3090	B7BPL3090
	100	B7BLB3100				B7BPK3100	B7BPL3100
	110						B7BPL3110
	125						B7BPL3125
	150						B7BPL3150

Notes:

1) B7L panels are factory drilled for maximum number of single pole branch breaker handles and B7P for maximum number of 3 pole branch breaker handles as standard.
2) Part numbers illustrated above include external handle, trip mechanism, locking tab and internal breaker.
   Refer to page 7 for complete ordering information and examples.
3) Space = External handle, shaft and trip mechanism installed to allow for future installation of breaker.
4) Ground Fault & Equipment protection breakers include external pushbutton for each breaker to test ground fault sensing circuit and the mechanical operation of breaker.
5) Switch Neutral Breaker note. A two pole breaker has one pole for breaking from main buss and one pole that breaks neutral. Three pole breaker consists of two poles for breaking from main buss and one pole that breaks neutral.

ACCESSORIES / OPTIONS

To be ordered as separate item with notation on order for assembly into enclosure.

Description	Catalog Number
Drain & Breather[1] NEMA 3, 7CD, 9 EFG	SU-3
Drain & Breather [1]NEMA 3, 7BCD, 9EFG (not CSA)	SU-3B
Grounding Kit 100 AMP	KIT-251 G-I
225 AMP	KIT-252 G
Special Baked Epoxy Finish	B7SF
Copper Buss and lugs for B7L series	B7CU
Eye bolts for ease of installation [2]	B7EB
Change 100 Amp Buss to 225 amp B7P series	B7ML225
Change 225 Amp Buss to 400 amp B7P series	B7ML400
Separate Grounded Neutral Terminal (24ckt)	B7GNT24
Separate Grounded Neutral Terminal (42ckt)	B7GNT42
Main lugs at bottom	B7MLBTN
Change standard conduit size and location	B7SPNPT

1. Installation of drain and breather will void the NEMA 4-4X Rating of panelboard. Drain and breather will be installed into a standard conduit opening provided in box.
2. Lifting eyebolts are installed in two conduit openings located in top of box and are to be removed after installation.

B7L/B7P SERIES PANELBOARDS

SPECIFICATION AND ORDERING INFORMATION

PANEL SELECTION FACTORS

Basic information required when specifying panelboards is as follows:

- Environment
- Service (Voltage/Frequency/Phase)
- Interrupting Capacity
- AMP Rating of Main (Lugs Only or Breaker)
- Branch Breaker (Type/Number of Poles/Amperage)

ORDERING INFORMATION

Specifying and ordering a complete panelboard assembly requires the selection of three components. (1) Basic Panel, (2) Branch Breaker and (3) Options (if required). This method of cataloging permits a wide variety and maximizes circuit flexibility in our panelboard offering. Components supplied in each of these selections include:

1) Basic Panelboard Enclosures (pages 4-5)
   - Explosion-proof enclosure consisting of box and cover.
     - Cover predrilled and plugged for maximum number of branch breaker handles. (handles not supplied)
     - Box supplied with conduit openings.
   - Main circuit breaker and external handle. (when specified)
   - Panelboard internal chassis with buss bars but less branch circuit breakers.

2) Branch Circuit Breakers (page 6)
   - Internal circuit breaker
   - External handle mechanism with internal tripping mechanism.
   - Test pushbutton for GFI (when ordered)
   - Lockout shield with on-off-trip-reset identification.

3) Options - Accessories (page 6)
   - As required

ORDERING EXAMPLE

Specification is for a 3 phase 120/208 volt panel with 100 Amp main lugs complete with (4) single pole 20 Amp, (2) double pole 20 Amp and (1) three pole 30 Amp branch breakers with a separate grounded neutral terminal.

Branch Breaker Total =	(4) 1Pole	=	4 Poles Total
	(2) 2Pole	=	4 Poles Total
	(1) 3Pole	=	3 Poles Total
			Total 11 Branch Poles

Specification / Ordering Example

B7L20 - 312 - ML100	(Basic panelboard enclosure)
with:	
(4) B7BLA1020	(1 Pole 20 Amp Branch)
(2) B7BLA2020	(2 Pole 20 Amp Branch)
(1) B7BLB3030	(3 Pole 30 Amp Branch)
(1) B7GNT24	(Separate Grounded Neutral Terminal)

CATALOG LOGIC

Panelboard catalog number logic for basic enclosure.

B7 L 20 - 1 12 - ML 100

- 100 — Mains Amp Rating
- ML — Mains: ML = Main Lugs Only

MBB	Main Breaker	BAB
MBC		CA
MBE		EHD
MBF		FDB
MBJ		JD

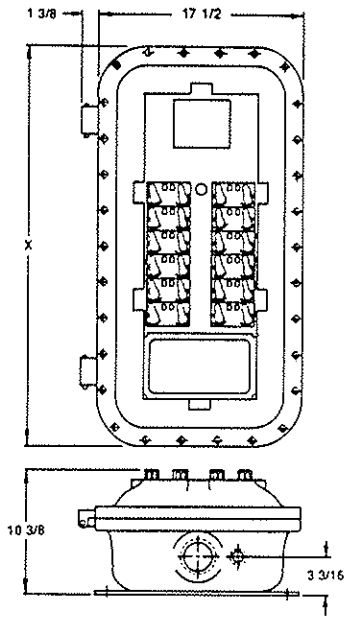
- 12 — # Of Branch Poles
- 1 — 1 = Single Phase 3 = Three Phase
- 20 — Nominal Inside Length of Box 20 - 29 - 41 - 50
- L — L = Lighting P = Power
- B7 — Constant For PRISM Series Enclosures

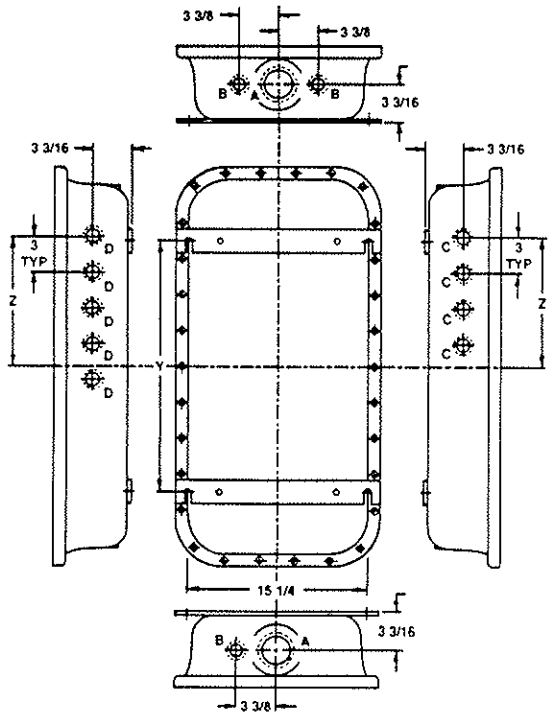
PRISM®

B7L/B7P SERIES PANELBOARDS

DIMENSIONAL DATA

Enclosure Box Size	Catalog Number			Conduit Size		Conduit Quantity			
				A	B	A	B	C	D
A	MXB - 13207	24 3/8	13	2	1	6 7/8	2	3	3	4
B	MXB - 13297	33 3/8	21	2 1/2	1	10 7/8	2	3	4	5
C	MXB - 13417	45 3/8	33	3	1	16 7/8	2	3	5	6
D	MXB - 13507	54 3/8	42	3	1	21 3/8	2	3	6	7



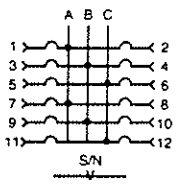


WIRE INFORMATION

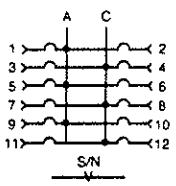
E	F	G	H	I	J	K	L	M	N
#12 - #1	#6 - 250MCM	#12 - 1/0	#14 - 1/0	2/0 - 250MCM	#14 - #1	#6 - 2/0	#6 - 4/0	#2 - 4/0	#2 - 2/0

WIRING DIAGRAMS

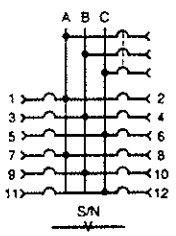
Main Lug Only
Three Phase 4-Wire
Solid Nuetral
120/208 VAC



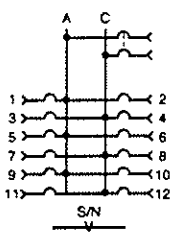
Main Lug Only
Single Phase 3-Wire
Solid Nuetral
120/240 VAC



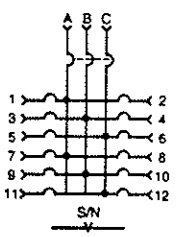
Chassis Mounted
Main Breaker
Three Phase 4-Wire
Solid Neutral
120/208 VAC



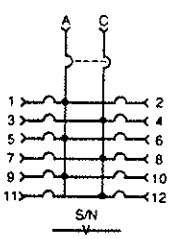
Chassis Mounted
Main Breaker
Single Phase 3-Wire
Solid Neutral
120/240 VAC



Vertical
Main Breaker
Three Phase 4-Wire
Solid Neutral
120/208 VAC



Vertical
Main Breaker
Single Phase 3-Wire
Solid Neutral
120/240 VAC



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Telephone (314) 531-0460 • FAX: (314) 531-7164
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Telephone (416) 839-1138 • FAX: (416) 839-9108

Zenith Product Bulletin

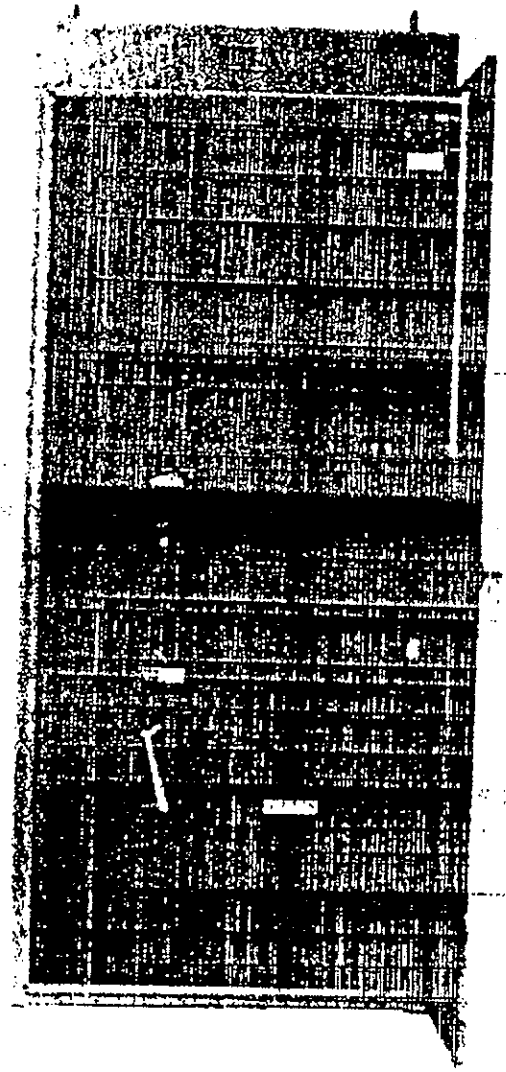
A Product Bulletin Dedicated to Informing the Electrical Community

TB-1212
Revision
December, 1992

Some emergency power installations require multiple automatic transfer switches, each feeding a specific load. In many such installations, where non-critical loads are being served, specifications may call for manual or non-automatic transfer switches that are manually operated because operating personnel are present and the loads are not of a critical nature requiring unattended automatic operation.

Because of the less critical function of these non-automatic transfer switches there have been no specific requirements set forth and, as a result, devices such as double throw disconnect switches have been used. Since the non-automatic transfer switches are part of the emergency power supply system they should have the same electrical ratings as the automatic transfer switches feeding the more critical loads. In the event of a short circuit the non-automatic transfer switches must have the same withstand current ratings as the automatic transfer switches and they must be as rugged and dependable.

To meet this need, Zenith has developed the ZTSM series electrically operated, mechanically held non-automatic transfer switches. These units feature the same rugged construction as the ZTS series of automatic transfer switches and are supplied with the same electrical ratings and mechanical features. The ZTSM series is electrically operated by means of push buttons or double throw switches mounted on the switch enclosure or at a remote location. Unlike the disconnect switches mentioned above, the ZTSM series offers additional protection by incorporating normal and alternate source voltage sensing relays that will not permit the switch to be manually transferred unless the source to which it is being transferred is at 90% of its rated voltage. In addition, the ZTSM series is tested and listed per UL-1008 standards. Double throw disconnect switches are not.



ZTSM160F 1600 AMP 4 Pole Non-Automatic Transfer Switch

ZTSM Series Non-Automatic Transfer Switch Features:

- U.L. & C.S.A. Listed
- Amperage sizes, 40, 80, 100, 150, 225, 260, 400, 600, 800, 1000, 1200, 1600, 2000, 3000
- Poles: 2, 3, or 4
- Available for operation on all standard voltage systems
- Withstand Current Ratings: Same as ZTS series automatic transfer switches
- Available in standard and delayed transition versions
- Bypass/Isolation units (ZBTS Series) also available

Published By: Zenith Controls, Inc. • 830 West 40th Street • Chicago, Illinois 60609

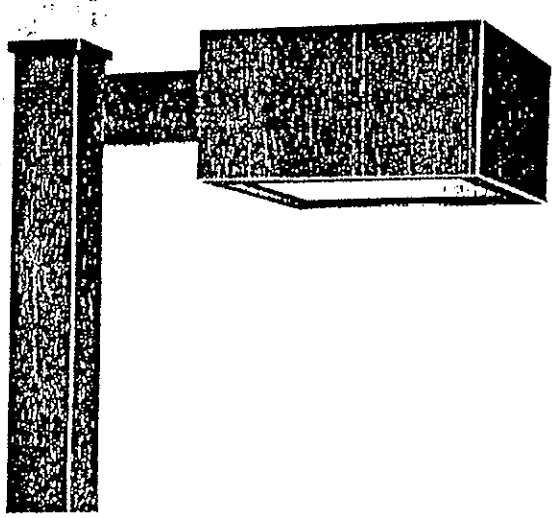
Luxmaster Classic 400

Side Mount

High Pressure Sodium
200 to 400 Watts

Metal Halide
~~250 &~~ 400 Watts

SERIES LM



FEATURES

- One piece formed aluminum housing with clean precision formed edges
- Hydroformed captive and tethered optical assembly
- Easily installed Power-Pad™ assembly
- Dacron polyester gasketing around optical assembly to provide a barrier to contaminates
- Durable baked-on acrylic enamel finish
- Ideal for applications:
  - Parking lots
  - Apartment and condominium complexes
  - Single-store shopping centers
  - Malls

Ordering Data

High Pressure Sodium

Primary Volts	Ballast Type	Power Factor	Power Pad	Lamp Housing
LUXMASTER CLASSIC 200 WATT HIGH PRESSURE SODIUM				
120/208 240/277*	Regulated	High	LMS20AM1	LMSXXXXX3MFSX
120	Regulated	High	LMS20A12	LMSXXXXX3MFSX
208	Regulated	High	LMS20A20	LMSXXXXX3MFSX
240	Regulated	High	LMS20A24	LMSXXXXX3MFSX
277	Regulated	High	LMS20A27	LMSXXXXX3MFSX
480	Regulated	High	LMS20A48	LMSXXXXX3MFSX
LUXMASTER CLASSIC 250 WATT HIGH PRESSURE SODIUM				
120/208 240/277*	Regulated	High	LMS25AM1	LMSXXXXX3MFSX
120	Regulated	High	LMS25A12	LMSXXXXX3MFSX
208	Regulated	High	LMS25A20	LMSXXXXX3MFSX
240	Regulated	High	LMS25A24	LMSXXXXX3MFSX
277	Regulated	High	LMS25A27	LMSXXXXX3MFSX
480	Regulated	High	LMS25A48	LMSXXXXX3MFSX
LUXMASTER CLASSIC 400 WATT HIGH PRESSURE SODIUM				
120/208 240/277*	Regulated	High	LMS40AM1	LMSXXXXX3MFSX
120	Regulated	High	LMS40A12	LMSXXXXX3MFSX
208	Regulated	High	LMS40A20	LMSXXXXX3MFSX
240	Regulated	High	LMS40A24	LMSXXXXX3MFSX
277	Regulated	High	LMS40A27	LMSXXXXX3MFSX
480	Regulated	High	LMS40A48	LMSXXXXX3MFSX

***MULTI-VOLT LUMINAIRES: All multi-volt luminaires are pre-wired for 120 volt operation, but are easily field-reconnectable for 208, 240, or 277 volt operation.**

NOTES

1. **STANDARD DISTRIBUTION IS TYPE 3.** For **IES TYPE 5 DISTRIBUTION** change the 3 in the lamp housing catalog number to 5. (Example: LMSXXXXX3MFSX to LMSXXXXX5MFSX.)
2. **STANDARD FINISH** is dard bronze. Other colors available, contact factory if required.
4. **LAMPS** are not included, order separately.
5. **50 HERTZ BALLAST** is available for all luminaires. Contact factory to information.
6. For more information, contact your local American Electric representative.

Metal Halide

Primary Volts	Ballast Type	Power Factor	Power Pad	Lamp Housing
LUXMASTER CLASSIC 250 WATT METAL HALIDE				
120/208 240/277*	Regulated	High	LMH25AM1	LMHXXXXX3MFSX
120	Regulated	High	LMH25A12	LMHXXXXX3MFSX
208	Regulated	High	LMH25A20	LMHXXXXX3MFSX
240	Regulated	High	LMH25A24	LMHXXXXX3MFSX
277	Regulated	High	LMH25A27	LMHXXXXX3MFSX
480	Regulated	High	LMH25A48	LMHXXXXX3MFSX
LUXMASTER CLASSIC 400 WATT METAL HALIDE				
120/208 240/277*	Regulated	High	LMH40AM1	LMHXXXXX3MFSX
120	Regulated	High	LMH40A12	LMHXXXXX3MFSX
208	Regulated	High	LMH40A20	LMHXXXXX3MFSX
240	Regulated	High	LMH40A24	LMHXXXXX3MFSX
277	Regulated	High	LMH40A27	LMHXXXXX3MFSX
480	Regulated	High	LMH40A48	LMHXXXXX3MFSX

***MULTI-VOLT LUMINAIRES: All multi-volt luminaires are pre-wired for 120 volt operation, but are easily field-reconnectable for 208, 240, or 277 volt operation.**

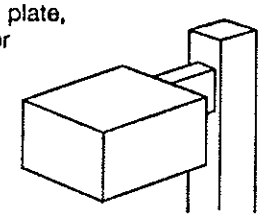
NOTES

1. **STANDARD DISTRIBUTION IS TYPE 3.** For **IES TYPE 5 DISTRIBUTION-** change the 3 in the lamp housing catalog number to 5. (Example: LMHXXXXX3MFSX to LMHXXXXX5MFSX.)
2. **STANDARD FINISH** is dark bronze. Other colors available, contact factory if required.
3. **LAMPS** are not included, order separately.
4. **50 HERTZ BALLAST** is available for all luminaires. Contact factory for information.
5. For more information, contact your local American Electric representative.

Options / Accessories

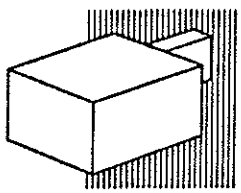
Pole mount, secured with solid steel plate, attaches luminaire directly to round or square pole. Full length mounting screws secure luminaire, arm and pole.

Catalog Number **-LMPX**



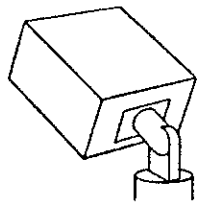
Wall mount arm secures luminaire to wall plate with full length mount screws. Full length mounting screws secure luminaire to arm and wall plate.

Catalog Number **-LMWX**

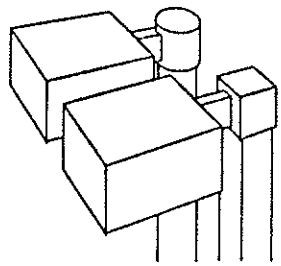


Adjustable knuckle for pole attachment of luminaire. Makes a smooth transition from pole to luminaire.

Catalog Number **-LMKX**



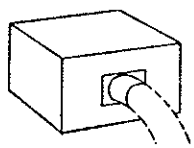
Square/round tenon adaptor mounts on top of round or square pole for luminaire attachment. Makes a smooth transition from pole to luminaire. Available mounting arrangements listed below.



Catalog Number	Description
LMTX	Square Tenon with 1 Arm
LM1X	Square Tenon with 2 Arms at 90°
LM2X	Square Tenon with 2 Arms at 180°
LM3X	Square Tenon with 3 Arms
LM4X	Square Tenon with 4 Arms
LM5X	Round Tenon with 1 Arm
LM6X	Round Tenon with 2 Arms at 90°
LM7X	Round Tenon with 2 Arms at 180°
LM8X	Round Tenon with 3 Arms at 90°
LM9X	Round Tenon with 3 Arms at 120°
LM0X	Round Tenon with 4 Arms at 90°

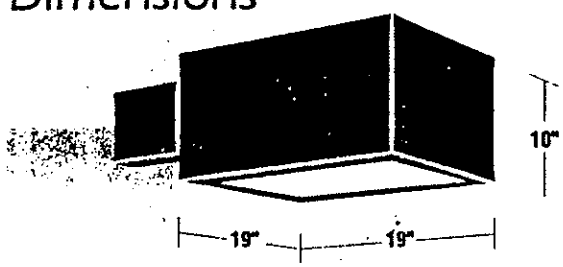
Mast arm mount—Luminaire is attached to curved mast arm for mounting to pole or structure.

Catalog Number **-LMMX**



Field installed **photoelectric control** available, contact factory for more information.

Dimensions



Effective projected area is 2.3 sq. ft.

Photometric Test Reports

Lens Type	Lamp Watts and Type	Socket Position	NEMA Type	Report Number
	LUXMASTER CLASSIC SERIES LM			
Glass	200W–400W HPS	Fixed	V-M-C	AE40001
Glass	250W MH	Fixed	V-M-C	AE41121
Glass	400W MH	Fixed	V-M-C	AE41091
Glass	200W–400W HPS	A-2	III-M-C	AE41591
Glass	250W MH	Fixed	III-M-C	AE41511
Glass	400W MH	Fixed	III-M-C	AE41491

Complete photometric reports are available for all products. Consult your local American Electric representative.

SQUARE STRAIGHT STEEL POLES

For use with floodlight luminaires such as MINILITER®, MAGNULITER®, SPORTSLITER®, as well as Magnu-Series architectural luminaires.

STEEL SSP SERIES

Square Straight Shaft — One-piece construction, steel tubing.

Pole Top — All poles available with 2⅜" O.D. tenons or machined to accept side mounted Magnu-Series luminaires.

Handhole — Group I and II poles only have 3" x 4" reinforced frame. Group III poles have 4" x 6" frame. Both include cover. Ground lug standard.

Base — Steel plate type base with two-piece base cover.

Anchor Bolts — Four "L" shaped bolts per set with two nuts and two washers each. Bolt template included.

Standard Finish — Rust preventive primer.

ORDERING INFORMATION

Catalog Number (1)	Pole Height		Wind Load Rating (2) 80 MPH		100 MPH		120 MPH		Pole Size	Base Square	Anchor Bolt Size (3)	Bolt Circle (3)	Bolt Projection (3)	Pole Weight	
	Ft.	M	EPA	Wt.	EPA	Wt.	EPA	Wt.						lbs.	kgs.
GROUP I															
SSP-410X-XX	10	3.0	21.7	540	13.3	330	9.3	200	4.0"	9.0"	¾"x30"x3"	8.0"	3.87"	88	39.9
SSP-412X-XX	12	3.7	17.7	440	10.7	265	7.0	160	4.0"	9.0"	¾"x30"x3"	8.0"	3.87"	98	44.5
SSP-414X-XX	14	4.3	14.6	365	8.6	215	5.2	130	4.0"	9.0"	¾"x30"x3"	8.0"	3.87"	110	49.9
SSP-416X-XX	16	4.9	12.2	305	7.0	175	3.7	100	4.0"	9.0"	¾"x30"x3"	8.0"	3.87"	122	55.3
SSP-418X-XX	18	5.5	10.3	255	5.6	135	2.5	75	4.0"	9.0"	¾"x30"x3"	8.0"	3.87"	135	61.2
SSP-420X-XX	20	6.1	8.7	215	4.5	105	—	—	4.0"	9.0"	¾"x30"x3"	8.0"	3.87"	147	66.7
SSP-425X-XX	25	7.6	6.0	150	3.2	81	—	—	4.0"	9.0"	¾"x30"x3"	8.0"	3.87"	178	80.1
SSP-430X-XX	30	9.1	7.4	175	2.5	100	—	—	4.0"	11.0"	1"x36"x4"	10-12"	4.12"	381	171.4
GROUP II															
SSP-518X-XX	18	5.5	28.3	705	16.9	420	10.4	250	5.0"	11.0"	¾"x30"x3"	11.0"	3.87"	239	108.4
SSP-520X-XX	20	6.1	24.8	620	14.5	360	8.4	210	5.0"	11.0"	¾"x30"x3"	11.0"	3.87"	263	119.3
SSP-525X-XX	25	7.6	19.2	480	10.7	265	4.2	145	5.0"	11.0"	¾"x30"x3"	11.0"	3.87"	322	146.1
SSP-530X-XX	30	9.1	6.0	150	4.0	150	—	—	5.0"	11.0"	¾"x30"x3"	11.0"	3.87"	381	171.4
GROUP III															
SSP-630X-XX	30	9.1	21.0	525	11.1	285	3.7	155	6.0"	13.0"	1"x36"x4"	12.0"	4.12"	458	207.7
SSP-635X-XX	35	10.7	15.8	395	7.3	180	—	—	6.0"	13.0"	1"x36"x4"	12.0"	4.12"	530	240.4
SSP-640X-XX	40	12.2	12.4	310	4.9	120	—	—	6.0"	13.0"	1"x36"x4"	12.0"	4.12"	602	273.1

(1) Catalog Number, as listed, does not include tenons or machining for side mounting. Desired fixture mounting must be specified by substituting for all X's in Catalog Number.

(2) Maximum allowable EPA is based on steady winds of 80 and 100 MPH with gusts to 104 and 130 MPH respectively, 120 MPH steady winds with 156 MPH gusts. All calculations are based on a minimum yield of 46,000 PSI.

(3) Factory supplied template must be used when setting anchor bolts. Hubbell Lighting will deny any claim for incorrect anchorage placement resulting from failure to use factory supplied template.

OPTIONS

Illustrations and complete descriptions can be found on page 34.

Description	Suffix
Weatherproof receptacle	M16
LEKTROCOTE® finish	M50 thru M53
Hubbell Seal (internal coating)	M55

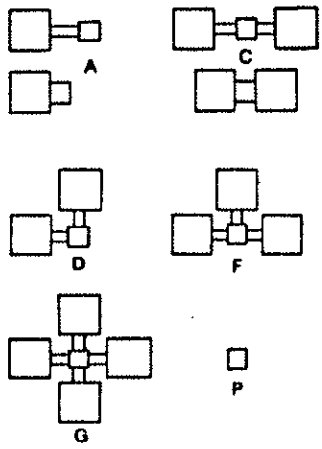
CATALOG LOGIC

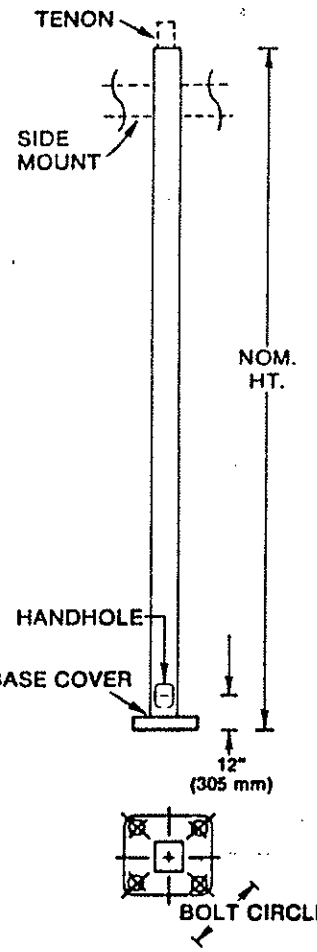
S S P — 4 10 X — X X — M X X

- **Pole Cross Section** (S) — S - Square
- **Pole Material** (S) — S - Steel
- **Base Type** (P) — P - Steel Plate
- **Shaft Size** (4) — **Square Style** 4 - 4.0" to 4.9", 5 - 5.0" to 5.9", 6 - 6.0" to 6.9"
- **Nominal Pole Height** (10) — (See Ordering Information)
- **Top Type** (X) — 1 - 2⅜" O.D. Tenon, 6 - Side Mount
- **Fixture Arm Size (Holes)** (X) — 0 - None, Tenon only; 1 - LUMASQUARE® II; 2 - Magnu Series
- **Mounting Arrangement For Side-Mount Magnu-Series*** (X) — A - One fixture; C - Two fixtures at 180°; D - Two fixtures at 90°**; F - Three fixtures at 90°**; G - Four fixtures at 90°**; P - Tenons only
- **Options** (MXX) — (See Above)

*Verify loading requirement based on allowed EPA.
**For proper mounting clearance use MAA-10 arm.

MOUNTING ARRANGEMENTS





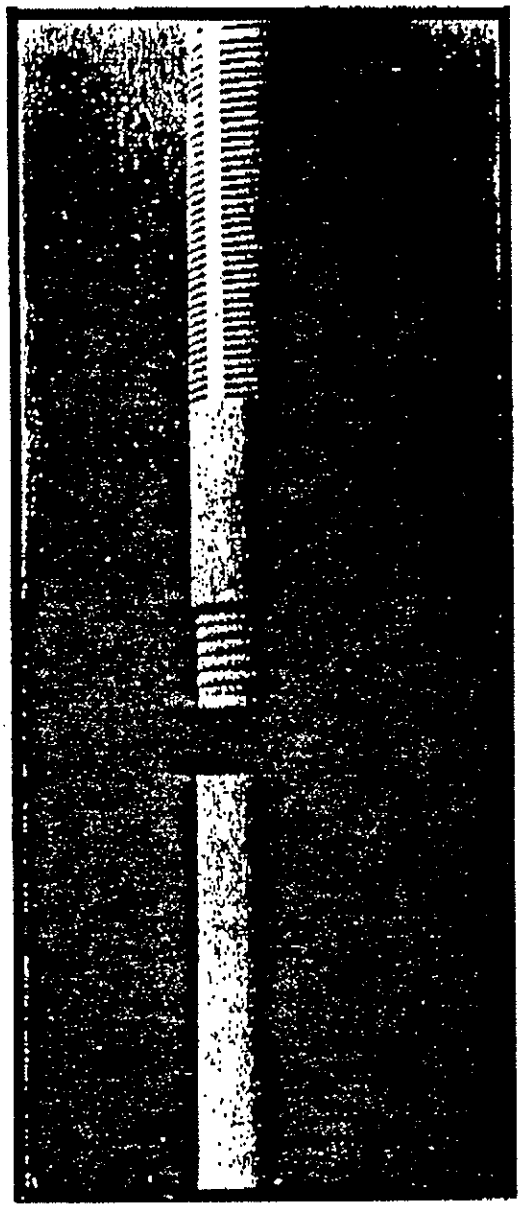
HUBBELL® Lighting Division

SECTION 11

Monitoring wells

MONOFLEX

MONITORING SCREENS AND CASINGS



FLUSH THREADED POLYVINYL CHLORIDE SCREENS AND CASINGS

PVC Flush Threaded Joints eliminates contamination caused by solvent.

All PVC Products are manufactured without ink to prevent unwarranted contaminated readings.

SIZES AVAILABLE

Pipe Dim:
1/2" O.D. thru 12" O.D.
Screen Lengths:
2.5', 5', 10', 20'
Casing Lengths:
2.5', 5', 10', 20'
Slot Sizes:
.006 and up

ACCESSORIES AVAILABLE

Flush Threaded Points and Plugs and Caps.
Locking Caps.
TEFLON®, Viton, or Neoprene "O" Rings.

MORRIS Industries, Inc.

Pompton Plains, NJ
(201) 835-6800
(800) 835-0777
Fax #: (201) 835-7414

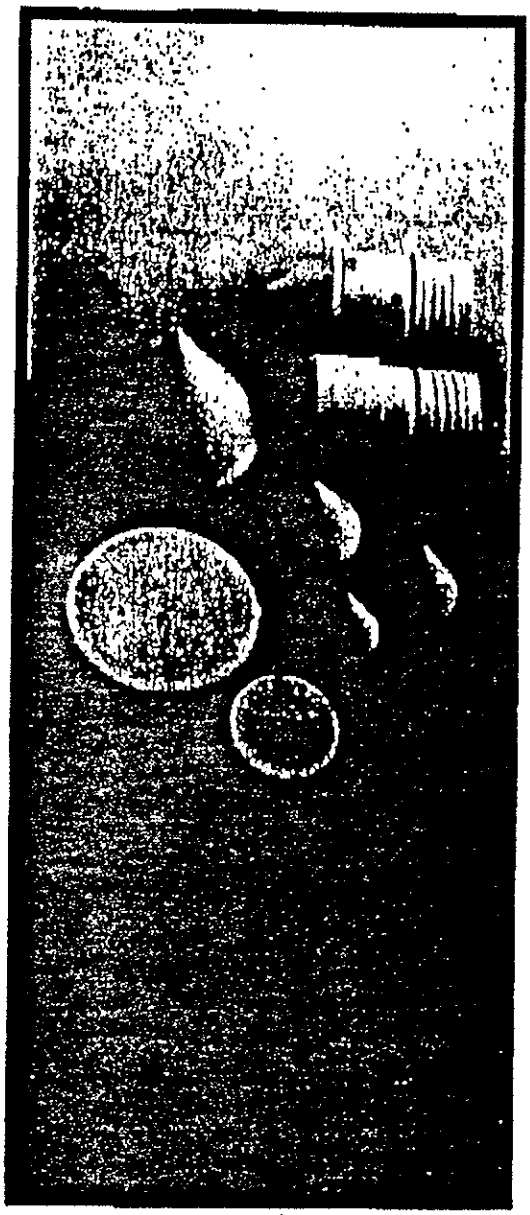
Mechanicville, NY
(518) 664-7775
(800) 535-8591
Fax #: (518) 664-2006

Durham, Conn.
(203) 349-1777
(800) 232-2777
Fax #: (203) 349-9363

Dillsburg, Penn.
(717) 432-9651
(800) 637-7724
Fax #: (717) 432-1150

MONOFLEX

POINTS, PLUGS AND CAPS



SLIP AND FLUSH JOINT ACCESSORIES

PVC Plugs and Points fit I.D. of Pipe.

PVC Fittings are riveted into threaded ends.

SIZES AVAILABLE

½" thru 12" I.D. or O.D.

MORRIS Industries, Inc.

Pompton Plains, NJ (201) 835-6600 (800) 835-0777 Fax #: (201) 835-7414 ● Mechanicville, NY (518) 664-7775 (800) 835-6591 Fax #: (518) 664-2008 ● Durham, Conn. (203) 349-1777 (800) 232-2777 Fax #: (203) 349-9363 ● Dillsburg, Penn. (717) 432-9681 (800) 637-7724 Fax #: (717) 432-1150

PELTONITE® BENTONITE PELLETS

SEALING AGENT

DESCRIPTION:

PELTONITE is a sealing agent manufactured by ROCTEST offering great possibilities in the treatment of water problems in civil engineering works.

PELTONITE is the commercial name given to pre-formed bentonite balls, the bentonite used being of the high sodium mineral type.

APPLICATIONS:

PELTONITE can certainly find a wide range of applications and its usage is only limited by the ingenuity of those involved with water problems.

Typical applications are:

— sealing of all types of piezometer holes.

— sealing of large size dewatering wells and of wellpoints.

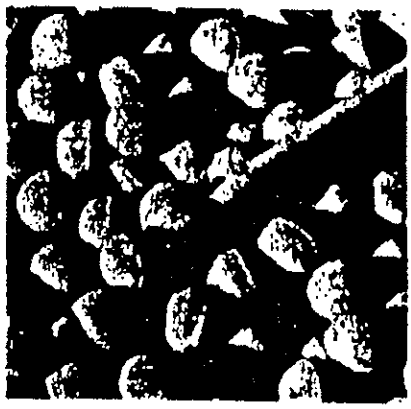
— sealing the bottom of open end caissons.

— sealing of detrimental infiltration through rock discontinuities.

WHY SHOULD YOU USE PELTONITE?

PELTONITE has many advantages:

- scientific proof has been made of the high quality seals obtained with bentonite pellets and this without the need of any special tamping tool.
- the probability of obtaining a satisfactory seal over the old method of using hand-rolled bentonite balls is highly increased.
- the bentonite balls are of uniform size and shape.
- their small size, spherical shape and high density improve their settling characteristics in water.
- jamming problems as they settle are almost eliminated.
- they are easy to handle.
- they considerably cut down the time usually needed to perform a good quality seal and consequently, reduce equipment and labor costs involved in an installation.
- they come in conveniently packed rigid 50 lb. drums which are re-sealable, thus minimizing waste.
- storage of **PELTONITE** is independant of temperature conditions.



PELTONITE balls are small spheres ⅜" in diameter.

Useful information:

The following table gives the weight of PELTONITE needed to perform a 1 foot seal for different borehole diameters.

HOLE DIA. (in.)	2	3	4	5	6	7	8
WEIGHT OF PELTONITE (lb)	3	4	7	11	15	20	27

Specifications:

SIZE:	⅜" dia. (10 mm.)
DENSITY:	1.8
DRY BULK DENSITY:	75 lb/ft³ (1260 kg/m³)
SWELL FACTOR:	greater than 10 when unconfined and fully saturated.
STANDARD PACKAGE:	50 lb (22,7 kg) per barrel

MORRIS Industries, Inc.

Pompton Plains, NJ (201) 835-6600 (800) 835-0777 Fax #: (201) 835-7414 ● Mechanicville, NY (518) 664-7775 (800) 535-6591 Fax #: (518) 664-2008 ● Durham, Conn. (203) 349-1777 (800) 232-2777 Fax #: (203) 349-9363 ● Dillsburg, Penn. (717) 432-9651 (800) 537-7724 Fax #: (717) 432-1150

MORIE SCREENINGS

Typical Physical Analysis

#1 Well Gravel

Inches	MM.	Sieve No.	Cum. Grams	% Ret.	% Pass.
.0661	1.700	12	0.8	0.8	99.2
.0555	1.410	14	14.2	13.4	85.8
.0469	1.190	16	45.3	31.1	54.7
.0394	1.000	18	74.6	29.3	25.4
.0331	.850	20	95.3	20.7	4.7
.0278	.710	25	98.4	3.1	1.6
.0234	.600	30	99.3	0.9	0.7
.0197	.500	35	99.7	0.4	0.3
.0165	.425	40	99.9	0.2	0.1

Typical Chemical Analysis

SiO_2	99.390
Fe_2O_3	.240
Al_2O_3	.190
TiO_2	.120
CaO	.010
MgO	.004
L.O.I.	.046

Acid solubility (1:1 HCL) .08 to .11%
Sp. Gr. - 2.64 to 2.66

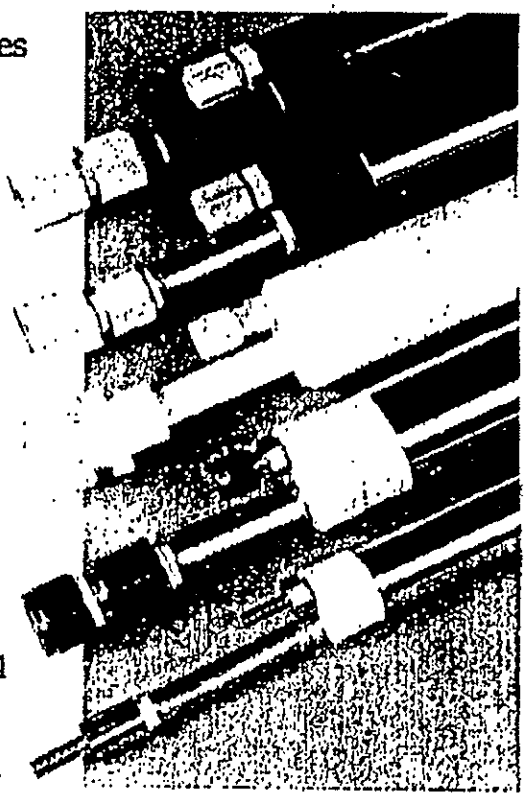
MORRIS Industries, Inc.

Pompton Plains, NJ (201) 835-9600 (800) 835-0777 Fax #: (201) 835-7414 • Mechanicville, NY (518) 664-7775 (800) 835-8891 Fax #: (518) 664-2006 • Durham, Conn. (203) 349-1777 (800) 232-2777 Fax #: (203) 349-9363 • Dillsburg, Penn. (717) 432-9651 (800) 637-7724 Fax #: (717) 432-1150

GROUNDWATER SAMPLING EQUIPMENT

Pneumatic Bladder Sampling Pumps

Well Wizard pumps come in an unmatched range of sizes and materials—plus a 10-year warranty.



THE BEST PUMPS FOR YOUR PROJECT-GUARANTEED!

No matter how demanding your application, we've got the pump. Need samples from over 600 feet? Testing in the ppb range? What about other tough sample collection problems—aggressive/corrosive environments, non-standard well casings, difficult site conditions? No matter what the challenge, QED makes a pump that will do the job better.

So much better, we guarantee it. Dedicated Well Wizard bladder pumps with protective intake screens are guaranteed for ten years against pump failure. They'll keep on working or QED will repair or replace them free. Nobody else in the business offers this level of protection.

PURGE AND SAMPLE WITH THE SAME PUMP

In many situations, a Well Wizard bladder pump can be used for both purging and sampling. For low purge volumes, a standard model (1100, 1200, or 1300-series) may be the choice. Model T1200 is most commonly used. For greater volumes, a high-rate 1500-series Power Pump will cut purging times (and labor costs) by approximately 50%.

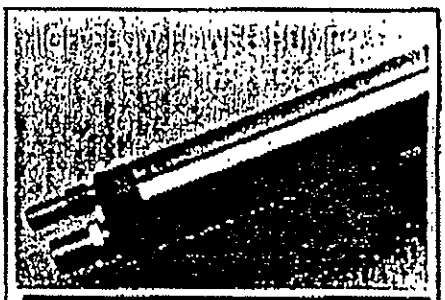
The advantages are obvious. A single-pump system is simple to specify and install; extremely economical; and delivers unmatched bladder-pump sample quality. Large purge volumes may require the use of an accessory, such as a Purge Mizer™ inflatable packer or a purge pump; see pp. 18-19 for details.

SPECIFICATIONS:

MODEL NO.	BODY MATERIAL	BLADDER MATERIAL	INTAKE SCREEN	FITTING MATERIAL*	MAXIMUM LIFT (ft.)	LENGTH (Dimension in inches)	DIA	WEIGHT (lbs)
T1100	Teflon	Teflon	Opt	Teflon	250	40.33	1.66	4
P1101	PVC	Teflon	†	Polypro	300	40.85	1.66	3
P1101S	PVC	Teflon	Std	Polypro	300	40.85	1.66	3
P1101H	PVC	Teflon	Opt	316 S.S.	600	40.75	1.66	3
ST1101P	316 S.S.	Teflon	Std	316 S.S.	1000	40.50	1.66	10
T1200	Teflon/316 S.S.	Teflon	Opt	316 S.S.	300	41.14	1.50	5
P1201	PVC/316 S.S.	Teflon	~~Opt~~	Polypro	300	41.23	1.50	4
P1201H	PVC/316 S.S.	Teflon	Opt	316 S.S.	600	41.37	1.50	4
T1300	Teflon/316 S.S.	Teflon	Opt	316 S.S.	200	46.75	1.00	3
Power Pumps								
P1500	PVC/316 S.S.	Teflon	Opt	316 S.S.	200	93.00	1.50	9
T1500	Teflon/316 S.S.	Teflon	Opt	316 S.S.	200	93.00	1.50	9

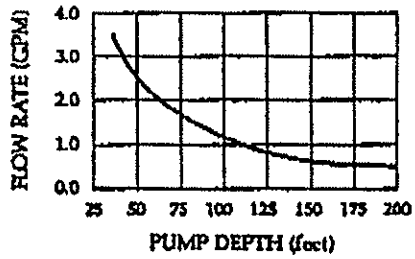
* T1300 requires Clamp Tool No. 35168 for field attachment of tubing. Clamps are provided w/ pump.

† This model cannot be retrofitted with screen. If screen is desired, order P1101S.



FLOW PERFORMANCE CURVE:

1500 Series Pumps



Note: Flow rates are based on pump submergence of 25 feet and operating gas pressure of 100 psi from 3111HR Air Source/Controller. Call for flow rates under other conditions.

TO BUILD THE BEST, START WITH THE BEST MATERIALS

Bladder pump design allows construction of the highest quality materials, with consistent usage throughout the pump. All parts and fittings that contact the sample are matched for compatibility and better performance. You will achieve accurate sampling with the greatest cost-efficiency by choosing the proper pump material.

Teflon®/PTFE

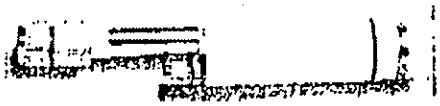
For maximum sample accuracy at low contaminant levels, and longest pump life in harsh chemical environments, QED uses only the finest duPont Teflon® and other PTFE resins available.

Stainless Steel

All stainless steel is not the same. Electropolishing stainless steel has been proven to give the most inert finish for preserving water quality, with lower porosity to help it resist corrosion. That's what we use in all QED stainless parts, rather than inferior alloys with little or no protective finish. (Stainless steel pumps are not recommended for low metal sampling levels, high acid, high dissolved solids, or reducing conditions.)

PVC

Polyvinyl chloride is an economical alternative when monitoring doesn't require stainless steel. We use only NSF-grade PVC, extruded specifically for QED with no markings or lubricants to contaminate the sample.



CERTIFIED CLEAN

Lab-Certified Cleaning

All Well Wizard pumps pass through a rigorous cleaning procedure, and are laboratory-certified to be free of all EPA 601, 602, base neutral, and acid extractable contaminants.

Production parts are batch-treated in laboratory cleaning solution at 130°F and are rinsed with 130°F tap water. Parts are then washed with purified water (filtered, treated with activated carbon and a series of ion exchange columns). Assembly and testing steps also use purified water.

A special 24-hour water extraction test is then run, and the water analyzed; pumps that don't test clean are run through the procedure again until they do. Preassembled pumps are issued a reference number when they have been certified clean and are sealed in polyethylene bags for protection until they are installed.

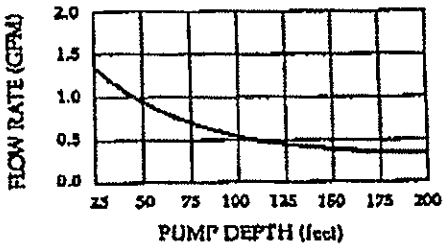
The "Secret" Of Bladder Durability

It's no secret. We start with the most inert polymers available...go through all the process variables to find the toughest formulations...test each batch of bladder material for the equivalent of decades of service to assure reliable performance... and protect bladders with easy-to-replace inlet screen cartridges to reduce abrasion and wear.

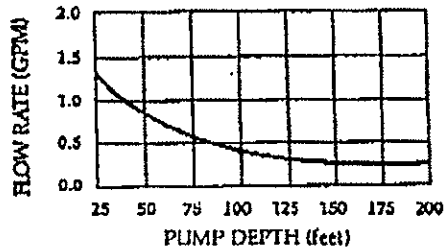
If a bladder does malfunction, QED supplies a quick-change kit so you can easily replace just the bladder sleeve—in the field, with no waiting.

FLOW PERFORMANCE CURVES:

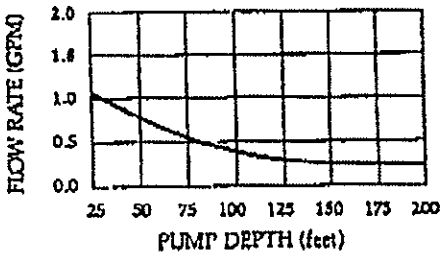
1100 Series Pumps



1200 Series Pumps



1300 Series Pumps



Note: Flow rates are based on pump submergence of 25 feet and operating gas pressure of 100 psi from 5111HR Air Source/Controller. Call for flow rates under other conditions.

FIELD REPLACEABLE BLADDERS:

FOR PUMP NO.	W/ CLAMP TOOL	W/O CLAMP TOOL
T1100	14055	14065
P1101	14057	14067
1200 Series	35315	35320
1500 Series	35858	35857

14026	Complete Bladder Cartridge Teflon (for T1100)
14002	Complete Bladder Cartridge PVC/Teflon (for P1101)
35314	Bladder Replacement Tool Kit 1 - 35052 Clamp Hand Tool 1 - 35312 Pin Punch

Note: All kits contain 2 bladder sleeves and seal replacement sets. 35315 includes pin punch.

INTAKE SCREENS (Protect Bladders):

MODEL NO.	DESCRIPTION
35200	Optional S.S. Screen for 1200 & 1500 Series Pumps

Note: Intake screens must be used to qualify for 10-year warranty.

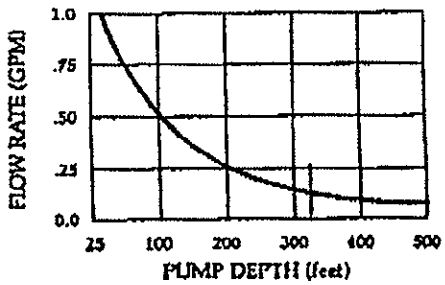
WELL WIZARD ON VIDEO

Well Wizard Operation & Maintenance

A user's manual on video, this 17-minute tape is packed with valuable, easy-to-follow instructions. Sections on installation, operation, and troubleshooting are color-coded for quick reference. Learn from the experts about sample pumps, purge pumps, inflatable packers, and pneumatic controllers. Included with every Well Wizard System.

DEEP WELL FLOW CURVE:

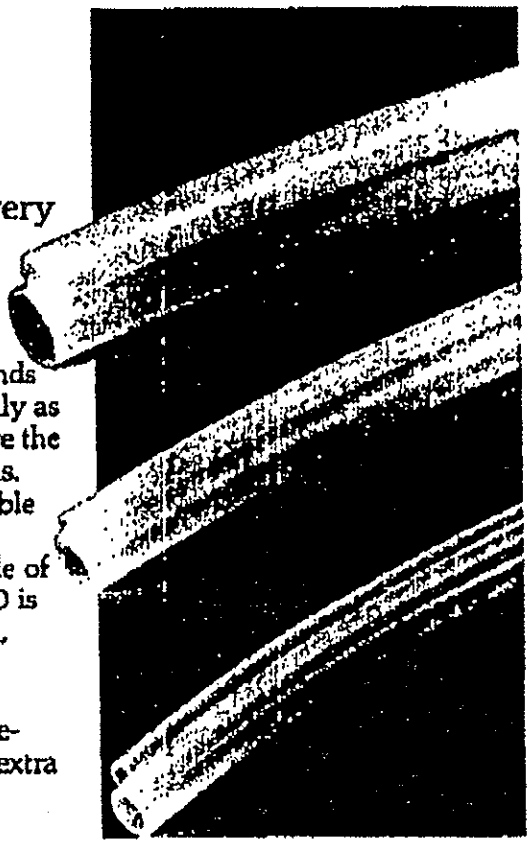
1100 Series Pumps



Note: Flow rates based on pump submergence of 25 feet. Depths to 320 feet based on operating gas pressure of 165 psi from 3111HPE Air Source/Controller.
*Even greater depths (to 1000 feet) are possible; consult QED for details.

Sample and Purge Tubing

A critical component of any monitoring system, tubing assemblies in a variety of materials fulfill every need.



PROTECT YOUR SAMPLES WITH THE BEST TUBING

QED has always recognized that ground water monitoring demands the highest material standards. This applies to tubing; a sample is only as good as the tubing it runs through. QED tubing enhancements ensure the ultimate accuracy of ground water samples for monitoring programs.

Twin-line bonded tubing makes handling, installation, and portable water level probe use easier. Economical Teflon-lined polyethylene bonded tubing is our most popular choice, with Teflon on the inside of the sample discharge tubing where it's really needed. Model PT5100 is used most often. Other tubing set choices include all-Teflon bonded, polyethylene bonded, and polypropylene bonded (for deep wells).

All tubing is controlled-quality, virgin-grade material, without printing. Standard tubing assemblies are cut to exact length and pre-assembled to well cap and pump per customer specifications at no extra cost. Bulk tubing is also available; inquire for details.

Teflon is a duPont trademark; material may be an equivalent PTFE.

SPECIFICATIONS:

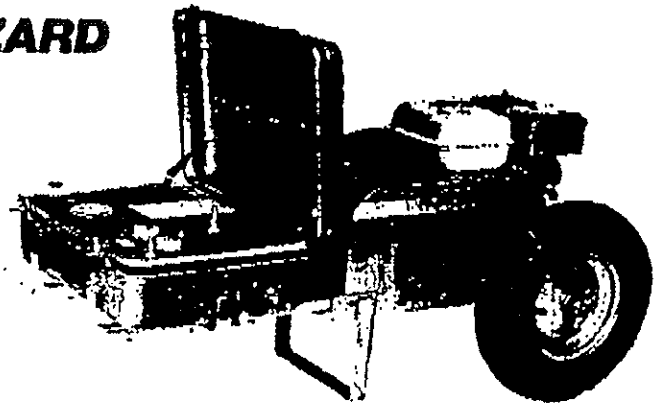
MODEL NUMBER	MATERIAL	AIR SUPPLY (inches) O.D.	AIR SUPPLY (inches) I.D.	DISCHARGE (inches) O.D.	DISCHARGE (inches) I.D.	MAX OPER PRESSURE PSI	MAX DEPTH (feet)	MIN BEND RADIUS (inches)	TUBING BOND TYPE	PUMP TYPE	PUMP MODEL NUMBERS
P5100	Polyethylene	0.250	0.170	0.500	0.375	200	400	2.50	Continuous	Sampling	1100 and 1200 Series
→ PT5100	Teflon-lined PE	0.250	0.170	0.500	0.375	200	400	2.50	Continuous	Sampling	1100 and 1200 Series
T5110	Teflon	0.250	0.170	0.500	0.375	240	500	3.00	Continuous	Sampling	T1100 and T1200 Series
PR5100	Polypropylene	0.250	0.170	0.500	0.375	300	600	2.50	Cable Wrap	Sampling	P1101H and P1201H Series
P5000	Polyethylene	0.250	0.170	0.375	0.250	300	600	1.25	Continuous	Sampling	T1300
PT5000	Teflon-lined PE	0.250	0.170	0.375	0.250	300	600	1.25	Continuous	Sampling	T1300
T5010	Teflon	0.250	0.170	0.375	0.250	300	600	2.50	Continuous	Sampling	T1300
PR5010	Polypropylene	0.250	0.170	0.375	0.250	300	600	1.25	Cable Wrap	Sampling	T1300
P5200	Polyethylene	0.250	0.170	0.250	0.170	300	600	1.00	Continuous	Sampling	1100 and 1200 Series
PT5200	Teflon-lined PE	0.250	0.170	0.250	0.170	300	600	1.00	Continuous	Sampling	1100 and 1200 Series
T5200	Teflon	0.250	0.170	0.250	0.170	320	600	1.50	Continuous	Sampling	1100 and 1200 Series
P5610	Polyethylene	0.500	0.375	0.750	0.625	150	200*	4.00	Continuous	Purge	HR4100, HR4500/4500LB, HR4600
PT5610	Teflon-lined PE	0.500	0.375	0.750	0.625	150	200*	4.00	Continuous	Sampling	1500 Series
T5600	Teflon	0.500	0.375	0.750	0.625	150	200*	9.00	Teflon Ring	Purge	HR4200, HR4700/HR4700LB

*Maximum pump depth recommendations reflect limits of efficient purge pumping.

WELL WIZARD

Controllers/Air Sources

Workhorse controller/compressor carts provide self-contained portable performance.



3111LR Controller/Compressor Cart

RUGGEDLY CONTRUCTED, EASILY PORTABLE

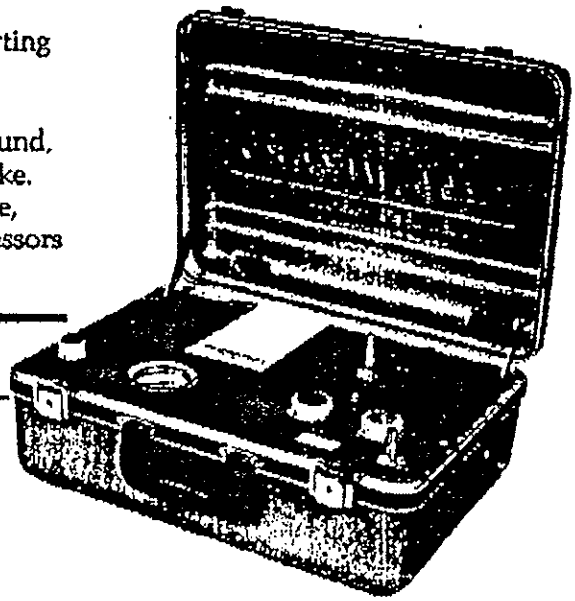
Most of our customers choose the 3111 series controller/compressor carts. They combine field-proven pneumatic controllers with performance-engineered compressors, powered by reliable, fast-starting 4 HP Honda gasoline engines. Model 3111LR is the most popular choice.

The most durable, portable, all-in-one pump-driving system around, the 3111 series operates every sampling and purging system we make. It's simple and self-contained, optimized for maximum performance, reliability, and ease of use. Finishing touches include oilless compressors for maximum contamination protection.

SPECIFICATIONS:

MODEL NO.	DESCRIPTION
3111LR	Standard controller/compressor cart drives pumps to 200 ft. lift; 4 HP Honda engine, high output compressor (4.3 SCFM at 100 psi), with model 3013 controller mounted on the anti-vibration braced cart, with easy wheel/handle breakdown; 89 lbs.
3111LH	High pressure model controller/compressor cart provides lifts to 320 ft. with high pressure compressor (2.1 SCFM at 165 psig) and model 3013H high pressure controller, otherwise similar to model 3111LR above; 93 lbs.

Note: Economy models available with Briggs & Stratton engines: 3111HR standard lift; 3111HH* high pressure.



3013 Pneumatic Controller

THE MOST RELIABLE CONTROLLERS IN THE INDUSTRY

Versatile Well Wizard 3013 series controllers are fully adjustable, can operate high-rate purge pumps at full capacity and still be throttled down to 0 psi for EPA-recommended low flow rates for sampling.

One-person portability, fast set-up, and unattended cycling greatly reduce labor costs, and QED systems come complete—no extra charges for hoses, batteries, chargers or other necessary equipment.

All standard and high pressure models are compatible with a wide range of gas sources. Optional Pump Manifold lets one controller run three sampling pumps within a 20-foot radius. High pressure models allow lifts to 1000 feet. Pneumatic design provides sophisticated control with no batteries or electrical supply. And it's tough: Well Wizard controllers have been left out in the rain, dropped from trucks, even had their lids ripped off—and still kept on working.

EXTRA CONTROLLER PERFORMANCE BUILT IN

Pneumatic Power

3013 series controllers have all-pneumatic design for maximum reliability. No battery to drain, no long waits for recharging or replacement batteries—if you've got pressure, you've got power. Third-generation pneumatic controls provide inherent shock and moisture resistance for real ruggedness.

Electronic Efficiency

Model 350 has uniquely efficient circuits that work for 100 hours on one set of inexpensive, readily available AA batteries. Its MIL-SPEC circuit board delivers continued performance in all conditions. Warning light shows a full day's power remaining, so you won't get left out in the field.

SPECIFICATIONS:

MODEL NO.	LOGIC	MAXIMUM SUPPLY PRESSURE (PSI)	MAXIMUM PUMP DEPTH (feet)	WEIGHT (lbs)	LENGTH (Dimensions in inches)	WIDTH	HEIGHT
3013	Pneumatic	125	250	22	18	14.50	6.75
3013H	Pneumatic	300	600	26	18	14.50	6.75
3013UH	Pneumatic	500	1000	32	18	14.50	6.75

ACCESSORIES:

MODEL NO.	DESCRIPTION
3000	Multiple Pump Manifold
3017	Low Submergence Adaptor

SAMPLE PRO

Portable Water Level Meter

Get accurate, repeatable measurements quickly and easily at all depths.

Model 6000SS

CONVENIENT, RELIABLE PERFORMANCE

Static water level measurement is faster, easier, and more precise than ever with Sample Pro™ 6000 Series flat tape water level meters.

The compact electronic probe, standard in stainless steel, is specially designed to eliminate false readings caused by cascading water, and fits easily in wells, boreholes, and standpipes. Kink-resistant flat tape is permanently marked in 1/50th ft. increments, allowing repeatable depth measurements accurate to 1/100th ft.

Kevlar strands reinforce the tape for improved stretch resistance; the Kevlar connects to bolted metal for a stronger probe/tape connection and better water-tight seal, protecting against probe failure.

SIMPLE OPERATION AND DECONTAMINATION

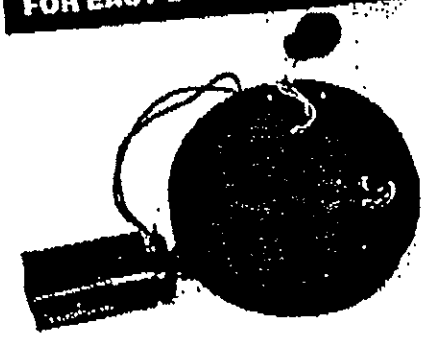
The probe and cable are lowered from the easy-to-carry, free-standing reel. Visual and audio alarms indicate contact with static water; depth measurement is taken directly from the tape. A built-in sensitivity control allows adjustment to fit varying water conductivity conditions. The unit operates for up to a year on a single, easily-replaceable 9 volt battery.

Decontamination is easier than ever. The meter electronics can be removed by disconnecting a single plug; the whole reel/tape/probe assembly can then be simply washed down or even totally immersed for thorough cleaning between wells.

OPTIONS AND ACCESSORIES

Seven standard models are available with inch or metric markings in a range of cable lengths from 100' to 650' and 50 to 150 meters. Lengths up to 1500' can be special ordered; please inquire.

Accessories include a padded protective carrying bag and a tape guide which keeps the cable from rubbing on the edge of the well casing, for reduced tape wear, easier lowering and raising, and more precise, repeatable measurements.



Removable Electronics Assembly

SPECIFICATIONS:

Probes:	Stainless steel (w/ strain relief), 5/8" diameter x 5" long
Tape:	Flat tape, PVC with Kevlar and tinned copper conductors, markings at 1/50' intervals or 1 centimeter intervals for metric
Power:	One standard 9V battery
Reel:	Small, free-standing with carrying handle and winding knob, brake, probe holder, battery test, on-off switch, sensitivity adjustment (Model 6000QSS uses larger reel)

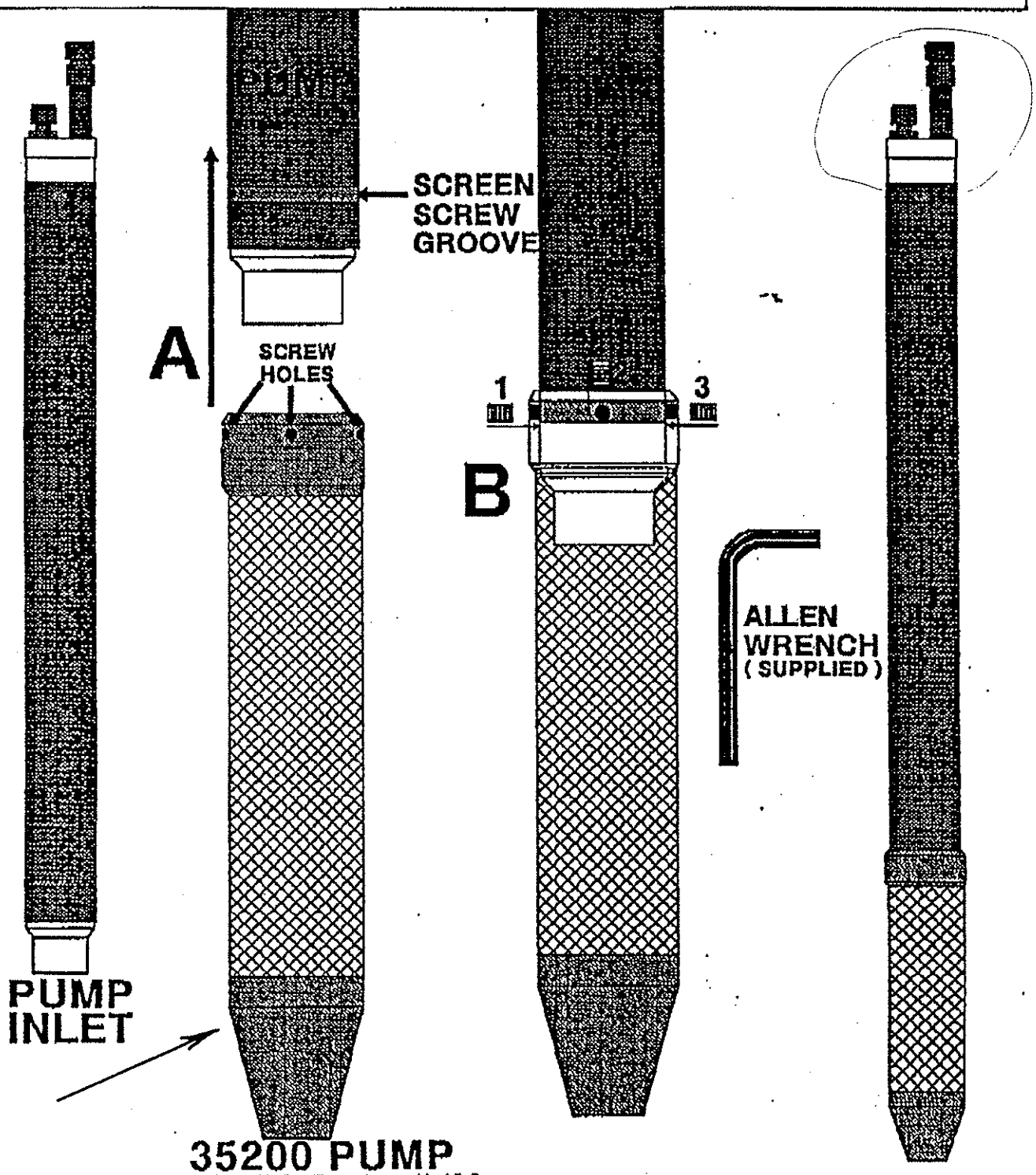
Depth Options:

MODEL NO.	TAPE LENGTH	METRIC MODELS	TAPE LENGTH
6000YSS	100 ft.	M6000-50	50 meters
→ 6000MSS	300 ft.	M6000-100	100 meters
6000SS	150 ft.	M6000-150	150 meters
6000QSS	650 ft.		

ACCESSORIES:

MODEL NO.	DESCRIPTION
36059	Tape guide
36060	Carrying bag

1200 SERIES PUMP INLET SCREEN ATTACHMENT SLIDE SCREEN OVER PUMP INLET AND ALIGN THE SCREEN'S SCREW HOLES OVER TOP OF THE SCREEN SCREW GROOVE OF THE PUMP'S BODY. HOLD SCREEN IN PLACE WHILE THREADING THE SCREEN'S 3 SET SCREWS, (USING THE PROVIDED ALLEN WRENCH), THROUGH THE SCREEN SCREW HOLES AND INTO THE PUMP SCREEN SCREW GROOVE. TIGHTEN SCREWS AN EQUAL DISTANCE IN ON ALL 3 SIDES TO PROVIDE A FIRM HOLD ON ALL SIDES. MAKE SURE SCREEN IS FIRMLY ON BEFORE INSERTING DOWN WELL.



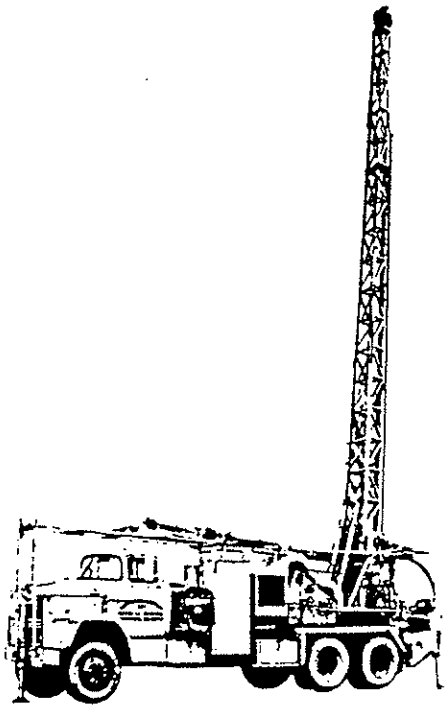
35200 PUMP INLET SCREEN

(OPTIONAL)

MORETRENCH AMERICAN

BUCKET DRILL RIGS

EXTRACTION WELL DRILLING EQUIPMENT



BUCKET DRILL

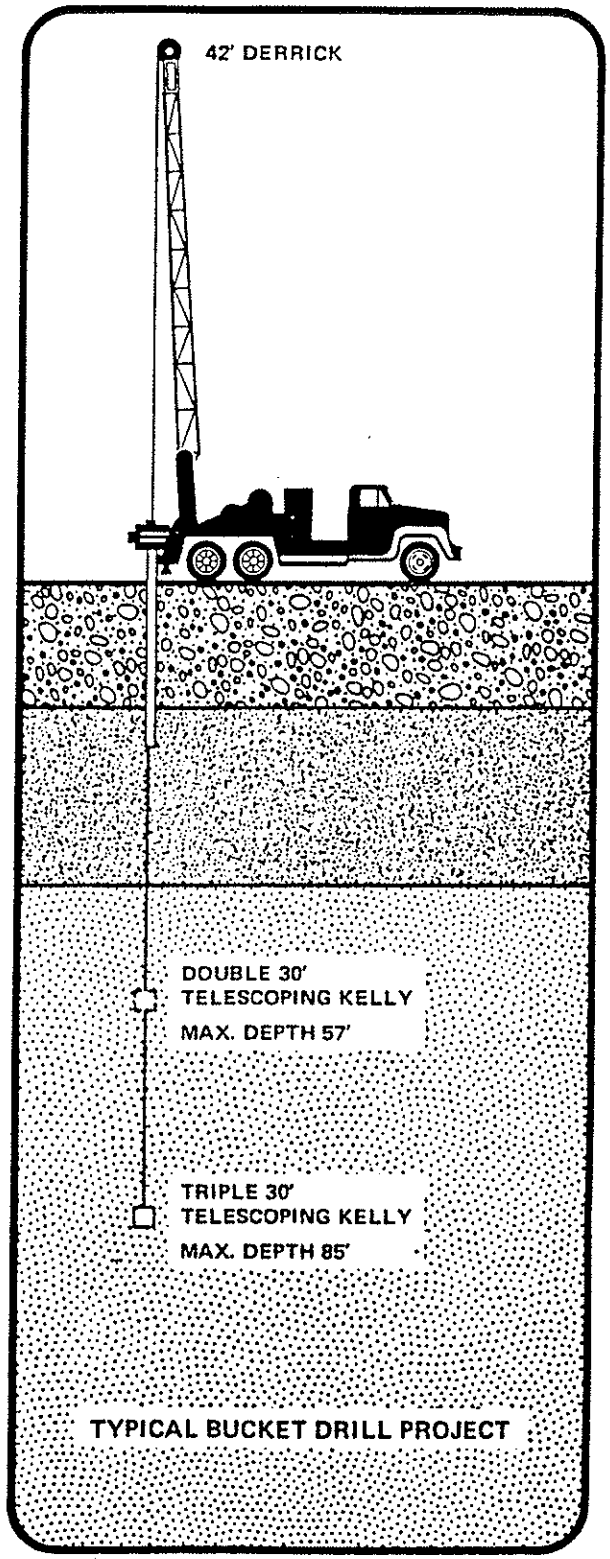
A heavy duty model with 7000-pound double drum hoist. The 52-inch ring gear takes buckets to 48 inches in diameter. With a triple telescoping Kelly and 39-foot derrick, depths to 85 feet can be reached. By use of a stem, depths to 105 feet are possible.

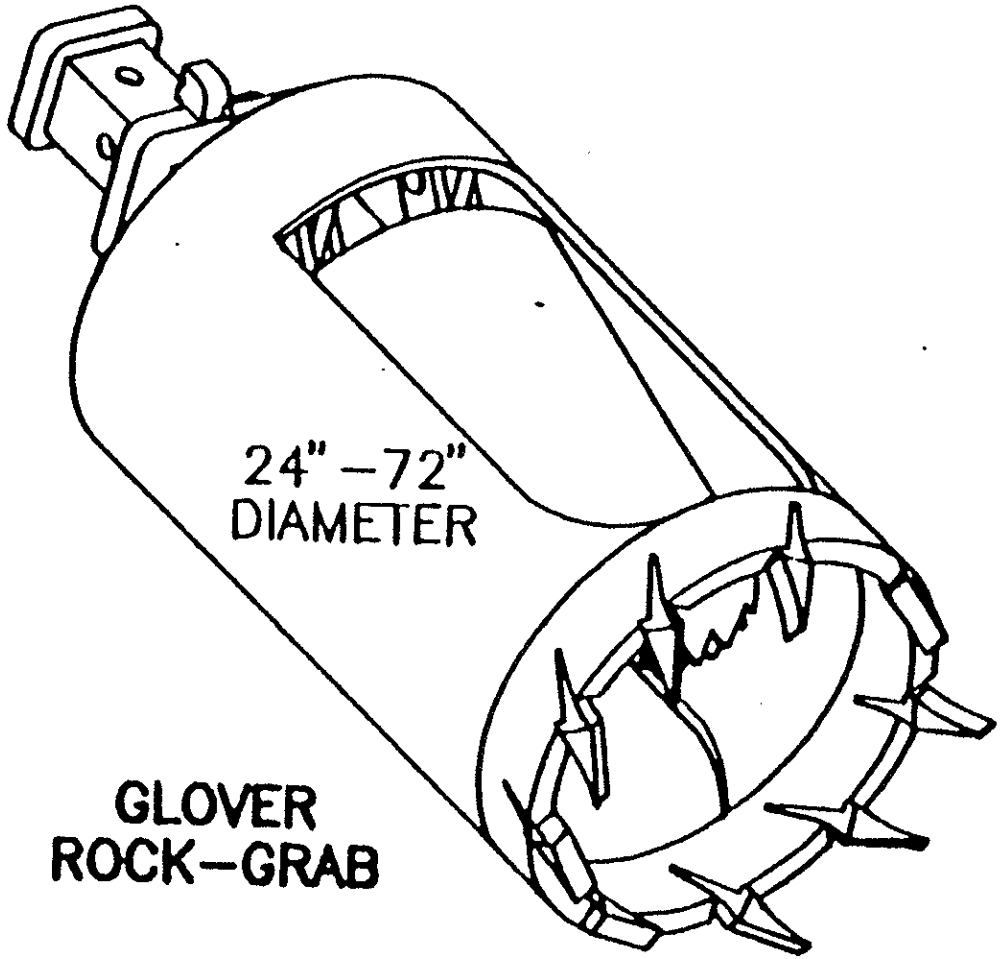
Moretrench American uses the Bucket Drill to predrill excavations for the installation of Moretrench dewatering wells.

Revert or bentonite is used as a drilling fluid to support the sides of the excavation.

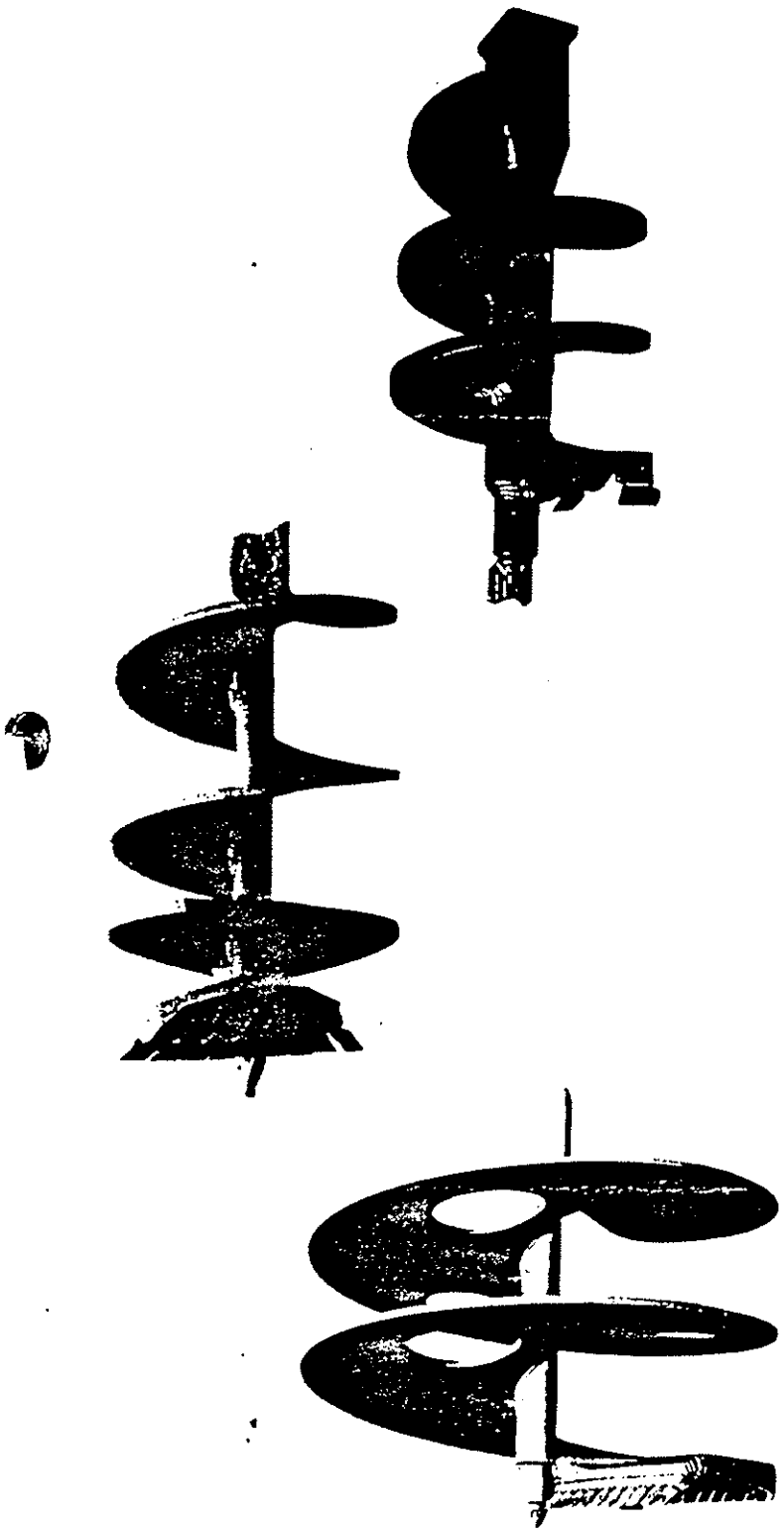
Moretrench American wellscreens and select sand or gravel filters are installed upon completion of the drilling operation.

Submersible pumps are used as the pumping tool for deep wells.





**GLOVER
ROCK–GRAB**



SPADE TOOTH STEP AUGER

This auger incorporates a step-tooth design minimizing "walking" tendencies. It uses spade type teeth mounted in discrete positions both radially and in elevation. Full contact with the surface being drilled results in stability and continuous penetration in materials such as soft limestone, clay, shale, compacted sand and gravel. Worn teeth are easily removed and replaced. This auger performs well in a wide range of drillable materials that otherwise requires more than one tool for efficient drilling production.

SINGLE FLIGHT, DOUBLE CUTTING EDGE AUGERS

These augers incorporate features of both the single flight, and double flight augers. The auger has two cutting edges for which a full line of cutting edge configurations is offered. The first leading edge of the flights cuts and conveys material up the auger. The opposing cutting edge is on a partial flight and serves to balance cutting forces when starting a shaft. This auger offers the advantage of double flight augers without reducing efficient conveyance of materials. Less tool weight and lower cost are also advantages to this design when compared to a double flight auger.

MUDDING AUGERS

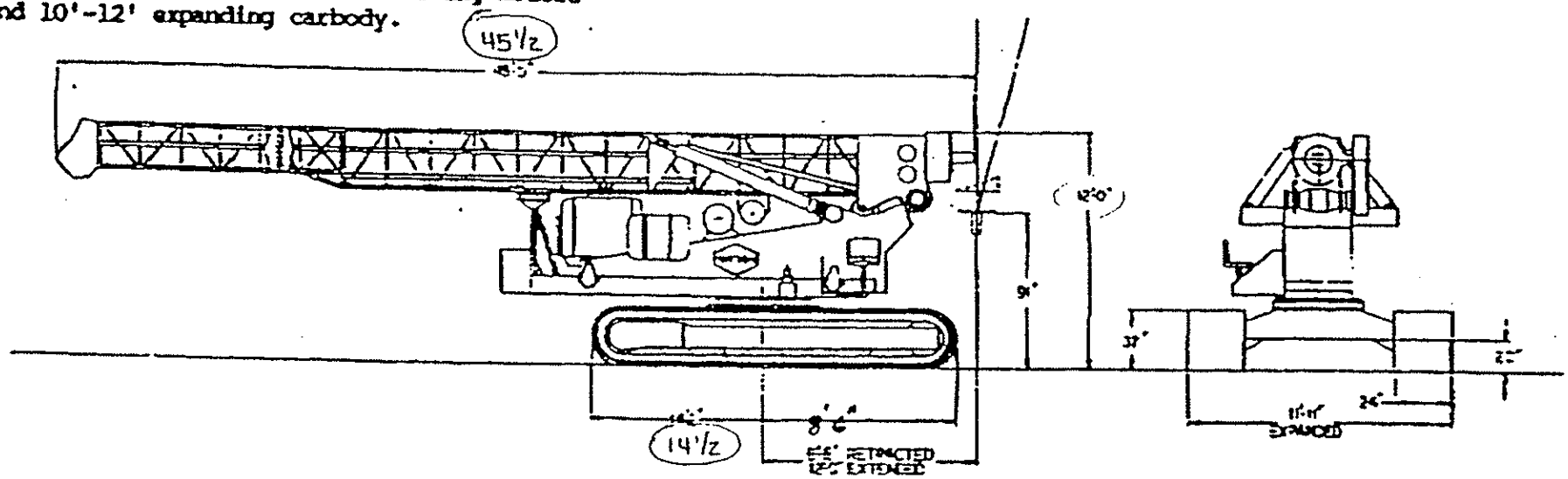
The principle purpose of a mudding auger is to drill and mix cuttings into a slurry. The openings placed in the auger's flights allow circulation of materials through the tool and complement mixing effects as the auger is rotated while alternately raised and lowered. The openings also provide a vacuum/pressure relief that results in increased speed and ease in which the auger may be raised and lowered in the shaft. Flight holes also serve to eliminate problems which result from pulling a partial vacuum in unstable materials that may result in wall collapse and shaft deformation. Mudding augers may also be used for typical drilling production. They are available in single or double flight configurations and may be equipped with a variety of cutting edges.

U-13

Notes:

1. Dimensions for standard 60' drill depth unit.
   Approximate unit weight - 64,000#

2. Standard crawler unit has dual swing motors and 10'-12' expanding carbody.



66,000 gross

66,000 10' wide

SUBMISSION FOR PIEZOMETERS

PROCEDURE

I. Piston Tube Sampling

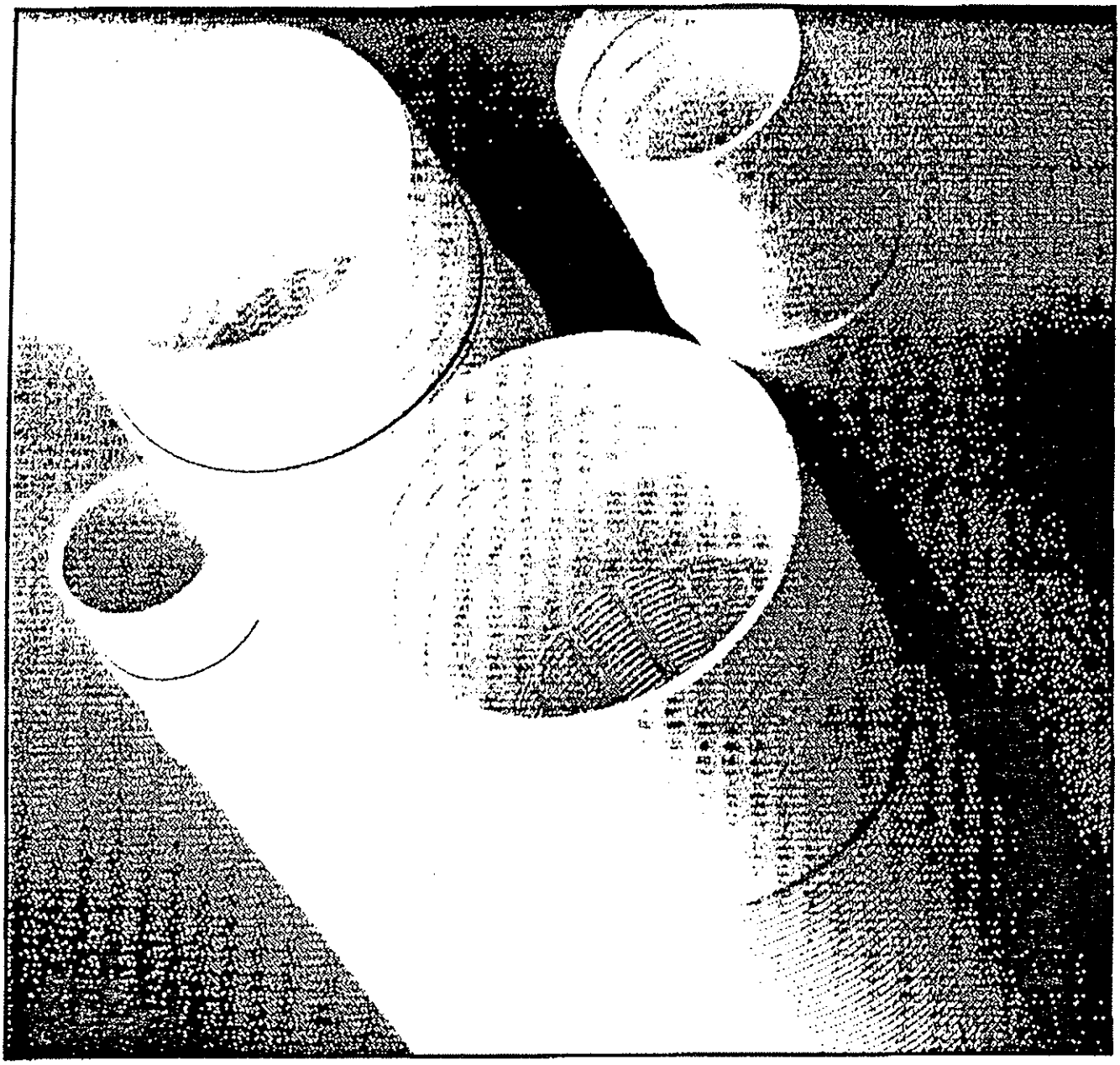
To retrieve samples of the slurry wall backfill, we propose to proceed as outlined below:

- Minimum 8" O.D. hollowstem augers will be advanced to the prescribed depth. The diameter of the hollowstem will be minimum 4 1/4".
- Upon reaching the target depth, a nominal 3" I.D. piston tube sampler measuring 24" in length will be pressed to its full depth.
- The tube will be withdrawn and the sample turned over to BET.
- The augered hole will be backfilled with a cement-bentonite grout in the proportion of 1 bag of portland cement, 4 to 6 pounds of dry bentonite to 7 gallons of water.

II. Piezometer Installation

- Minimum 8" O.D. hollowstem augers will be advanced to depth. The hollowstem will be minimum 4 1/4" I.D. A wooden plug will be placed in the lead auger prior to drilling.
- Upon reaching completion depth, the hollowstem will be flushed with clear water to remove any fines and to stabilize the hole for piezometer construction.
- Minimum 1 1/4" I.D. PVC piezometer assemblies will be inserted in the hollowstem conforming to the depth requirement of the specifications.
- Filter gravel will be placed by tremie as the augers are withdrawn to a point 6" above the screen as specified.
- Above the filter gravel, * cement-bentonite grout will be placed via a grout pump and tremie pipe.
- The piezometer will be completed with cap, protective casing and lean concrete as specified.

* 7 GAL. H_2O
1 BAG (94#) PORTLAND CEMENT
5# BENTONITE POWDER



PVC Vee-Wire® Screens

- Only continuous slot, wire-wrapped non-metallic screens available without a restricting pipe base.
- More open area per foot than any other non-metallic screen available. Allows more water to enter at lower velocities, which reduces turbidity and enables a more representative sample to be collected.
- Exceptionally strong due to sonically welded PVC wire and rods.
- Thermally-attached fittings (through 6PS), eliminate solvent welding in the field, which can endanger sampling accuracy.

PVC Slotted Pipe

- Use Johnson screens™ slotted PVC pipe when monitoring applications do not require the performance of Vee-Wire® screen.
- Meets Wheelabrator Engineered Systems Inc.'s high standards of quality.
- Slots are cleaned to remove stringers and burrs.

MORIE SCREENINGS

Typical Physical Analysis

#1 Well Gravel

Inches	MM.	Sieve No.	Cum. Grame	% Ret.	% Pass.
.0661	1.700	12	0.8	0.8	99.2
.0555	1.410	14	14.2	13.4	85.8
.0469	1.190	16	45.3	31.1	54.7
.0394	1.000	18	74.6	29.3	25.4
.0331	.850	20	95.3	20.7	4.7
.0278	.710	25	98.4	3.1	1.6
.0234	.600	30	99.3	0.9	0.7
.0197	.500	35	99.7	0.4	0.3
.0165	.425	40	99.9	0.2	0.1

Typical Chemical Analysis

SiO_2	99.390
Fe_2O_3	.240
Al_2O_3	.190
TiO_2	.120
CaO	.010
MgO	.004
L.O.I.	.046

Acid solubility (1:1 HCL) .08 to .11%
Sp. Gr. - 2.64 to 2.66

THE MORIE COMPANY, INC.

MINERS OF INDUSTRIAL SAND AND GRAVEL

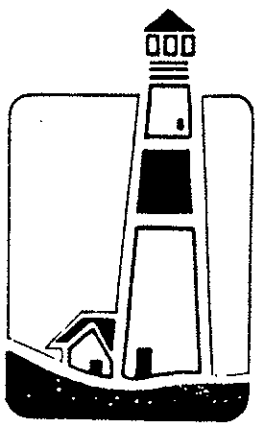
Main Office: 1201 N. High St., Millville, NJ 08332

800/257-7034 • in N.J. 800/521-0485 • Fax # 609/327-4107

GEORGIA SILICA DIVISION
Junction City, GA 31812
404/269-3294 • Fax # 404/269-3191

ALABAMA SILICA DIVISION
Tuscaloosa, AL 35401
205/758-8353

TENNESSEE SILICA DIVISION
Camden, TN 38320
901/584-8201

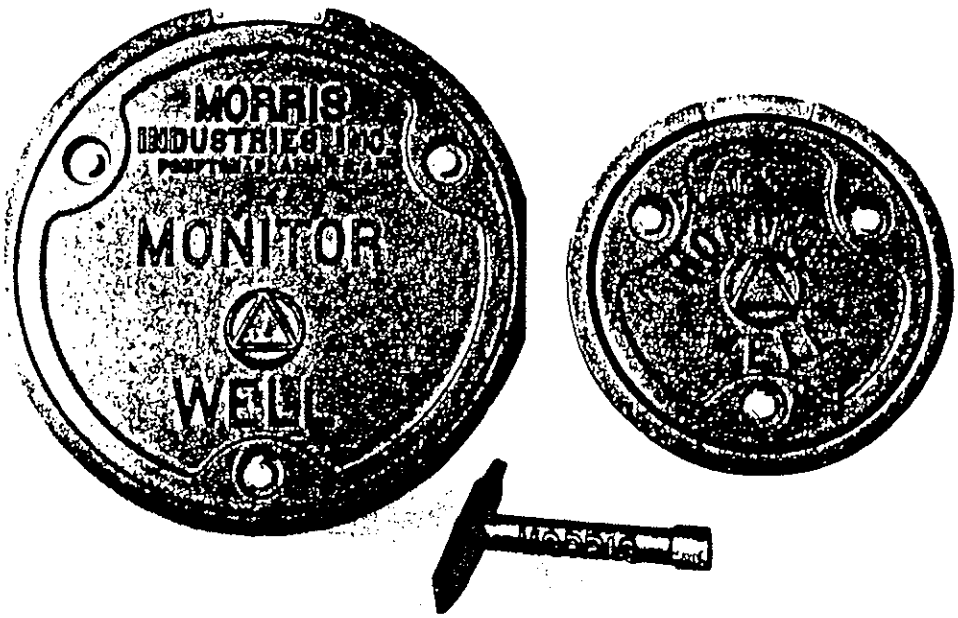


MORRIS

WATERTIGHT MANHOLE

12″ inch

8″ inch



- MADE FROM STEEL CONSTRUCTION
- WATERTIGHT
- EASY ACCESS
- INCLUDES MULTI-PURPOSE WRENCH
- IDENTIFICATION PLATE
- AVAILABLE WITH STEEL OR 20 GAUGE GALVANEALED SKIRT
- MANHOLES EXCEED THE H-20 AASHTO LOAD RATING
- TESTED IN ACCORDANCE WITH FEDERAL SPECIFICATION #RR-F-621D

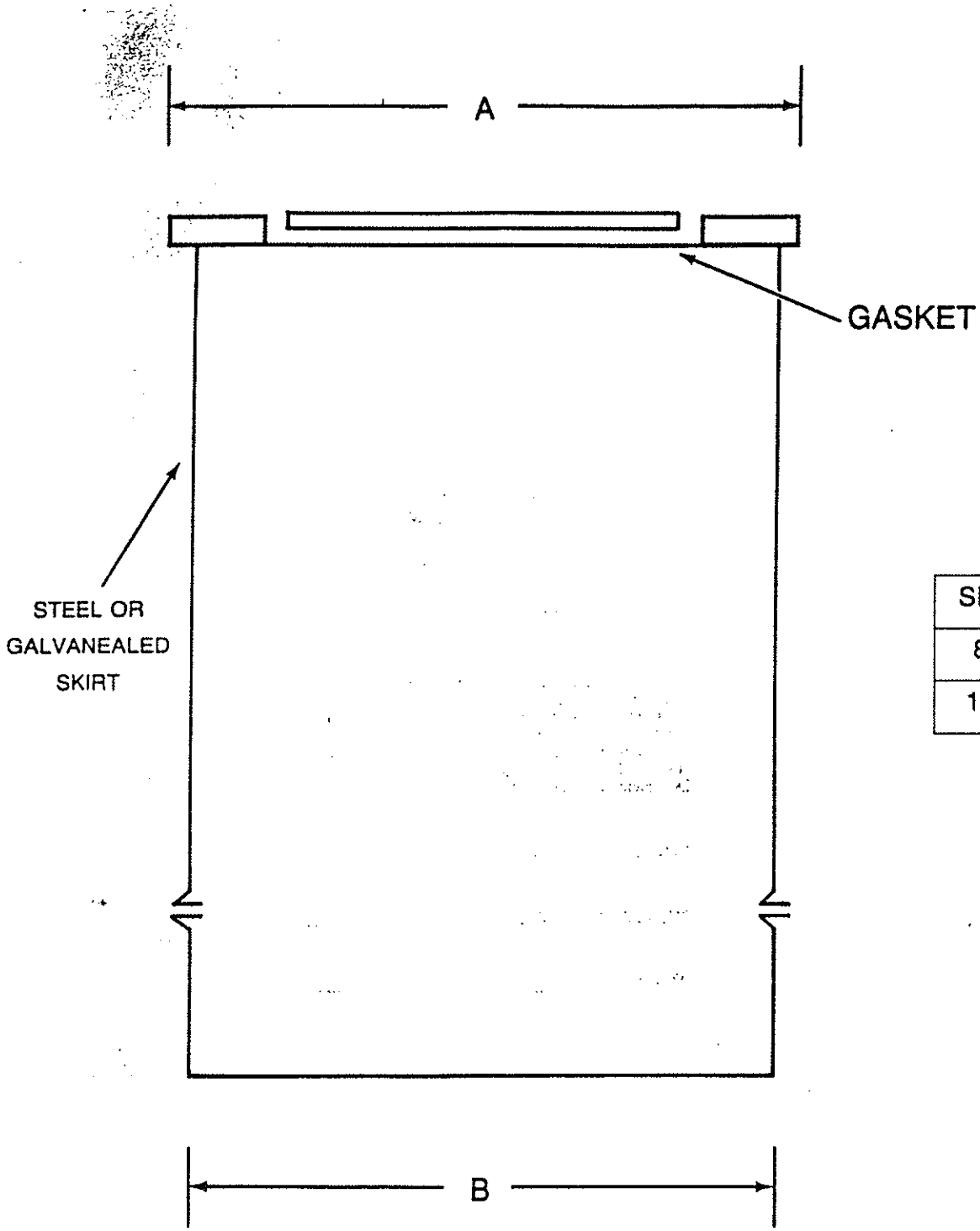
AVAILABLE THRU **MORRIS industries, inc.**

777 Route 23
Pompton Plains, NJ 07444
(800) 835-0777
Fax # (201) 835-7414

44 Route 146
Mechanicville, NY 12118
(800) 635-6591
Fax # (518) 664-2006

21 Commerce Circle
Durham, Conn. 06422
(800) 232-2777
Fax # (203) 349-9363

975 West Siddonsburg Road At US 1
Dillsburg, Penna. 17019
(800) 637-7724
Fax # (717) 432-1150



DIMENSIONS

SIZE	A	B
8″	9 3/4″	8 5/8″
12″	13 1/8″	12 1/2″

PRODUCT NUMBERS FOR ORDERING

PART #	DESCRIPTION
318100600	8″ WATERTIGHT MANHOLE W/6″ STEEL SKIRT
318101200	8″ WATERTIGHT MANHOLE W/12″ STEEL SKIRT
318101800	8″ WATERTIGHT MANHOLE W/18″ STEEL SKIRT
318100751	8″ WATERTIGHT MANHOLE W/7½″ GALVANEALED SKIRT
318101201	8″ WATERTIGHT MANHOLE W/12″ GALVANEALED SKIRT
318131201	12″ WATERTIGHT MANHOLE W/12″ GALVANEALED SKIRT

BRECO MECHANICAL GROUP, INC.
201 SAW MILL RIVER ROAD
YONKERS, NEW YORK 10701

*TEL. (914) 963-3600 * FAX (914) 963-3989*

WELL AND PIEZOMETER ABANDONMENT PROCEDURES

Per Section 02677 of the Specifications, the following describes the proposed method of abandoning the existing wells.

1. The wells will be located in the field. The outer protective casing will be removed.

2. A mixture of cement, bentonite and water will be used as a grout mixture for grouting the existing wells. The grout mix design will be as follows:

Portland Cement	94 Lbs.
Powdered Bentonite	4-6 Lbs.
Water	8-10 Gals.

3. The cement-bentonite grout will be mixed and pumped through a tremie pipe 3 feet from the bottom of the well to the top of the well.

4. A well abandonment report will be kept in accordance with Paragraph 1.3.B and Paragraph 1.7 of Section 02677. The report form that will be used is attached.

5. After 24 hours the well will be inspected for settlement of the grout previously placed. If any settlement occurred, additional grout will be placed in the well.

6. After the wells have been grouted, the inner casing shall be removed to 4 to 5 feet below ground surface. The remaining portion of the hole will be backfilled.

cwpdocs/abandonm

BRECO MECHANICAL GROUP, INC.

WELL ABANDONMENT REPORT

PROJECT: 876 HP
LOCATION: Pelham Landfill
Bronx, N.Y.

SPEC. SECTION: 02677

WELL NO:_____

TYPE WELL:_____

SIZE (DIAMETER):_____

DEPTH:_____

DEPTH OF GROUT LOSS:_____

AMOUNT OF GROUT:_____

DEPTH OF GROUT (STAGES):

A._____ F._____
B._____ G._____
C._____ H._____
E._____ J._____

CASING CONDITIONS:_____

_____

_____

STATIC WATER LEVEL:_____

DEPTH OF SEAL:_____

CHANGES DURING SEALING:_____

REMARKS:_____

_____

_____

DATE OF CLOSURE:_____

TIME STARTED:_____

TIME COMPLETED:_____

COMPLETED BY:_____

BENTONITE PELLET SEALS

PureGold®
Groundwater Monitoring Products

AMERICAN COLLOID COMPANY
Water/Mineral Division

American Colloid Company's PureGold® Product Line

American Colloid Company has specifically engineered the PureGold® product line to meet the strict regulatory requirements of the groundwater monitoring industry. PureGold® products are produced from the highest quality bentonite clays. Each product consists of a blend of pure, dried bentonite clays without polymers or organic additives. PureGold® products are formulated under strict quality control standards. The products have been analyzed for inorganics using the EP Toxicity Test Method, and for organic priority pollutants using U.S. EPA CLP procedures. The analytical results were below EP Toxicity maximum concentration limits for inorganics and below CLP detection limits for organics.

PRODUCT NAME	USE
PureGold® Gel	A 90 bbl. yield, polymer free drilling fluid. Used for maintaining borehole integrity in unstable geologic formations.
PureGold® Grout	A high solids bentonite grout. A safe substitute for cement. Used for sealing the annulus of groundwater monitoring wells and abandoning boreholes.
PureGold® Tablets	Bentonite tablets available in 1/2", 3/8" and 1/4" diameters. Used for sealing the annulus of groundwater monitoring wells.
PureGold® Doughnut	A bentonite cylinder. Used for sealing the annulus of groundwater monitoring wells.
PureGold® Chips	Bentonite chips available in two sizes: 1/4" to 3/8" and 3/8" to 3/4". Used for abandoning shallow boreholes. (< 100')
PureGold® Lube	A bentonite based tool joint lubricant. For use in environmental drilling where petroleum based lubricants are not allowed.
PureGold® Grouter	A grout mixer available in two models. Used for mixing and pumping high solids bentonite grouts.
Marsh Funnel & Cup Mud Balance	Test equipment for measurement of drilling fluids and grout.

1500 W. Shure Drive • Arlington Heights, Illinois 60004-1434 • (708) 392-4600 • Fax (708) 506-6199

CETCO

COLLOID ENVIRONMENTAL TECHNOLOGIES COMPANY

Groundwater Division

TECHNICAL DATA SHEET

PureGold® Chips

NSF CERTIFIED

Description: PureGold® Chips are natural sodium bentonite screened to 1/4" to 3/8" in size.

Recommended Use: For sealing shallow boreholes, decommissioning wells, providing an interface between bentonite grouts and cement, and as a backfill for ground rod installations.

Characteristics:

- Chemically stable, results from TCLP Metals Analysis are below RCRA limits for hazardous constituents.
- Provides a high solids clay seal.
- Prevents infiltration of surface contamination.
- Provides a permanent flexible seal.
- Can be used to seal abandoned holes, conductor pipe and seismic shot holes.
- Forms a low resistivity contact to grounding rods.

Mixing and Application: Bagged material should be screened of fines before placing in hole. Material should be poured slowly down hole to prevent bridging or binding. If installed in the unsaturated zone, water should be added at two foot intervals to assure adequate hydration.

Bulk Density: 69.25 lbs./ft^3

Packaging: PureGold® Chips are packaged in 50 lb. Multi-wall weather resistant bags, 48 bags per pallet, and shrinkwrapped.

1350 W. Shure Drive • Arlington Heights, Illinois 60004-1440 • (708) 392-5800 • FAX (708) 506-6150
A wholly owned subsidiary of American Colloid Company

PRODUCT APPLICATION QUANTITIES

HOLE DIA. IN.	CU. FT./ LIN.FT.	1/2" TABLETS LBS./FT.	3/8" TABLETS LBS./FT.	1/4" TABLETS LBS./FT.	COURSE CHIPS LBS./FT.	MEDIUM CHIPS LBS./FT.	VOLCLAY GROUT LBS./FT.	PUREGOLD GROUT LBS./FT.
2	0.02	1.66	1.73	1.76	1.47	1.51	0.31	0.50
4	0.09	6.63	6.93	7.04	5.87	6.04	1.25	1.98
5	0.14	10.36	10.83	11.01	9.18	9.44	1.95	3.10
6	0.20	14.92	15.59	15.85	13.21	13.60	2.81	4.46
7	0.27	20.31	21.23	21.57	17.99	18.51	3.82	6.07
8	0.35	26.53	27.72	28.18	23.49	24.17	4.99	7.93
9	0.44	33.57	35.09	35.66	29.73	30.59	6.31	10.04
10	0.55	41.45	43.32	44.03	36.71	37.77	7.79	12.40
12	0.79	59.68	62.38	63.40	52.86	54.39	11.22	17.85
14	1.07	81.23	84.90	86.29	71.94	74.03	15.28	24.30
16	1.40	106.10	110.89	112.71	93.97	96.69	19.95	31.74
18	1.77	134.29	140.35	142.64	118.93	122.37	25.25	40.17
20	2.18	165.78	173.27	176.10	146.83	151.08	31.18	49.59
24	3.14	238.73	249.51	253.59	211.43	217.56	44.89	71.41
30	4.91	373.02	389.85	396.23	330.36	339.93	70.15	111.58
→ 36	7.07	537.14	561.39	570.58	475.72	489.50	101.01	160.67
Density (lbs./cu.ft.)		75.99	79.42	80.72	67.30	69.25	70.32*	75.55**

* When mixed with water according to instructions at 20% solids.
** When mixed with water according to instructions at 30% solids.

Note: All application rates assume true borehole size. Adjustments should be made for irregular borings and formation loss.

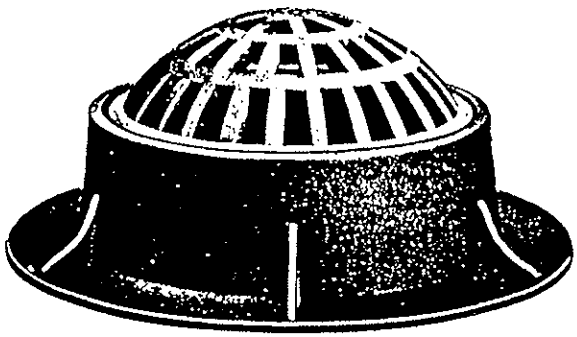
Cu. Ft. per Lin. Ft.	Hole Diameter (inches)	Casing Diameter 2	4	6	8	10	12	14	16	20	24	30
		VOLUME OF ANNULUS (Cubic Feet/Linear Feet)										
0.02	2											
0.09	4	0.07	0.00									
0.14	5	0.11	0.05									
0.20	6	0.17	0.11	0.00								
0.27	7	0.25	0.18	0.07								
0.35	8	0.33	0.26	0.15	0.00							
0.44	9	0.42	0.35	0.25	0.09							
0.55	10	0.52	0.46	0.35	0.20	0.00						
0.79	12	0.76	0.70	0.59	0.44	0.24	0.00					
1.07	14	1.05	0.98	0.87	0.72	0.52	0.28	0.00				
1.40	16	1.37	1.31	1.20	1.05	0.85	0.61	0.33	0.00			
1.77	18	1.75	1.68	1.57	1.42	1.22	0.98	0.70	0.37			
2.18	20	2.16	2.09	1.99	1.83	1.64	1.40	1.11	0.79	0.00		
3.14	24	3.12	3.05	2.95	2.79	2.60	2.36	2.07	1.75	0.96	0.00	
4.91	30	4.89	4.82	4.71	4.56	4.36	4.12	3.84	3.51	2.73	1.77	0.00
→ 7.07	36	7.05	6.98	6.87	6.72	6.52	6.28	6.00	5.67	4.89	3.93	2.16

CP MANHOLES - FRAMES AND GRATES

R-2560 Series
Beehive Grates with Frames

Suitable for drainage in circumstances where clogging of a flat grating is a problem. Excellent for roadside or earth ditch catch basins.

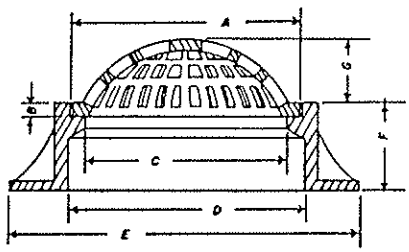
Qty = 4



Illustrating
R-2560-E

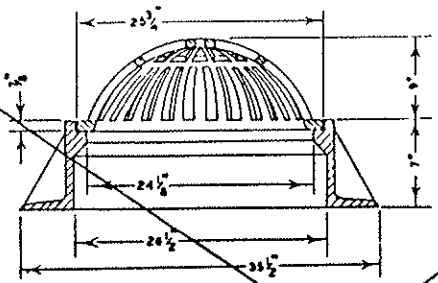
Catalog No.	Dimensions in inches							Wt. Lbs.
	A	B	C	D	E	F	G	
R-2560-A	12	1	11	12½	19	4	4	80
R-2560-B	15½	1¼	15	15	21	5	3	120
R-2560-C	18	1¼	16½	20½	30	8	4	190
R-2560-C1	22	1½	20	23	28	4	4½	195
R-2560-C2	22	1½	20½	24	28¼	6	4½	270
R-2560-D	22	1½	20	24½	35	9	4½	315
R-2560-D1	22	1½	20	23	28	4	7	210
R-2560-D2	22	1½	20½	24	28¼	6	7	285
R-2560-D3	22	1½	20	24½	35	9	7	345
R-2560-E	23	1½	21	25½	36	9	7	340
R-2560-EA	25¾	⅞	24⅛	26½	35½	4	6	265
R-2560-EB	25¾	⅞	24⅛	26½	35½	4	9	285
R-2560-E1	25¾	⅞	24⅛	26½	35½	7	6	285
R-2560-E2	25¾	⅞	24⅛	26½	35½	7	9	300
R-2560-E5	25¾	⅞	24⅛	26½	35½	8	6	345
R-2560-E6	25¾	⅞	24⅛	26½	35½	8	9	365
R-2560-E7	25¾	⅞	24⅛	26½	35½	9	6	350
R-2560-E8	25¾	⅞	24⅛	26½	35½	9	9	365
R-2560-E9	25¾	⅞	24⅛	26½	35½	10	6	360
R-2560-E10	25¾	⅞	24⅛	26½	35½	10	9	385
R-2560-F	29	1⅜	27	38	46	10	6	520
R-2560-G	32	1½	30	36	46	7	4	535

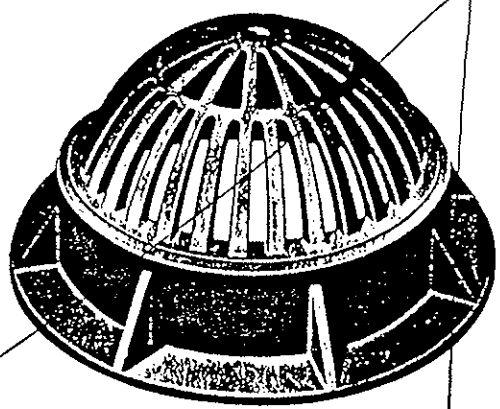
Furnished standard with ground bearing surfaces.



R-2561 High Beehive Grate and Frame

Total Weight 300 Pounds





Furnished standard with ground bearing surfaces.

R-2561-A

Same as above except with 6" high beehive grate.

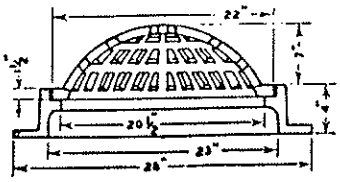
Total Weight 285 Pounds

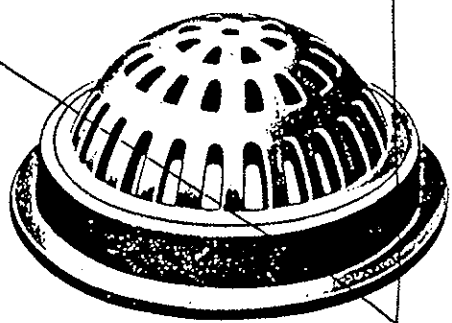
R-2563 Beehive Grate and Frame

Designed to fit in bell of 24" sewer pipe.

Total Weight 210 Pounds

Furnished standard with ground bearing surfaces.



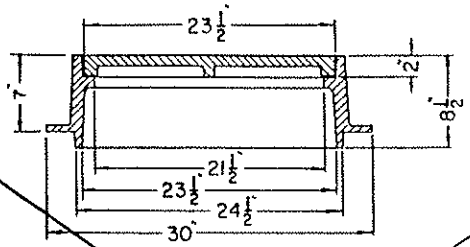


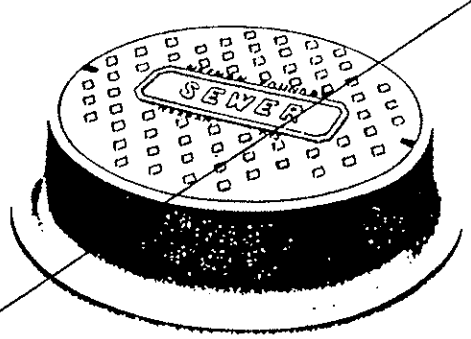
NEENAH FOUNDRY COMPANY

R-1708 Manhole Frame, Solid Lid

Heavy Duty

Total Weight 360 Pounds

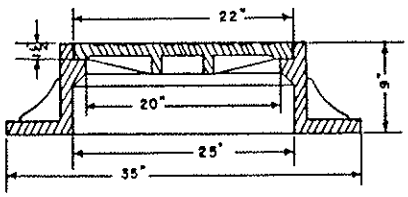


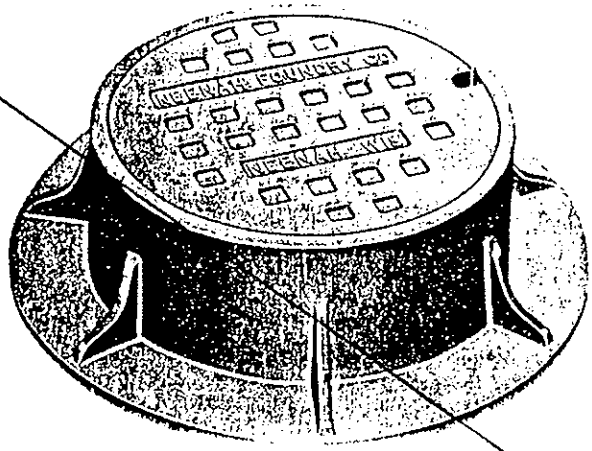


R-1710 Manhole Frame, Solid Lid

Heavy Duty

Total Weight 310 Pounds





R-1711-A Manhole Frame, Solid Lid

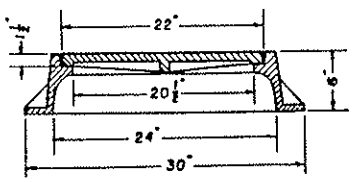
Heavy Duty

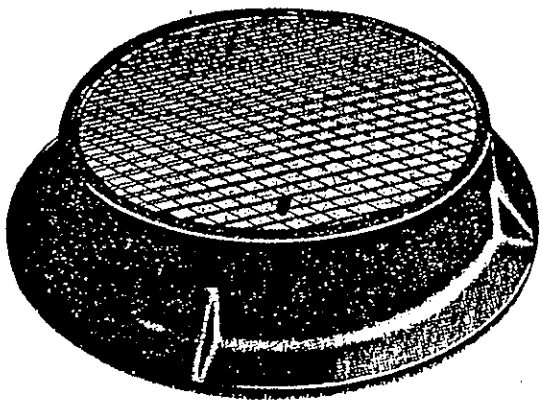
Total Weight 220 Pounds

R-1711-B

Light Duty

Total Weight 175 Pounds



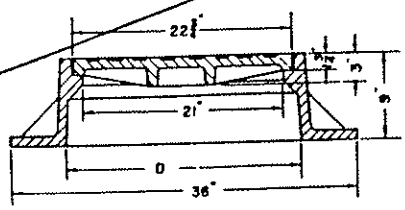


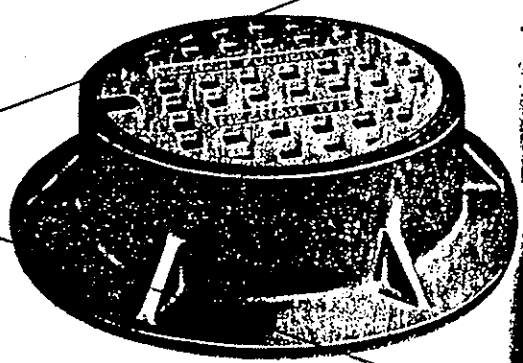
R-1712 Series Manhole Frames, Solid Lids

Heavy Duty

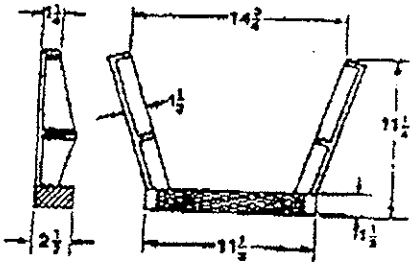
Catalog No.	D	Wt. Lbs.
R-1712	24½"	540
R-1712-B	26"	445
R-1712-C	26"	390*

*Furnished with platen lid, similar to R-1706-1.

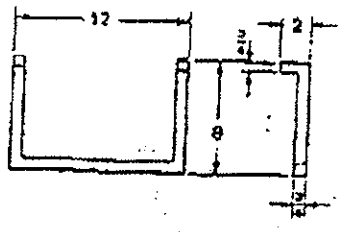




03310-1.5



PATTERN NUMBER 2587
(2587 225)



PATTERN NUMBER 2588
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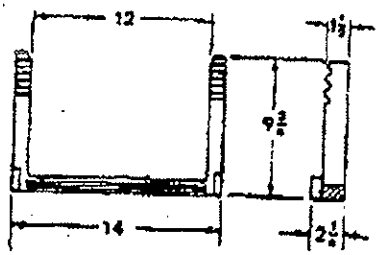
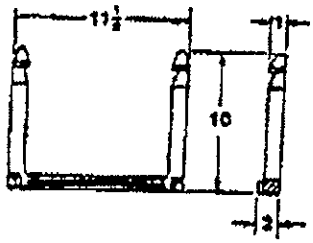


PATTERN NUMBER 2588-1
(2588 226)



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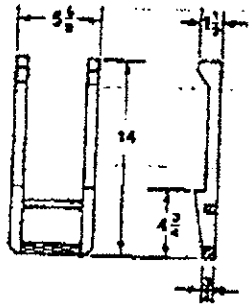
(2588 227)



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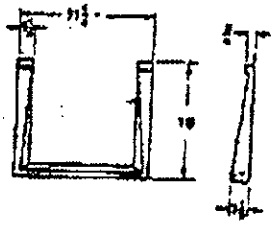
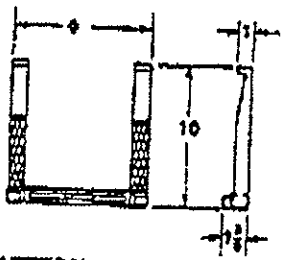


PATTERN NUMBER 2588-4
(2588 229)

Manhole Steps



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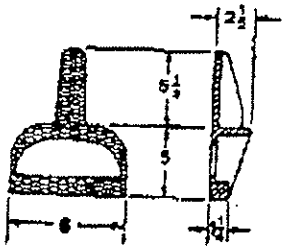

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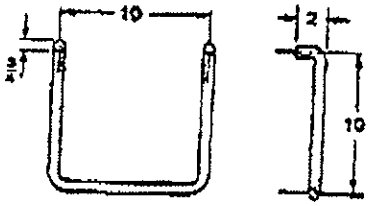

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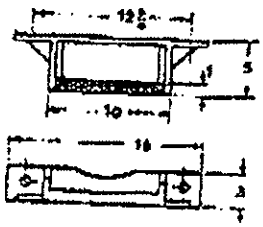

PATTERN NUMBER 2592
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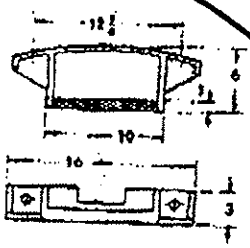
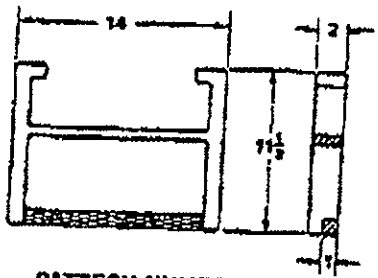


PATTERN NUMBER 2592-1
(2592 226)



PATTERN NUMBER 2650
(2650 228)
U.S. Government Standard

CAMPBELL FOUNDRY COMPANY 800 Bergen Street, Harrison, New Jersey 07029

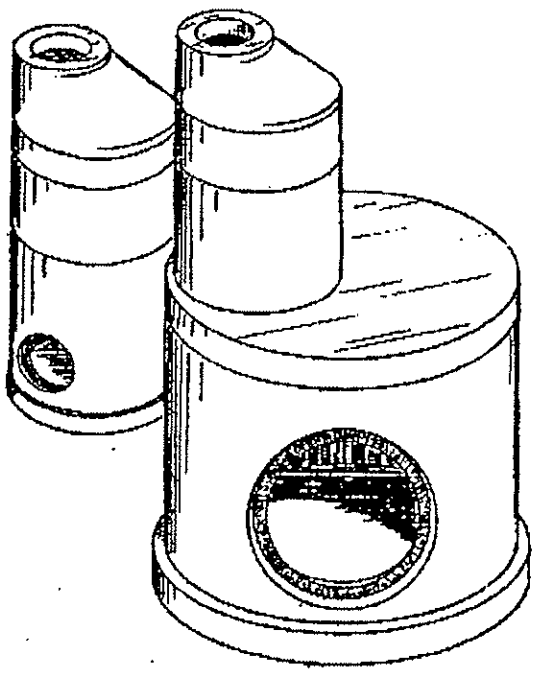
TOTAL P.01

Drawing: D-7

03310-1.5

A-LOK®

MANHOLE PIPE CONNECTOR FOR SANITARY SYSTEMS



US PATENTS

3,796,406	3,813,107
3,832,438	4,159,829
4,508,355	4,073,048

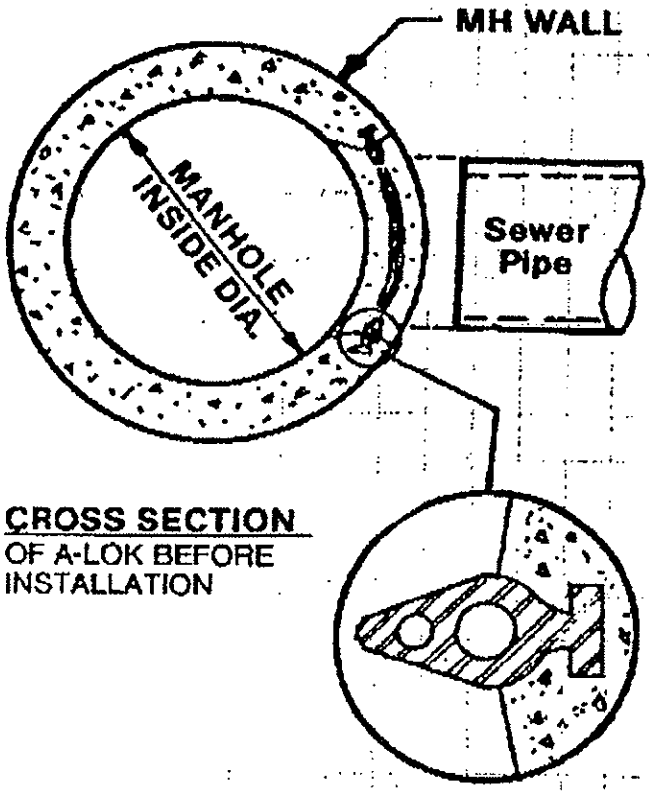
CANADIAN PATENTS

996,150	971,997
1,085,889	1,077,692

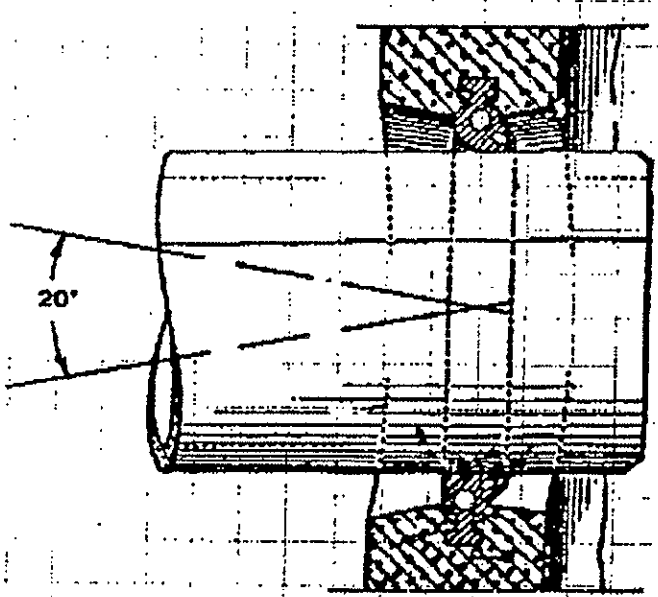
A-LOK® PRODUCTS INC.

P.O. BOX 1647
TULLYTOWN, PA 19007
1-800-822-ALOK

697 MAIN STREET
TULLYTOWN, PA 19007
(215) 547-3386



CROSS SECTION
OF A-LOK BEFORE INSTALLATION



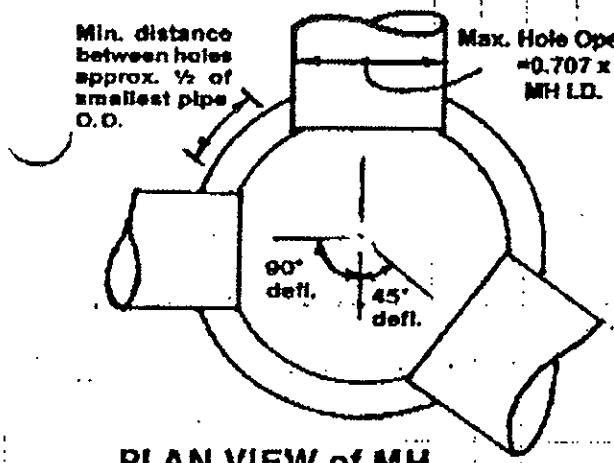
CROSS SECTION
OF A-LOK AFTER INSTALLATION

Drawing: # D-8-A

DESCRIPTION:

The A-LOK is a high performance flexible connector designed to produce a positive watertight connection for pipes entering precast manholes and other concrete structures. The rubber connector is compounded from a polyisoprene blend whose performance has been proven to be excellent for use in sanitary systems.

Integral placement of the connector in the concrete wall is achieved by use of a two part precision mandrel with a positive securing system to "lock in" connectors on the correct line and grade.



PLAN VIEW of MH

ADVANTAGES:

1.) A-LOK functions on pure compression, making field installation quick and easy. Clean and lubricate both connector and pipe; center pipe in connector and insert.

2.) The A-LOK connector assures a positive watertight connection, providing 10 degrees of omnidirectional deflection to eliminate infiltration and shear due to settlement or ground movement. This flexibility permits immediate backfill enhancing project safety, and overcoming the problems normally encountered with water, running sand and other unstable trench conditions.

3.) On larger diameter pipe when size prohibits it being installed in a flat plane the physical configuration of the A-LOK allows it to be cast in a curve with a radial progression of rotation. This design has resulted from years of extensive research and development and causes no loss in compression or deflection.

MANHOLE DIA.	MAX. PIPE SIZE O.D.	
	From Straight thru to 45° Defl.	If 90° Defl.
4 ft.	31½ in.	25 in.
5 ft.	42 in.	32 in.
6 ft.	51 in.	38 in.
7 ft.	59 in.	44 in.
8 ft.	73½ in.	50 in.

SPECIFICATIONS & TESTING:

1.) Available for pipes from 4" through 60" inside diameter.

2.) The A-LOK meets all material and performance requirements of A.S.T.M. Standard C-923 titled "Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes." Some of the requirements are given in the attached tables.

RESILIENT TEST REQUIREMENTS of A.S.T.M. C-923

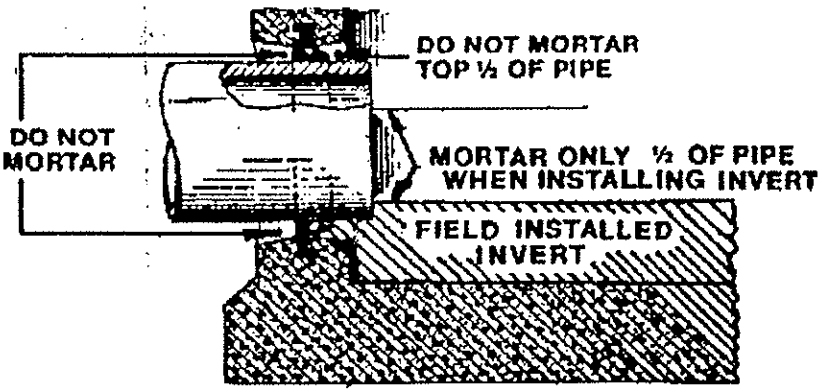
Test	Test Requirements	ASTM Method
Chemical resistance:		D 543, at 23 C for 48 h
1 N sulfuric acid	no weight loss	
1 N hydrochloric acid	no weight loss	
Tensile strength	1200 psi or 8.5 MPa, min	D 412
Elongation at break	350%, min	
Hardness	±5 from the manufacturer's specified hardness	D 2240 (Shore A durometer)
Accelerated oven-aging	decrease of 15%, max, of original tensile strength, decrease of 30%, max, of elongation	D 573, 70 ± 1 C for 7 days
Compression set	decrease of 25%, max, of original deflection	D 395, Method B, at 70 C for 22 h
Water absorption	increase, max, of [illegible] by weight	D 471, Immerse 0.75 by 2-in. or 19 by 25-mm specimen in distilled water at 70 C for 48 h
Ozone resistance	rating 0	D 1171
Low-temperature brittle point	no fracture at −40 C	D 746
Tear resistance	200 lbf/in. or 35 kN/m	D 624, Method B

A-LOK INSTALLATION INSTRUCTIONS

A-LOK is a compression gasket sized to fit pipe barrel. Entry pipe should have a smooth outside surface and the correct diameter. Clean and lubricate A-LOK and pipe end which will be inserted into A-LOK. Care should be taken to lube the entire portion of pipe which will slide through A-LOK. When pipe barrel is lubricated, pipe can be reversed or deflected without twisting A-LOK rubber. Pipe can be installed in either direction from inside or outside of manhole. If pipe is cut, care should be taken to allow no sharp edges. A slight bevel is preferred as a lead and this should also be lubricated. Entry adapters are available if necessary to enhance centering and coupling of pipe to manhole. Pipe bedding on outside of manhole is critical as non-rigid pipe may ovate if not bedded correctly. Mortar trowel should be run between pipe and A-LOK after installing to remove any mud, stone, or excess lubricant.

WARNING

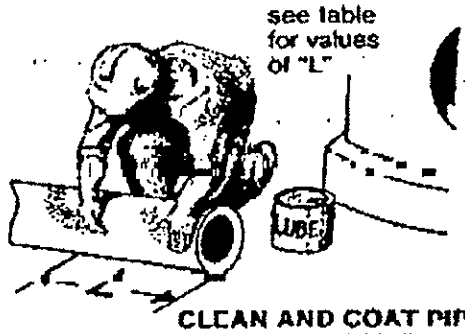
Because of the A-LOK connector's ability to insure a flexible, watertight joint, it is our strong recommendation that no mortar be placed around the connector at all on the outside of the structure and that no mortar be placed around the top half of the connector on the inside when completing the invert work. The use of mortar in either of these areas would eliminate the flexibility for which the connector is designed, and cause problems of shear.



1

CLEAN & LUBRICATE GASKET

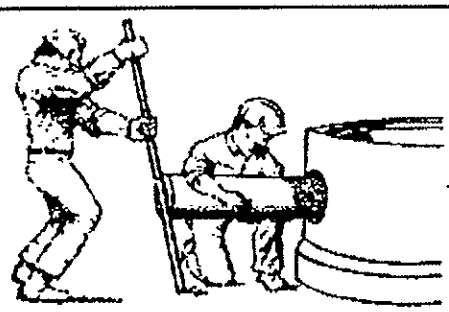
2



CLEAN AND COAT PIPE WITH LUBRICANT

"L" Inches FROM END

3



CENTER UP PIPE & PUSH HOME

PIPE DIA.	"L" MIN.
4"	12"
6"	"
8"	"
10"	"
12"	"
15"	"
16"	18"
18"	"
21"	24"
24"	"
27"	"
30"	"
33"	"
36"	"
42"	"
48"	"
54"	"
60"	"

A-LOK® PRODUCTS INC.

P.O. BOX 1647
TULLYTOWN, PA 19007
1-800-822-ALOK

697 MAIN STREET
TULLYTOWN, PA 19007
(215) 547-3366

A-LOK PIPE TO MANHOLE CONNECTOR INSTALLATION

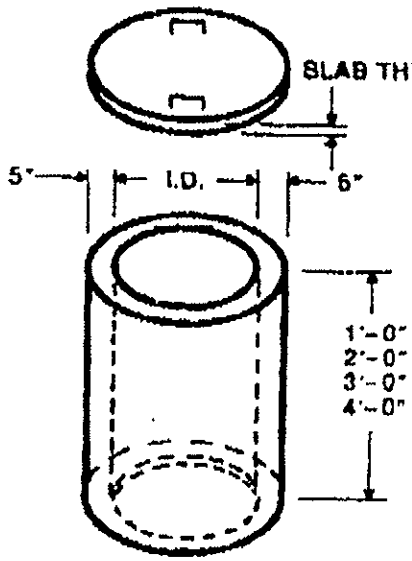
6893

FORT MILLER
THE FORT MILLER CO., INC

Precast MH Extension

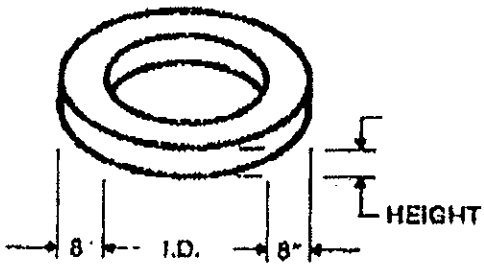
Grade & Access Extensions

CONCRETE:	4000 PSI
REINFORCEMENT:	ASTM A615 - GRADE 60 ASTM A185 - GRADE 65
ENTRAINED AIR:	5.0% - 9.0%



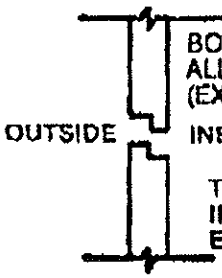
ACCESS EXTENSION

(INTERMEDIATE EXTENSIONS AVAILABLE)



GRADE EXTENSION

DESIGNED FOR AASHTO H-20 LOADING
30% IMPACT
SOIL PRESSURE 120 PCF



ACCESS EXTENSION JOINT DETAIL

WEIGHTS, LBS

GRADE EXTENSIONS		
I.D.	HEIGHTS AVAILABLE	LBS PER INCH OF HEIGHT
2' - 0"	4", 6", 8", 10"	68
2' - 6"	3", 5", 7", 9"	80

ACCESS EXTENSIONS			
I.D.	SLAB THICKNESS	SLAB WEIGHT	LBS PER FOOT
2' - 0"	3"	238	480
2' - 6"	4"	433	578
3' - 0"	4"	570	665

DESIGN CASE 1 (TRAFFIC)

EPOLON
22 BLACK MASTIC

PRODUCT DESCRIPTION: A heavy duty, interior/exterior, multi-mil, two component, coal tar epoxy compound. Specifically designed for the protection of steel and concrete in immersion service or where unusual resistance to severe humidity, corrosion, fresh or salt water immersion, abrasion, impact or general chemical attack is required.

RECOMMENDED USES: For use on: properly prepared steel and concrete surfaces such as concrete pipes, plant equipment, sewerage plants, cooling towers, underground tanks, barges, bulkheads, bridges, conveyors or sludge vessels and various chemical plants. Do not use for potable water service.

PERFORMANCE STANDARDS:

APPLICABLE STANDARDS: Meets performance requirements of Steel Structures Painting Council SSPC-16-68T and Corps of Engineers Specification C200a.

CHEMICAL RESISTANCE:

Immersion	Frequent Contact	Occasional Contact
Salt Solutions	Solvents	Organic Acids
Fresh Water	Alcohols	Mineral Acids
Crude Oil	Vegetable Oils	Oxidizing Agents
Alkalies	Petroleum Products	

GENERIC TYPE: Coal Tar Epoxy-Polyamide

FINISH: Semi-gloss

RECOMMENDED FILM THICKNESS:
Wet: 11 - 14 Mils
Dry: 8 - 10 Mils

THEORETICAL COVERAGE:
115 - 145 Sq. Ft./Gallon at
8 - 10 Mils Dry Film Thickness

DRYING TIME @ 75°F HUMIDITY 50%:
To Touch: 4 Hours
To Handle: 8 Hours
To Recoat: 18 Hours and within
72 Hours Maximum

MIXING RATIO: 4:1 By Volume

DRY HEAT RESISTANCE:
Continuous: 200°F
Intermittent: 250°F

REDUCER: EPOLON 145 REDUCER

APPLY BY: Airless Spray Recommended
Brush or Roller for small areas.

APPLICATION CONDITIONS:
Relative Humidity: Up to 85%
Temperature: 50° - 100°F
Surface Temp.: 5°F above Dew Point

COLOR: Black

NUMBER OF COATS RECOMMENDED: Two

TOTAL SOLIDS:
Volume: 71 - 73%
Weight: 81 - 83%

NUMBER OF COMPONENTS: Two

INDUCTION TIME @ 75°F: 30 Minutes

POT LIFE @ 75°F (Mixed): Up to 8 Hours

FLASH POINT (Mixed): 80°F (TCC)

VOLATILE ORGANIC COMPOUND:
Less than 2.0 Pounds Per Gallon

WEIGHT PER GALLON (Mixed): 10.6 lbs average

VISCOSITY @ 77°F (Mixed): 100 - 110 Krebs Units

SHELF LIFE: Up to 24 Months at Recommended Storage Conditions

STORAGE CONDITIONS: Indoors at 45° - 100°F

PACKAGED: One and Five Gallon Kits
One Gallon Kit: 1 Gallon Container Component A part filled @ .8 Gallon
1 Quart Container Reactor B part filled @ .2 Gallon
Five Gallon Kit: 5 Gallon Container Component A part filled @ 4 Gallons
1 Gallon Container Reactor B

EPOLON
22 BLACK MASTIC

MIXING

Mix contents of each component thoroughly to obtain a uniform consistency and insure no pigment remains on bottom of can. Pour the contents of the container marked "Reactor B" into the slack filled container marked "Component A" or in the ratio of 4 parts "Component A" to 1 part "Reactor B" by volume while under agitation. Continue agitation until the two components are thoroughly mixed. Allow to stand 30 minutes prior to application. Re-stir before using. Do not use mixed material beyond recommended pot life. Temperatures above 75°F will shorten pot life.

SURFACE PREPARATION

Prepare surface by method suitable for service and exposure. All surfaces must be dry, clean and free of all paint, rust and other foreign matter. Do not paint in dampness or temperatures below 50°F.

STEEL: All surface contamination including rust, mill scale, loose paint, old coatings, and all other foreign matter must be removed by dry abrasive blasting and coated within 8 hours or before visible rusting occurs. Surface profile of blast not to exceed 2 mils. Prior to blast cleaning, remove all visible deposits of oil and grease in accordance with Solvent Clean SP-1. Round off all rough welds and sharp edges and remove weld spatter. Minimum surface preparation: Immersion service - Near White Blast SP-10. Non-immersion service - Commercial Blast SP-6.

CONCRETE: New concrete must age at least 60 days before coating. Form release agents, curing compounds, salts, all previous coatings, hardeners, and other foreign matter will interfere with adhesion and must be removed and surface properly prepared by mechanical abrasion, abrasive blast, or acid etching. Surface must be swept or vacuumed to remove all spent abrasives, dust and other foreign matter. Minimum surface preparation is acid etch with a 15% muriatic acid solution creating a grainy surface texture, flush and rinse completely and allow to dry thoroughly.

SPECIFICATION

STEEL, IMMERSION, (Near-White Blast SP-10):
2 coats: EPOLON 22 BLACK MASTIC. Total dry film thickness: 16 mils minimum.

STEEL, NON-IMMERSION, (Commercial Blast SP-6):
1st coat: EPOLON RUST INHIBITOR 15 RED.
Finish with: 1 coat: EPOLON 22 BLACK MASTIC.

GALVANIZED METAL OR NON FERROUS METALS, RUST FREE (Solvent Clean SP-1):
1st coat: METAL BOND 47 PRIMER.
Finish with: 2 coats: EPOLON 22 BLACK MASTIC.

CONCRETE, NEW OR UNPAINTED WOOD:
1st coat: EPOLON 22 BLACK MASTIC (reduced 1 quart per gallon with EPOLON 146 REDUCER).
Finish with: 1 coat: EPOLON 22 BLACK MASTIC. Total dry film thickness: 16 mils minimum.

Allow 5 days curing time at recommended temperature and humidity before putting tank in service. Do not apply over previously painted surfaces.

REDUCER

If thinning is required:
Up to one pint per gallon of EPOLON 146 REDUCER.

RECOMMENDED EQUIPMENT
(or Equivalent)

AIRLESS SPRAY:
Standard airless equipment such as the Graco President or Bulldog 30:1 pump ratio. Inbound pressure 80 - 100 psi and .019" to .023" fluid tip.

Use a 50% overlap with each pass of gun. Airless spray recommended for best film build and to minimize spray dust. EPOLON 22 BLACK MASTIC may be applied, if required, to small areas only by brush and roller. Film build obtained will depend primarily upon the skill and technique of the applicator. In most cases when using brush or roller, a second coat will be necessary to achieve recommended film thickness. Use a short bristle brush or medium nap roller (do not use long nap lambs wool cover). Keep roller saturated with material, working coating into all irregularities. Be sure proper film thickness is obtained. Special attention should be given to sharp edges, boltheads, flanges, rivets, corners, welds and other irregular surfaces to insure they receive proper film thickness equivalent to that recommended for all other adjacent areas.

When applying two coats, be sure first coat is properly cured. Excessive film thickness or conditions of poor ventilation require longer dry times. Excessive humidity or condensation on the surface during curing may result in a surface haze or blush. This should be removed by water washing before recoating. When recoating after 72 hours of application of initial first coat, surface coating must be brush blasted or abraded prior to application.

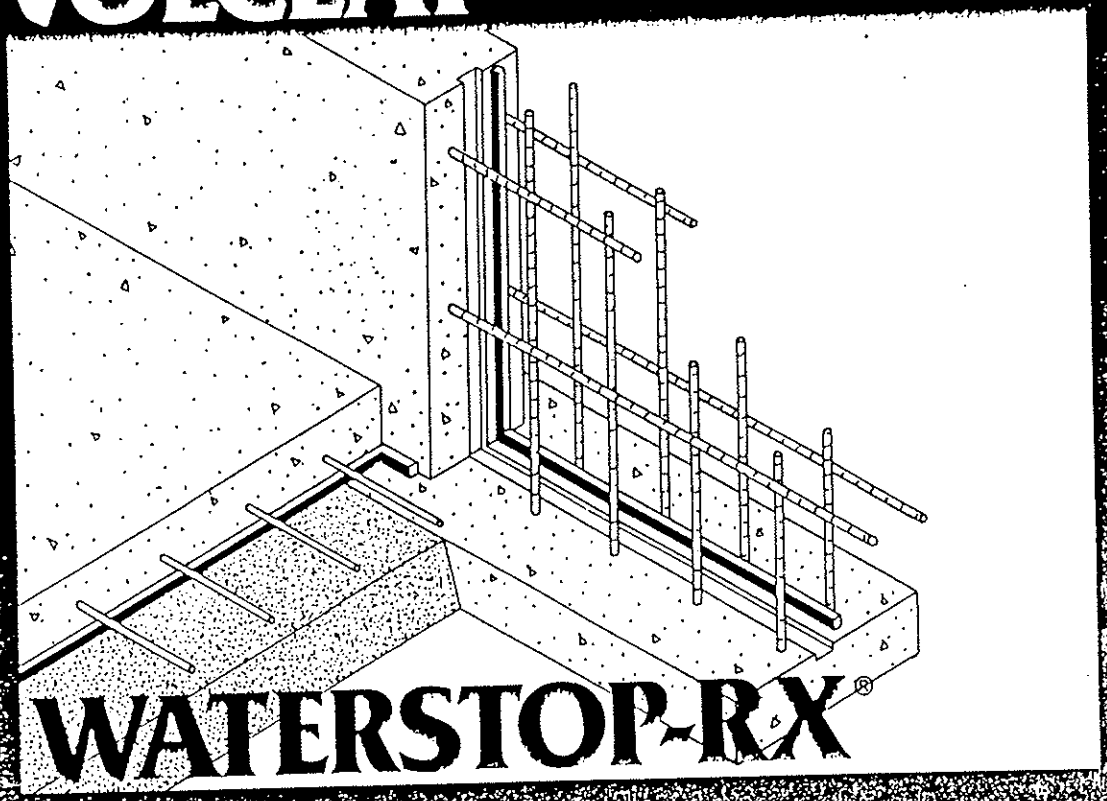
NOTE: Curing time is extended at temperatures below 70°F and shortened above 70°F. At low temperatures (50°F) curing speed is greatly retarded.

WARNING: FLAMMABLE. Contains xylene, glycol ethers and epoxy resin. Keep away from heat, sparks and open flame. Do not take internally. Explosion proof and non-sparking equipment should be used. May irritate eyes and skin. Prolonged breathing of vapors may irritate respiratory tract causing headache, nausea and dizziness. Use only with adequate ventilation. Avoid contact with skin and breathing of vapors of spray mist. Close container tightly and wash hands properly after each use. Keep out of reach of children. Refer to Material Safety Data Sheet prior to use.

FOR INDUSTRIAL USE ONLY • BY PROFESSIONAL APPLICATORS

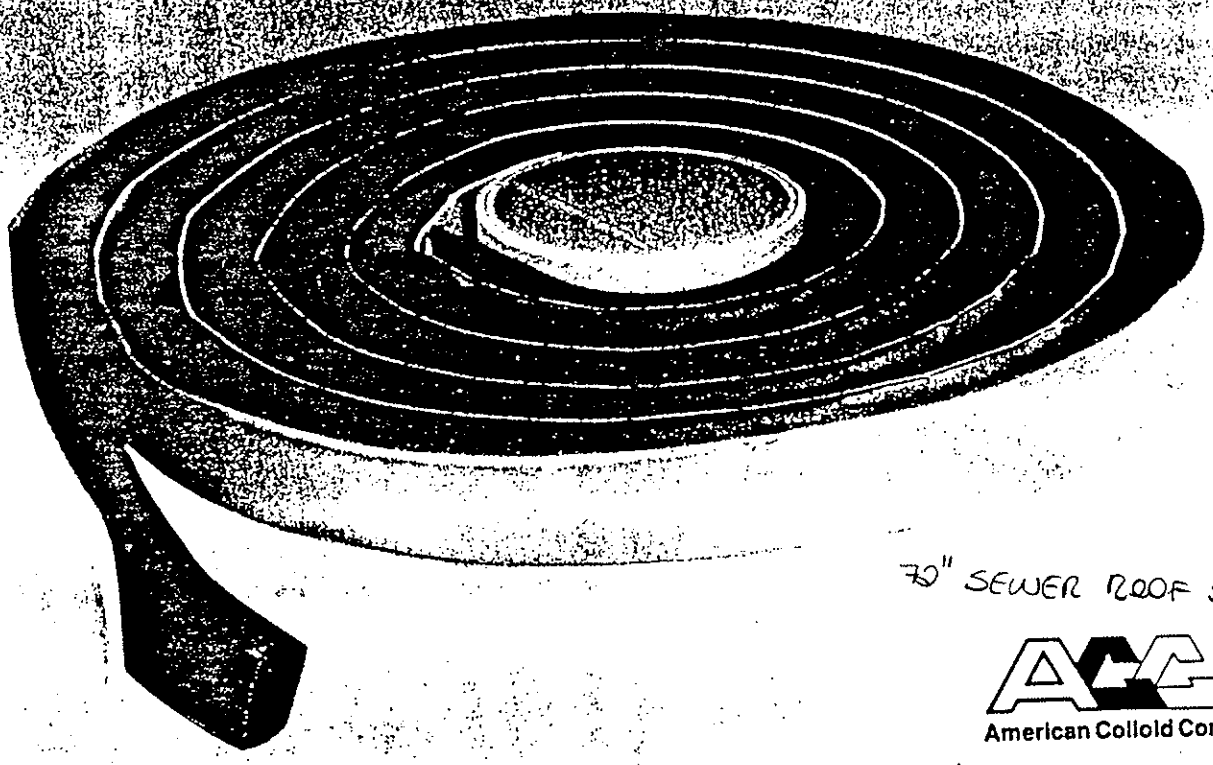
CON-LUX Coatings, Inc. Talmadge Road, Box 647 Edison, N.J. 08818-0647
201-287-4000

VOLCLAY®



WATERSTOP-RX®

Fast, effective, permanent sealing for concrete joints.



72" SEWER ROOF SLAB

American Colloid Company

Waterstop-RX® helps save time, money... and concrete structures.

Installing conventional waterstops in concrete joints is an important (but normally time-consuming) part of concrete construction. It can also be very labor-intensive, reducing the profitability of the job. Most important, conventional waterstops offer only a partial solution to water infiltration, leaving architects, engineers, and contractors open to liability problems.

Volclay® Waterstop-RX® solves water infiltration problems. It's easy to apply even by a single, inexperienced laborer, cutting installation time in half. It eliminates split-forming and splicing. And, its self-healing properties assure that concrete joints remain protected permanently.

How Waterstop-RX works

The key to Waterstop-RX is its western sodium bentonite base. Specified for more than 20 years for foundation waterproofing, bentonite swells in contact with water, forming an impenetrable gel. This property also allows bentonite products to fill in small cracks in concrete.

Waterstop-RX comes in a coil. It is applied by adhering the material to the **butt end of the concrete** with RX Primer or concrete cut nails—an operation that requires a single laborer. Then pour or place the next section of concrete to complete the joint. No split forming, splicing, or bonding is required as with conventional waterstops.

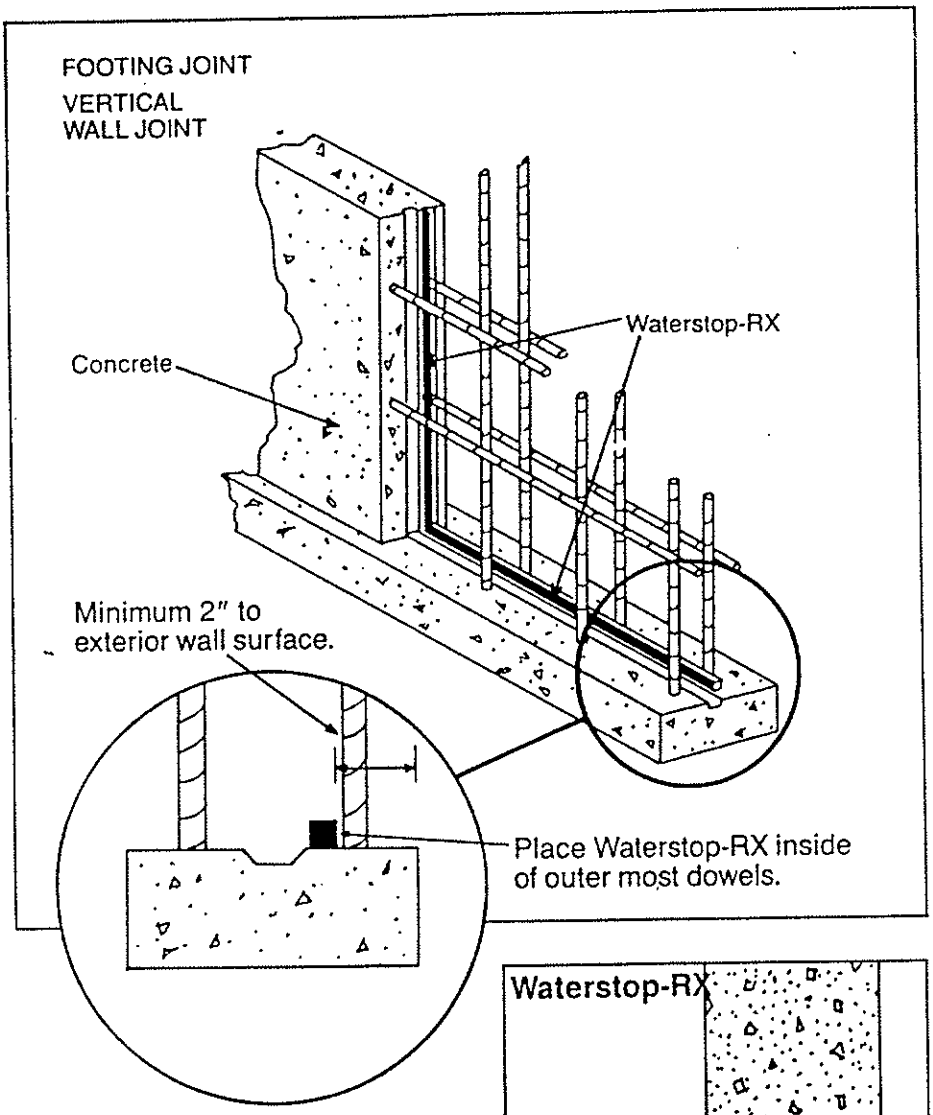
Upon hydration, Waterstop-RX swells to form a self-healing compression seal that completely locks out water. This action also prevents water migration along the waterstop and in keyways as an extra protection against penetration.

All-weather application

Waterstop-RX has been engineered for use under virtually all temperature conditions. Unlike other popular joint sealants, Waterstop-RX does not become stiff and brittle in cold weather nor spongy and difficult to work with in hot weather. As a result, Waterstop-RX does not have to be heated in cold weather, saving time and money. It also remains totally flexible without shrinking, hardening, or oxidizing regardless of the length of time it is exposed to the elements.

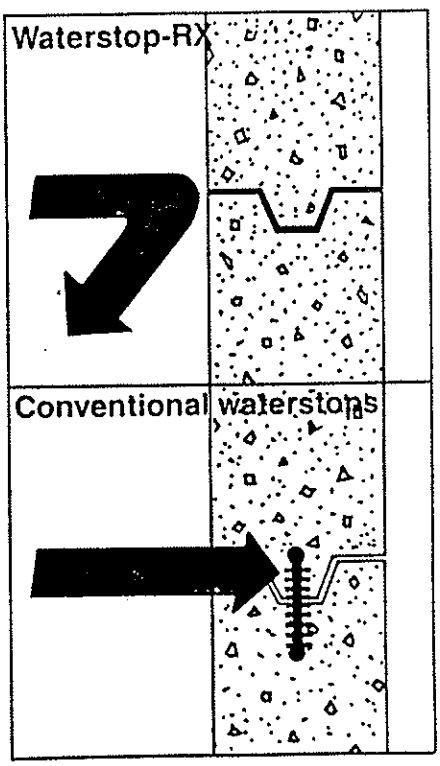
Safe to use

Because Waterstop-RX is non-toxic, no special handling equipment is required. It is clean to the touch, and does not contain any material which can discolor or irritate the skin, helping eliminate lost man-hours.



Waterstop comparison

Upon contact with water, Waterstop-RX swells to form a compression seal that repels water completely. No migration along the waterstop or keyway is allowed.



Water is stopped by a damming effect of hydrostatic pressure, but is allowed to remain inside the joint. This allows lateral movement along the waterstop or in the keyway. If a weak point is found, water can then enter away from the point of original contact, making repair difficult and costly.

Installation procedures

Surface preparation

Joint surfaces should be clean and dry. For best results, Waterstop-RX Primer should be applied to the joint surface prior to adhering Waterstop-RX, especially on vertical joints. The primer creates a tacky surface which allows for excellent adhesion to the concrete.

Positioning

Waterstop-RX is adhered to the butt end of the previous concrete pour and should be positioned a minimum of 2" from the exterior joint surface. Concrete cut nails, Waterstop-RX Primer, or both must be used to secure Waterstop-RX in place to prevent displacement of the material during the pour.

Waterstop-RX may also be installed in a cast in place recess at the exterior side of the joint. In this situation, precautions must be taken to protect Waterstop-RX from hydration prior to backfilling and backfill must be compacted to 85% modified proctor minimum, adjacent to the joint. The recess at the exterior of the joint should match the dimension of Waterstop-RX.

The ends of individual Waterstop-RX coils should be butted together—never overlapped.

Applications

Waterstop-RX is ideal for use on many types of poured in place and below grade precast concrete applications. There should be a minimum of 2" of concrete cover separating the exterior face of the Waterstop-RX from the exterior side of the joint.

NOTE: In cases of lightweight concrete or insufficient coverage, consult the manufacturer.

Use On:

Precast concrete wall panel systems

Septic tanks and sewage treatment plants

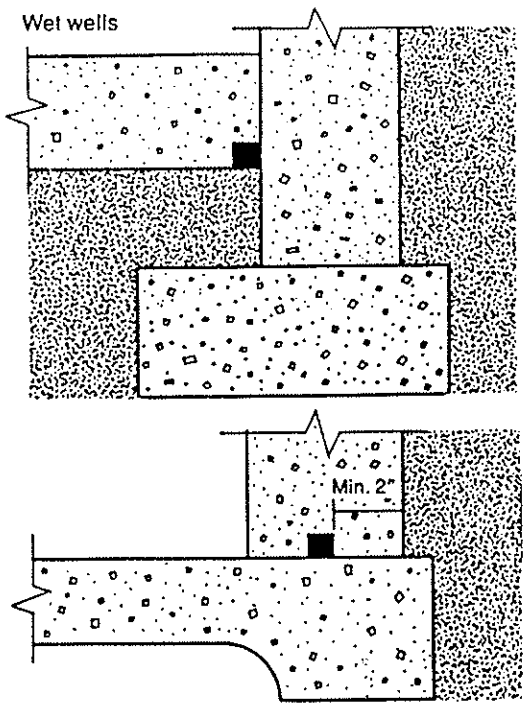
Sanitary and storm sewer manholes

Pipe (round, oval, flatbase, elliptical, and arch types)

Cold joints in foundation slabs or walls below grade

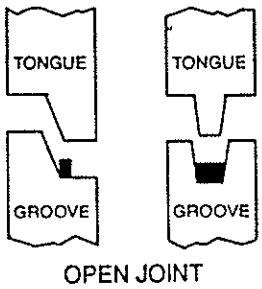
Burial vaults Utility vaults Box culverts

Wet wells

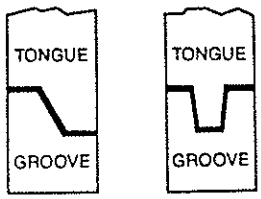


Typical sections showing placement of Waterstop-RX

When sealing manholes—septic tanks—vaults—utility boxes

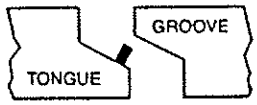


OPEN JOINT

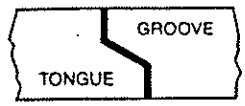


CLOSED JOINT

When sealing concrete pipe and culverts

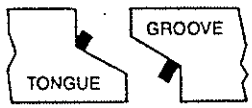


OPEN JOINT

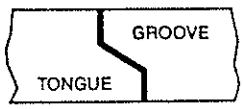


CLOSED JOINT

When a single coil of Waterstop-RX is used, apply as close as possible to the leading edge of the tongue as illustrated.



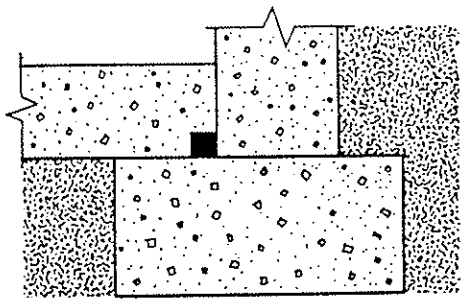
OPEN JOINT

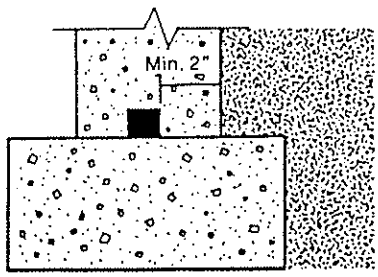


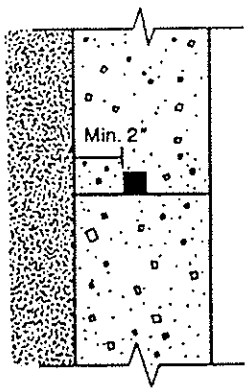
CLOSED JOINT

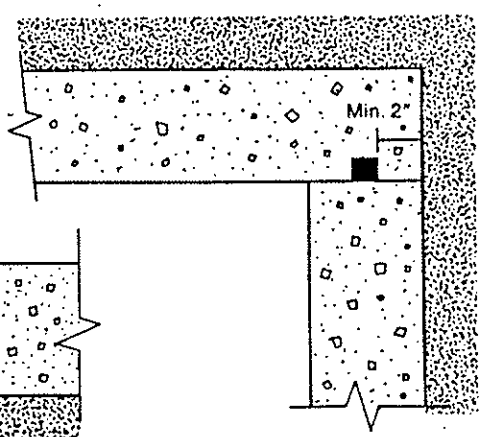
When a double coil of Waterstop-RX is used, apply one coil on the rear sliding surface of the tongue and another coil on the rear sliding surface of the groove or bell as illustrated.

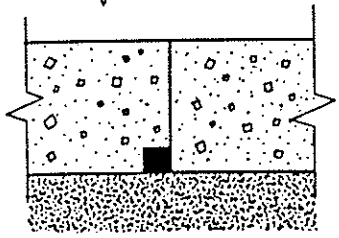
Typical Details











Waterstop-RX® Technical Information

volclay Waterstop-RX® is a flexible strip of bentonite waterproofing compound, coiled in two sizes. Dimensions and other specifications are as follows:

Dimensions	1" × ¾" × 16'6"	¾" × ⅜" × 25'0"
Weight	.50 lbs./ft. minimum	.165 lbs./ft. minimum
Carton Contents	100 L/F	150 L/F
Carton Weight	50 lbs.	25 lbs.
Carton Size	14" × 14" × 10"	14" × 14" × 10"
Pallet Size	4' × 4'	4' × 4'

Chemical Composition

Material	Test Method	Waterstop-RX Results
Butyl Rubber-Hydrocarbon (% by weight)	ASTM D-297	24.9%
Bentonite	SS-S-210-A	75.0%
Volatile matter	ASTM D-6	Below 1%

NOTE: Contains no asbestos fibers or asphaltics.

Physical Properties

Property	Test Method	Waterstop-RX Results
Specific gravity at 77°F	ASTM D-71	1.57
Softening point	ASTM D-30	N/A
Penetration	ASTM D-217 150 GTL 300 GTL	 58 85
Flash point	ASTM D93-97	365
Min. head pressure	Hydrostatic pressure test	231 ft. (100 psi)
Accelerated aging	(Mechanical oven 4 hrs. @ 212° F)	Maintained 99% solids
Flow resistance	(¾" overhead joint exposed to 135° F for 7 days)	No flow
Storage life		Indefinite
Adhesion to clean, dry concrete		Excellent
Application temperature range		5° to 125°F
Service temperature range		–40° to 212°F

Notice: The information presented here is believed to be correct. However, since it is provided without charge and without specific knowledge of the intended use or application of its product, American Colloid Company assumes no obligation or liability with respect to such use or application, and makes no warranty, either expressed or implied, as to the application or use of such product, or to the use or infringement of any patent or other proprietary rights of American Colloid Company or others with respect to such application or use.

Seal concrete joints quickly and permanently with the waterstop that heals itself—Waterstop-RX. For more information, contact your American Colloid Company distributor, or contact us direct.

Distributed by:

Limitations

In conditions where severe ground water contamination is expected, please consult the manufacturer for compatibility information. Waterstop-RX should be confined within a concrete joint with a minimum 2" concrete cover to the exterior of the joint surface. Waterstop-RX may also be installed in a cast-in-place recess at the exterior side of the joint. In this situation, precautions must be taken to protect Waterstop-RX from hydration prior to backfilling and backfill must be compacted to 85% of modified proctor minimum adjacent to the joint. The cast in place recess should match the dimension of the Waterstop-RX being used.

An exposed length of coil should not be submerged for extended periods of time. If Waterstop-RX exhibits considerable swelling prior to confinement in the joint, it must be replaced with new material. To avoid displacement of Waterstop-RX during or prior to concrete placement, cut nails and/or Waterstop-RX Primer must be used to hold the material in place. Proper care should be taken during concrete placement to avoid displacing the Waterstop-RX strip. Waterstop-RX is not an expansion joint product and should not be used as such.

NOTE: In cases of lightweight concrete or insufficient coverage, consult the manufacturer.

Warranty

American Colloid Company warrants its materials to be of good quality and will replace material proved to be defective. In no instance will American Colloid Company be liable for labor costs or incidental damage associated with the use of this product, unless stated in a warranty for a specific project.

Document

This brochure contains information to supplement information service available from American Colloid Company's Building Materials Division and from local distributors.

Application Assistance

Local distributors of Waterstop-RX are qualified to aid in solving problems related to use of this product. In the event that your needs are special or you have an unusual situation, your local Waterstop-RX distributor will arrange to have a factory representative contact you for personal assistance.

American Colloid Company
Building Materials Division
1500 W. Shure Drive
Arlington Heights, IL 60004
1-312-392-4600 FAX 1-312-506-6199
1-708-392-4600* TELEX ITT 4330321
*(After Nov. 1st, 1989)
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Newton, MA 02166 • 1-617-965-0895
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Form No. WS-200 689 36.6M Printed in U.S.A.

RECONSTRUCTION OF EXISTING 30" and 72" SEWERS BY INSITU FORM LINING

CoREZYN

TECHNICAL DATA SHEET

CoRezyn VE8319

CoRezyn VE8319 is a thixotropic, non-promoted, corrosion resistant, Bisphenol-A Epichlorohydrin based vinyl ester resin formulated for Insituform.

TECHNICAL DATA

TYPICAL LIQUID RESIN PROPERTIES:

Viscosity, (Brookfield Model LVT)	
#3 spindle @ 20 rpm, cps	3,200
Thixotropic Index	3.6
SPI Gel Time, 1.0% Active BPO, 180°F Oil Bath	
Gel Time, 150 to 190°F, minutes	16
Percent Non-Volatile	59
Weight per gallon, pounds	8.75

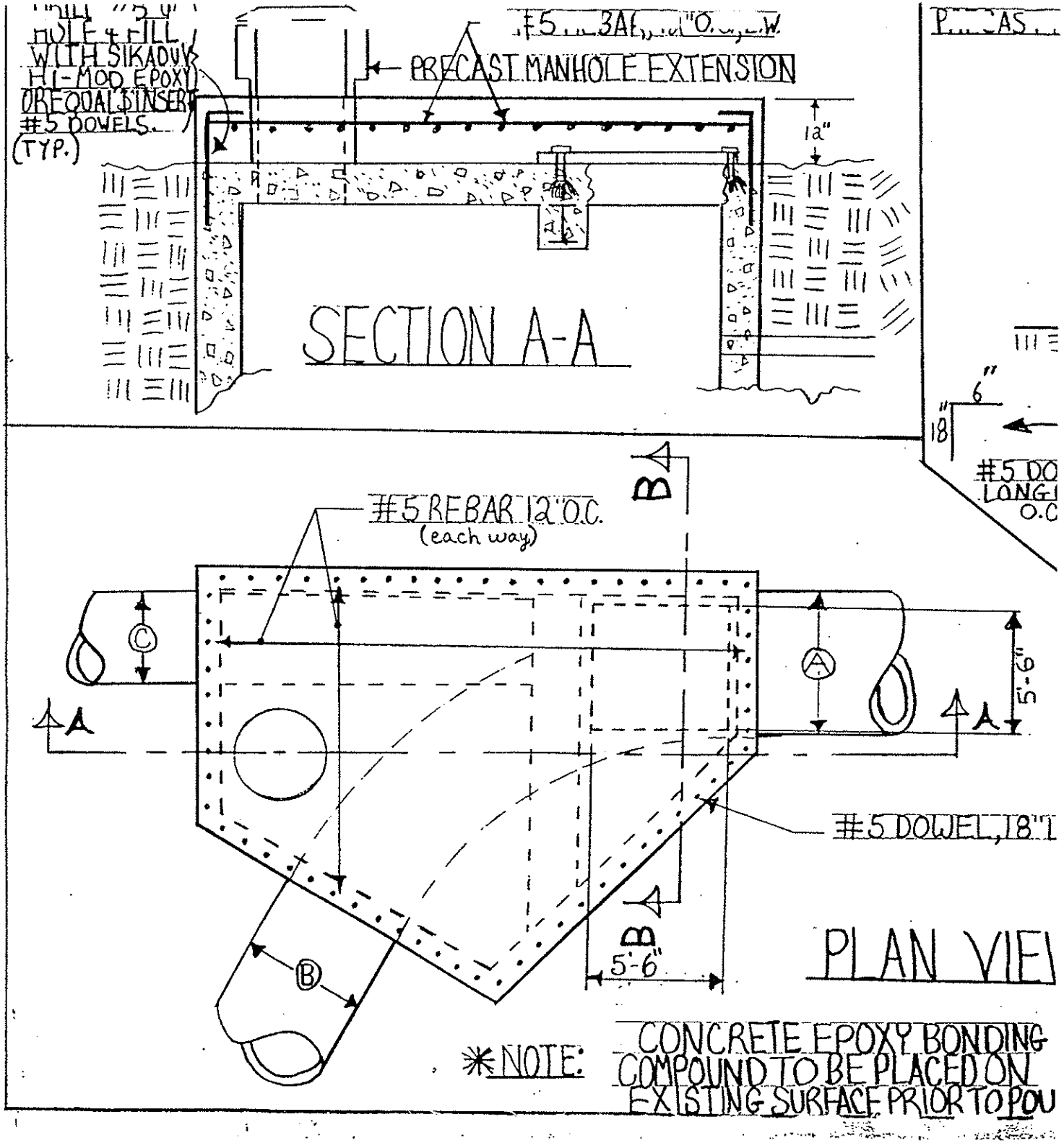
TYPICAL PROPERTIES OF A 1/8TH INCH THICK CLEAR CASTING:

Flexural Strength, psi, ASTM D790	18,000
Flexural Modulus, psi x 10^5, ASTM D790	4.5
Tensile Strength, psi, ASTM D638	11,600
Tensile Modulus, psi x 10^5, ASTM D638	4.7
Percent Elongation, ASTM D2583	5.0
Barcol Hardness, 934-1, ASTM D2583	54
Heat Distortion, °F, ASTM D648	210

TYPICAL PROPERTIES OF A 6mm INSITUFORM FELT LAMINATE

Esperox 570P, weight percent	1.0	0.0
Percadox 16N, weight percent	0.0	1.0
Trigonox C, weight percent	0.5	0.5
Flexural Strength, psi, ASTM D790	11,300	11,200
Flexural Modulus, psi x 10^5, ASTM D790	4.9	5.0
Tensile Strength, psi, ASTM D638	7,100	7,000
Tensile Modulus, psi x 10^5, ASTM D638	5.2	5.4
Percent Elongation, ASTM D2583	2.13	2.00

This Technical Data Sheet supersedes any issued prior to 10/1/91. DJH


#5 DOWEL, 18" O.C., E.W.
PRECAST MANHOLE EXTENSION
DRILL "5" HOLE & FILL WITH SIKADUR HI-MOD EPOXY OR EQUAL & INSERT #5 DOWELS (TYP.)
12"
SECTION A-A
6"
18"
#5 DO
LONG
O.C
#5 REBAR 12" O.C. (each way)
B
A
C
A
5'-6"
A
#5 DOWEL, 18" L
B
5'-6"
B
PLAN VIE
B
*NOTE: CONCRETE EPOXY BONDING COMPOUND TO BE PLACED ON EXISTING SURFACE PRIOR TO POU

NEOPRENE BOOT CONNECTION -
INFILTRATION DRAINAGE
TREATED

McMASTER-CARR
supply company

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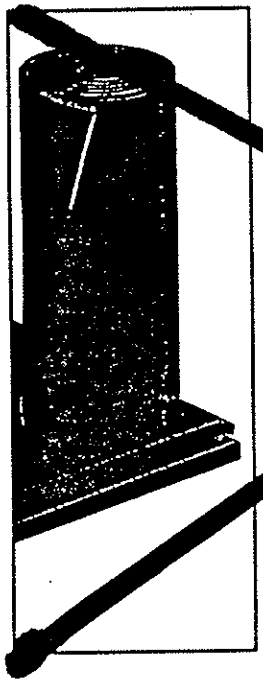
PLANT LOCATION

Dayton, New Jersey, U.S.A.

MAIL ADDRESS

P.O. Box 440
New Brunswick, NJ 08903-0440 U.S.A.

High-Grade Neoprene Rubber Sheeting



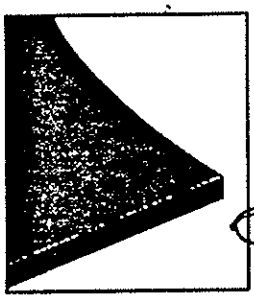
- *Color: Black* • *Durometer Hardness, Shore A: Soft, 35-45; Medium, 45-55; Firm, 55-65; Hard, 65-75*
- *Tensile Strength: 1500 psi* • *Temperature Range: −20° to +170° F*

The high tensile strength of 1500 psi makes this premium grade rubber a great choice for the most demanding applications. It takes rough handling with minimal abrasion and maintains its resiliency after extended compression. This neoprene has better resistance to oil, heat, ozone, oxidation, and flame than natural rubber. Appli[illegible]s include belting, mountings, seals, diaph[illegible]s, and insulation. Neoprene has all the s[illegible]sistance to general chemicals, except o[illegible]trated acids, as natural rubber. Meets A[illegible]2000-86E, Type BC and military specificati[illegible]L-R-3065.

Thick.	Soft No.	Soft NET EACH	Medium No.	Medium NET EACH	Firm No.	Firm NET EACH	Hard No.	Hard NET EACH
12" × 12" SHEETS								
1/16"	8568K511	$2.64	8568K611	[illegible]	8568K711	$2.36	8568K811	$2.46
3/32"	8568K512	4.14	8568K612	[illegible].96	8568K712	3.64	8568K812	3.68
1/8"	8568K513	4.82	8568K[illegible]	4.18	8568K713	4.50	8568K813	4.21
3/16"	[illegible]K514	6.50	8568[illegible]	5.81	8568K714	5.88	8568K814	5.50
1/4"	8568[illegible]	7.03	[illegible]K615	6.50	8568K715	7.47	8568K815	8.75
3/8"	8568K5[illegible]	9.22	[illegible]K616	8.59	8568K716	10.08	8568K816	8.76
1/2"	8568K517	[illegible]	8568K617	11.59	8568K717	13.38	8568K817	11.88
3/4"	8568K518	[illegible]	8568K618	15.43	8568K718	17.86	8568K818	13.58
1"	8568K519	[illegible]	8568K619	20.55	8568K719	23.62	8568K819	17.34
12" × 24" SHEETS								
1/16"	85[illegible]	4.77	[illegible]K621	4.55	8568K721	4.29	8568K821	4.45
3/32"	[illegible]K522	8.25	8568[illegible]	7.13	8568K722	6.55	8568K822	6.65
1/8"	[illegible]K523	8.68	8568K6[illegible]	7.58	8568K723	8.10	8568K823	7.58
3/16"	8568K524	11.89	8568K624	[illegible].63	8568K724	10.80	8568K824	10.11
1/4"	8568K525	12.91	8568K625	[illegible]	8568K725	13.69	8568K825	12.37
3/8"	8568K526	17.10	8568K626	15.[illegible]	8568K726	18.68	8568K826	16.20
1/2"	8568K527	23.30	8568K627	21.48	[illegible]K727	24.75	8568K827	21.65
[illegible]	8568K528	30.38	8568K628	28.82	8568[illegible]28	33.36	8568K828	30.22
[illegible]	8568K529	39.98	8568K629	38.42	8568K[illegible]	44.16	8568K829	38.58

Thick.	No.	NET/LIN. FT.	No.	NET/LIN. FT.	No.	NET/LIN. FT.	No.	NET/LIN. FT.
36" WIDE ROLLS								
1/16"	8568K11	$6.43	8568K31	$6.12	8568K19	$5.77	[illegible]K41	$6.00
3/32"	8568K12	10.06	8568K32	9.62	8568K21	8.84	8568[illegible]	8.96
1/8"	8568K13	11.71	8568K33	10.20	8568K22	10.93	8568K[illegible]	10.23
3/16"	8568K14	15.60	8568K34	13.95	8568K23	14.15	8568K44	13.25
1/4"	8568K15	20.52	8568K35	15.60	8568K24	17.95	8568K45	[illegible]03
3/8"	8568K16	22.78	8568K36	21.22	8568K25	24.69	8568K46	21.[illegible]
1/2"	8568K17	31.07	8568K37	28.62	8568K26	33.00	8568K47	28.8[illegible]
3/4"	8568K58	44.20	8568K68	44.20	8568K78	44.20	8568K88	44.20
1"	8568K59	59.90	8568K69	59.90	8568K79	59.90	8568K89	59.90

Commercial-Grade Neoprene Rubber Sheeting



- *Color: Black* • *Temperature Range: −20° to +220° F*
- *Tensile Strength: 1000 psi* • *Durometer Hardness, Shore A: 45-55*

Tensile strength of 1000 psi gives this commercial-grade neoprene the ability to handle most general purpose applications. It is great for gaskets, pump and tank flanges, diaphragms, shock absorbers, and insulation. This rubber stands up well to oil, abrasion, and weather. The rubber conforms to irregular flange joints, and it seals under minimum bolt loads.

Thick.	12" × 12" Sheets No.	12" × 12" Sheets NET EACH	12" × 24" Sheets No.	12" × 24" Sheets NET EACH	36" Wide Rolls No.	36" Wide Rolls NET/LIN. FT.
1/32"	9455K31	$3.13	9455K21	$4.08	9455K1	$5.38
1/16"	9455K32	3.32	9455K22	4.71	9455K2	8.16
3/32"	9455K33	3.94	9455K23	7.09	9455K3	9.24
1/8"	9455K34	5.35	9455K24	9.51	9455K4	12.40
3/16"	9455K35	8.94	9455K25	12.28	9455K5	15.99
1/4"	9455K36	9.49	9455K26	16.58	9455K6	21.62
3/8"	9455K37	12.60	9455K27	22.42	9455K7	28.23
1/2"	9455K38	14.93	9455K28	26.86	9455K8	35.14

Industrial-Grade Cloth-Inserted Neoprene Rubber Sheeting

- *Color: [illegible]* • *Temperature Range: −20° to +2[illegible]*
- *Tensile St[illegible]1000 psi* • *Durometer Hard[illegible], Shore A: 45-55*

Fabric reinforcement provides the strength needed for stress applications such as gasketing and diaphragm packing. A 6.7-oz. nylon ply is inserted per 1/16" of thickness. Sheets resist abr[illegible]oil, and weather. Meets ASTM [illegible]0-75E, Type BC.

Thick.	12" × 12" Sheets No.	12" × 12" Sheets NET EACH	12" × 24" Sheets No.	12" × 24" Sheets NET EACH	36" Wide Rolls No.	36" Wide Rolls NET/LIN. FT.
1/16"	869[illegible]	$5.63	8698K51	$9.88	869[illegible]	$12.55
3/32"	[illegible]K72	8.17	8698K52	14.30	8698[illegible]	18.18
1/8"	8698K73	10.89	8698K53	19.05	8698K[illegible]	24.23
3/16"	8698K74	14.63	8698K54	26.00	8698K34	[illegible]
1/4"	8698K75	17.31	8698K55	31.16	8698K35	[illegible]

Premium-Grade Nylon-Inserted Neoprene Rubber Sheeting

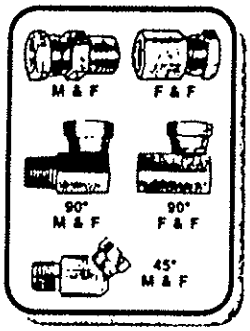
- *Color: Bl[illegible] Temperature Range: −40° t[illegible]220° F*
- *Tensile Strength: [illegible]500 psi* • *Durometer [illegible]ness, Shore A: 65-75*

[illegible] Inserts give rubber [illegible]ter tensile strength and de-[illegible]bility than cloth plies, making it [illegible]better for diaphragm packing. A [illegible]-oz. nylon ply is inserted for [illegible]1/16" of thickness. Resistant to ac[illegible]n, oil, and weather. Meets AST[illegible]2000-2BE715.

Thick.	12" × 12" Sheets No.	12" × 12" Sheets NET EACH	12" × 24" Sheets No.	12" × 24" Sheets NET EACH	36" Wide Rolls No.	36" Wide Rolls NET/LIN. FT.
1/16"	[illegible]K31	$6.89	8599K51	$12.05	[illegible]K11	$20.43
3/32"	[illegible]K32	8.88	8599K52	15.76	8[illegible]12	26.71
1/8"	8599K33	11.99	8599K53	21.40	8599[illegible]	36.29
[illegible]	8599K34	15.27	8599K54	27.50	8599K[illegible]	46.66
[illegible]	8599K35	18.26	8599K55	33.22	8599K[illegible]	61.92

Hose Accessories

Hydraulic Hose Swivel Adapters



Designed to prevent hose stress due to twisting during assembly, these easy-to-assemble adapters are excellent for confined areas.

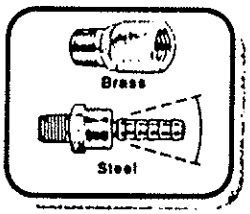
Adapters are made of steel with a corrosion-resistant finish. To minimize piping leaks, the swivel ends of each adapter have dry seal pipe threads.

Adapters are available in straight or angle styles, male pipe × female pipe swivel, or female pipe × female pipe swivel.

Threads Pipe Swivel NPT × NPS	Straight Male & Female No.	NET EACH	Straight Female & Female No.	NET EACH	90° Elbows Male & Female No.	NET EACH
⅛" × ⅛"	5340K11	$0.87	5340K21	$0.96	5340K31	$1.93
¼" × ¼"	5340K12	1.11	5340K22	1.21	5340K32	1.91
⅜" × ⅜"	5340K13	1.49	5340K23	1.51	5340K33	2.36
½" × ½"	5340K14	1.87	—	—	5340K34	2.87
½" × ½"	5340K15	1.89	5340K25	1.83	5340K35	2.98
¾" × ¾"	5340K17	3.23	5340K27	2.96	5340K37	4.92

Threads Pipe Swivel NPT × NPS	90° Elbows Female & Female No.	NET EACH	45° Elbows Male & Female No.	NET EACH
⅛" × ⅛"	5340K41	$1.95	5340K51	$1.68
¼" × ¼"	5340K42	1.87	5340K52	1.87
⅜" × ⅜"	5340K43	2.38	5340K53	2.26
½" × ⅜"	—	—	5340K54	3.11
½" × ½"	5340K45	3.04	5340K55	3.00
¾" × ¾"	5340K47	4.79	5340K57	4.64

Pneumatic In-Line Hose Swivels



Full 360° hose swivel helps eliminate the nagging problem of hose twisting and kinking. . . especially at critical connection points in air lines. Choose from brass or steel construction.

BRASS CONSTRUCTION– Include threaded male on one end and female on the other end. Pressure rating is 300 psi.

NPT M × F	No.	NET EACH
¼" × ¼"	4480K11	$2.59
⅜" × ⅜"	4480K12	5.29

STEEL CONSTRUCTION– Have threaded ¼" male NPT on one end, female hose end or swivel barb on the other end. Black oxide finish.

Description	No.	NET EACH
Male ¼" NPT × Swivel Barb for ¼" ID Hose	5302K63	$4.79
Male ¼" NPT × Swivel Barb for ⅜" ID Hose	5302K64	4.79
Male ½" NPT × ½" NPT Female Hose End		

360° Hydraulic Hose Swivel Joints

Designed for a 90° angle connection with a full 360° swivel, these joints eliminate annoying hose twisting and kinking. Joints prevent excessive flexing which means no more long radius bends. Ideal for use in most applications where hose moves, bends, and twists.

Plated steel construction. Threaded male on one end and female on the other end. May be used for hydraulic applications up to 3000 psi.

NPT Thread M × F	No.	NET EACH
¼" × ¼"	5381K15	$28.51
⅜" × ⅜"	5381K16	23.61
½" × ½"	5381K17	25.36
¾" × ¾"	5381K18	31.01
1" × 1"	5381K36	49.17

316 Stainless Steel Unperforated Worm Drive Hose Clamps

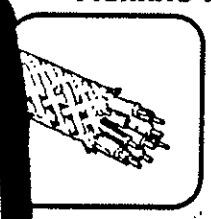
Extra-wide band threads are stamped, leaving the unperforated clamps smooth on the inside—the risk of damage to your hose is eliminated.

Made of 316 stainless steel, these clamps are ideal for use in environments with an aggressive atmosphere and high risk of corrosion. The joining of the band to the housing is arranged so that the least possible deviation from a circular shape arises while the clamps are being tightened. The bands and screw threads are properly pitched-virtually immune to vibration back-off. Band width is 31/64". Slotted hex head screws are ⅛".

Clamps are sold in packages of 10.

Clamp Diameter Range Inches Min.	Max.	mm Min.-Max.	No.	NET/PKG
7/16	¾	11- 17	45945K61	$13.26
½	⅞	13- 20	45945K62	13.92
⅝	1 1/16	15- 24	45945K63	13.92
¾	1 3/16	19- 28	45945K64	14.64
⅞	1 5/16	22- 32	45945K65	14.64
1 1/16	1 5/8	26- 38	45945K66	15.38
1 ¼	1 7/8	32- 44	45945K67	15.78
1 ½	2 1/16	38- 50	45945K68	16.40
1 ¾	2 ⅜	44- 56	45945K69	16.80
2	2 11/16	50- 65	45945K71	17.29
2 5/16	3 ⅛	58- 75	45945K72	18.15
2 11/16	3 ½	68- 85	45945K73	18.96
3	3 ⅞	77- 95	45945K74	19.87
3 7/16	4 5/16	87-112	45945K75	21.19
4 ⅜	5 5/16	104-138	45945K76	22.70
5 ⅛	6 ⅝	130-165	45945K77	22.91
6 ¼	7 ⅛	155-181	45945K78	25.50
7 7/32	8 ¼	180-206	45945K79	27.45
8 ⅛	9 3/32	205-232	45945K81	29.10
9 3/32	10 ⅛	231-572	45945K82	31.34
10 ⅛	11 ⅝	256-283	45945K83	32.93
11 ⅛	12 ⅛	282-308	45945K84	34.66

Flexible Braided Sleeving



Protect hose, wire bundles, and cable from abrasion with this flexible, sturdy braided sleeving. Cut sleeving with scissors. . .no heat, chemicals, or other tools are needed for installation.

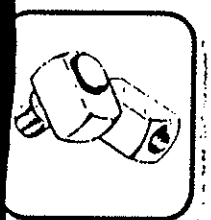
TINNED COPPER—Furnished in an expanded form, the sleeving does not have to inch-its-way over the material to be protected. . .the material can easily be fed through the enlarged sleeve. The sleeve's diameter is reduced when it is pulled lengthwise over the material for a neat, smooth fit.

0% shielding over the nominal diameter is provided.

OLYESTER— Material is impervious to salt water, fuels, most ning solvents, hydraulic fluids, lubricating oils, and antifreeze. ving is also fungus-resistant. Supplied in a nonexpanded form. aximum recommended service temperature is 257° F.

inal		NET/ FOOT	
	No.	1-49	50-Up
NED COPPER			
	5537K26	$0.65	$0.52
	5537K27	.98	.76
	5537K28	1.29	1.03
LYESTER			
	5547K26	.67	.56
	5547K27	1.07	.89
	5547K28	1.25	1.04

Bi-Directional 360° Pneumatic Hose Swivels



Improve tool maneuverability and extend hose life. Units swivel 360° at two locations to allow air hose to drop straight to the floor . . .no matter how the tool is held. The male pipe thread screws directly into most air tools and accepts male pipe thread hose fittings and standard quick-change adapters. Maximum psi: 150.

NOTE: Do NOT use these swivels on percussion tools or in areas of high mechanical abuse.

Size	No.	NET EACH
¼" NPT	91095K81	$12.66
⅜" NPT	91095K82	22.83
½" NPT	91095K83	36.87

BRECO MECHANICAL GROUP, INC.
201 Saw Mill River Road
YONKERS, NEW YORK 10701

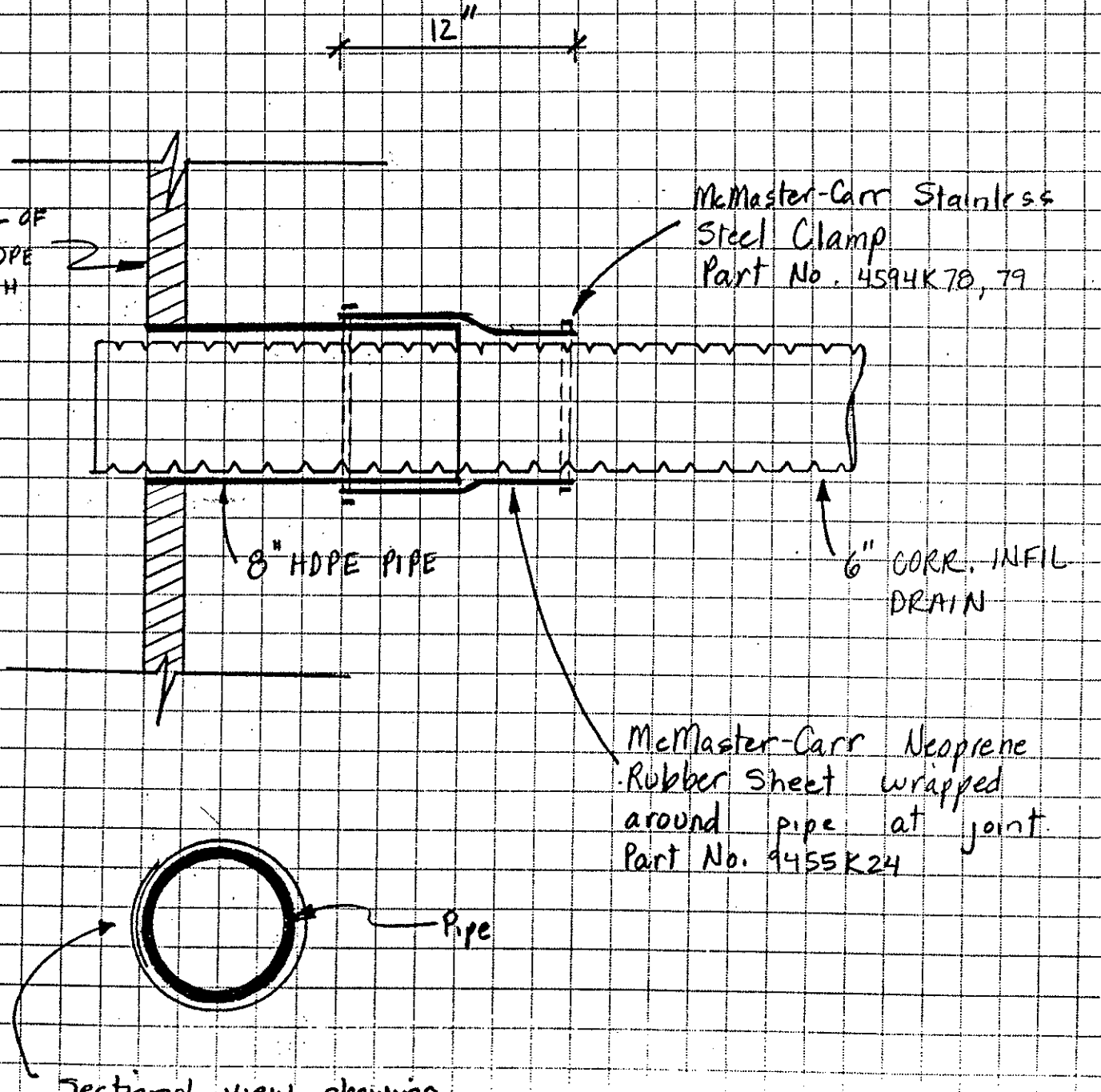
JOB _____

SHEET NO. 1 OF 1

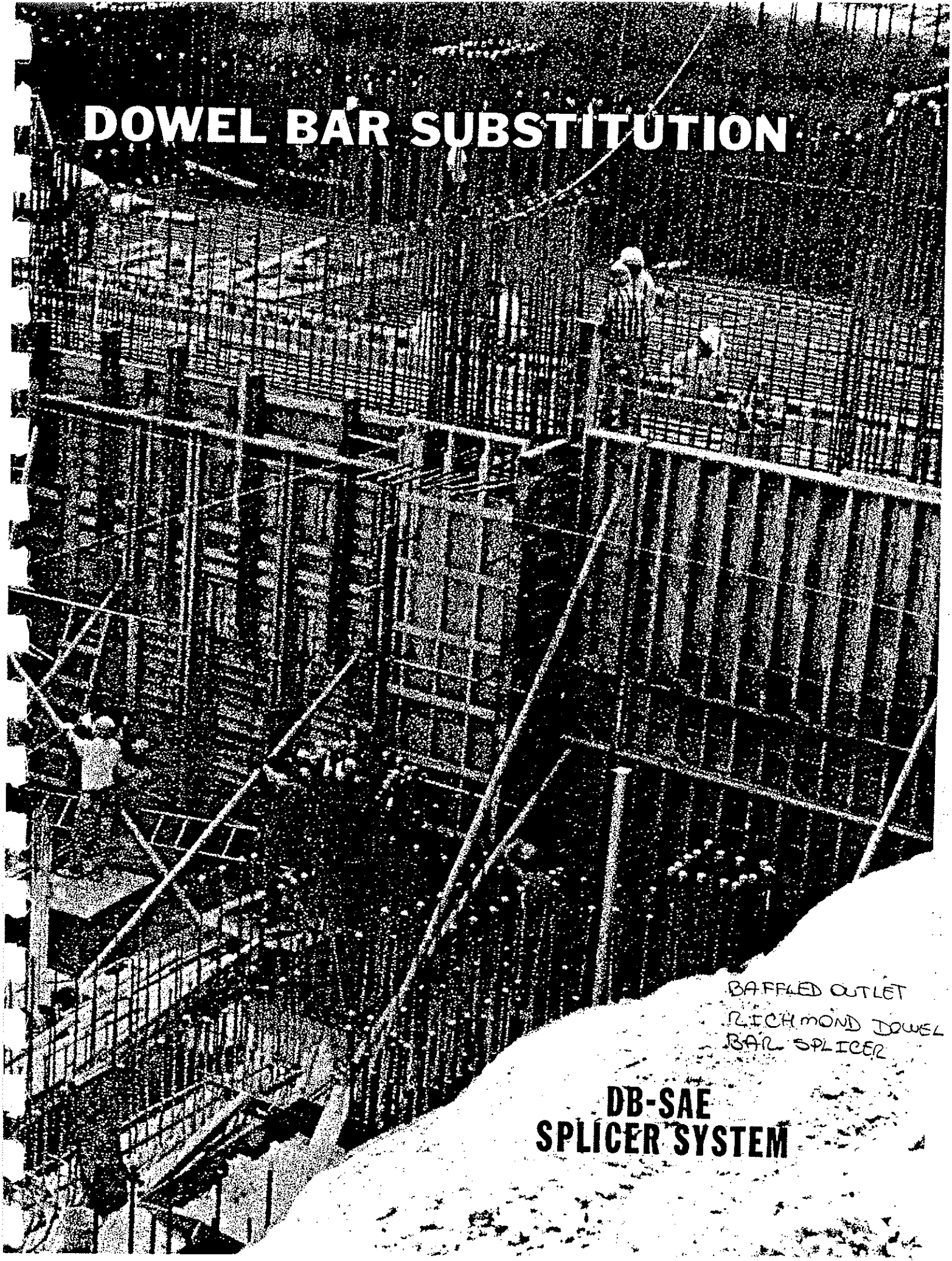
CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE Neoprene Boot Connections



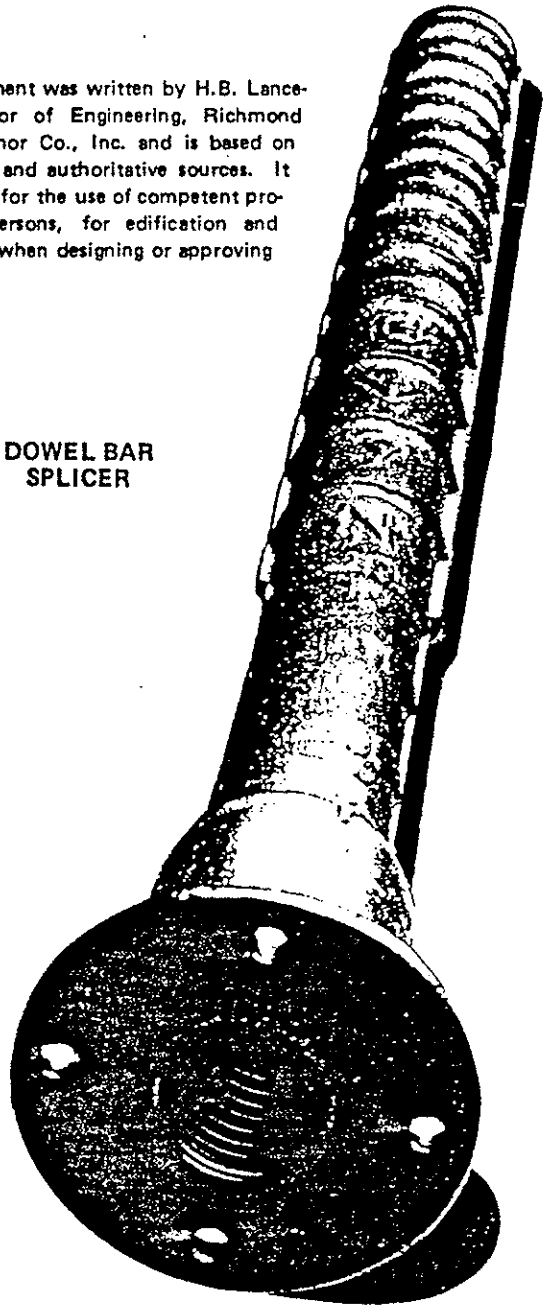
DOWEL BAR SUBSTITUTION



BAFFLED OUTLET
RICHMOND DOWEL
BAR SPLICER

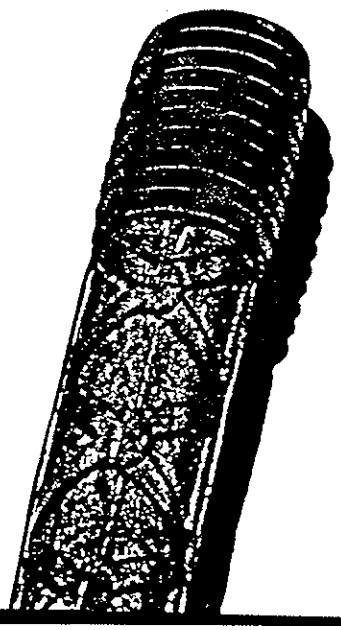
DB-SAE SPLICER SYSTEM

This Document was written by H.B. Lancelot, Director of Engineering, Richmond Screw Anchor Co., Inc. and is based on facts, tests and authoritative sources. It is intended for the use of competent professional persons, for edification and evaluation, when designing or approving a project.



DOWEL BAR SPLICER

Patent Pending



DOWEL-IN

INTRODUCTION:

Richmond published the first dowel bar substitution brochure in 1974. Since that time Richmond has continued to study, develop and manufacture anchorages and splice devices to meet the ever increasing demands from the construction industry. This brochure is the fruition of that effort, a second generation dowel bar substitution system with improved design, strength and economics.

DEVELOPMENT:

As good as the initial dowel bar substitution system is, the continuing study revealed unexpected barriers and hesitancies among engineers against a system based on wire insert splice mechanisms. To remove these objections a system was needed that would be readily identified, familiar to handle, easy to use and compatible to standard codes and practices. From this reasoning came the Dowel Bar Splicer, manufactured from standard deformed rebar. . . a simple, yet unique, splice connection.

DESIGN:

The Dowel Bar Splicer and Dowel-In are fabricated from standard rebar material and are designed to achieve full rebar loads, threading does not reduce bar area. Dowel-Ins are furnished with rolled UNC threads in nominal diameters of 5/8", 3/4", 7/8", 1" and rolled UN threads in nominal diameters of 1-1/8", 1-1/4", 1-7/16" and 1-9/16". Splicers are furnished in corresponding sizes and threads. These sizes are suitable for splicing # 4 through # 11 bars and/or substituting for # 4 through # 11 protruding dowels. The Splicer is available in straight or hooked configurations with single or double receivers. Dowel-Ins are available straight or hooked. Both the Splicer and Dowel-In are available cut to required length.

HOW TO USE THE CHARTS:

The Splicer data and Dowel Bar Substitution information is presented in Tables 1, 2, 3, 4 and 5. Table 1 is a quick comparison of dowel diameters to appropriate dowel substitution options. For example, specification documents might require No.4 dowels. To find the proper substitution, enter Table 1 at No. 4 and proceed across the Table noting that the substitution will be composed of a No. 5 bar Splicer with 5/8" diameter internal thread and a No. 4 bar Dowel-In with 5/8" diameter external rolled thread. This simple procedure can be repeated for any given dowel size.

To determine proper lap splice lengths, use Tables 2 and 3. When hooked bars are specified, use Table 4 for load requirements. Tension splices may be achieved by adhering to Table 5 or Table 1.

NOTE: All illustrated applications lend themselves to any continuous splice requirement.

SPECIFIED OR REQUIRED DOWEL BAR SIZE			
BAR SIZE	GRADE 60 REBAR LOADS – lbs.		
	P_y	1.25 P_y	$P_{ult.}$
#4	12,000	15,000	18,000
#5	18,600	23,250	27,900
#6	26,400	33,000	39,600
#7	36,000	45,000	54,000
#8	47,400	59,250	71,100
#9	60,000	75,000	90,000
#10	76,200	95,250	114,300
#11	93,600	117,000	140,400

RECOMMENDED DOWEL BAR SPLICER AND DOWEL - IN SIZES						
SYSTEM THREAD SIZE	DB - SAE BAR SIZE	DOWEL - IN BAR SIZE	SYSTEM STRESS AREA (min.)	GRADE 60 REBAR LOADS – lbs.		
				P_y	1.25 P_y	$P_{ult.}$
5/8" - 11UNC	#5	#4	.20	12,000	15,000	18,000
3/4" - 10 UNC	#6	#5	.31	18,600	23,250	27,900
7/8" - 9 UNC	#7	#6	.44	26,400	33,000	39,600
1" - 8UNC	#8	#7	.60	36,000	45,000	54,000
1-1/8" - 8UN	#9	#8	.79	47,400	59,250	71,100
1-1/4" - 8UN	#10	#9	1.00	60,000	75,000	90,000
1-7/16" - 8UN	#11	#10	1.27	76,200	95,250	114,300
1-9/16" - 8UN	#11	#11	1.56	93,600	117,000	140,400

TABLE 1: Recommended Dowel Bar Splicer and Dowel In Sizes

GRADE 40	f'_c = 3,000 psi					f'_c = 5,000 psi					MIN. COMP. SPLICE
	TENSION DEVELOPMENT				COMP. DEV.	TENSION DEVELOPMENT				COMP. DEV.	
BAR SIZE	ℓ_d	$1.3\ell_d$	$1.7\ell_d$	$2.0\ell_d$	ℓ_d	ℓ_d	$1.3\ell_d$	$1.7\ell_d$	$2.0\ell_d$	ℓ_d	
4	12	12	14	16	8	12	12	14	16	8	12
5	12	13	17	20	9	12	13	17	20	9	13
6	13	17	22	26	11	12	16	20	24	9	15
7	18	23	30	35	13	14	18	24	28	11	18
8	23	30	39	46	15	18	23	30	36	12	20
9	29	38	50	58	17	23	29	38	45	14	23
10	37	48	63	74	19	29	37	49	57	15	25
11	46	59	78	91	20	35	46	60	71	17	28

TABLE 2: Required Development and Lap Lengths – Grade 40

GRADE 60	f'_c = 3,000 psi					f'_c = 5,000 psi					MIN. COMP. SPLICE
	TENSION DEVELOPMENT				COMP. DEV.	TENSION DEVELOPMENT				COMP. DEV.	
BAR SIZE	ℓ_d	$1.3\ell_d$	$1.7\ell_d$	$2.0\ell_d$	ℓ_d	ℓ_d	$1.3\ell_d$	$1.7\ell_d$	$2.0\ell_d$	ℓ_d	
4	12	16	20	24	11	12	16	20	24	9	12
5	15	20	26	30	14	15	20	26	30	11	13
6	19	25	33	38	16	18	23	31	36	14	15
7	26	34	45	53	19	21	27	36	42	16	18
8	35	45	59	69	22	27	35	45	54	18	20
9	44	57	74	88	25	34	44	58	68	20	23
10	56	72	94	111	28	43	56	73	86	23	25
11	68	89	116	137	31	53	69	90	106	25	28

TABLE 3: Required Development and Lap Lengths – Grade 60

Table 1 is a direct comparison of dowel diameters and appropriate substitution options.

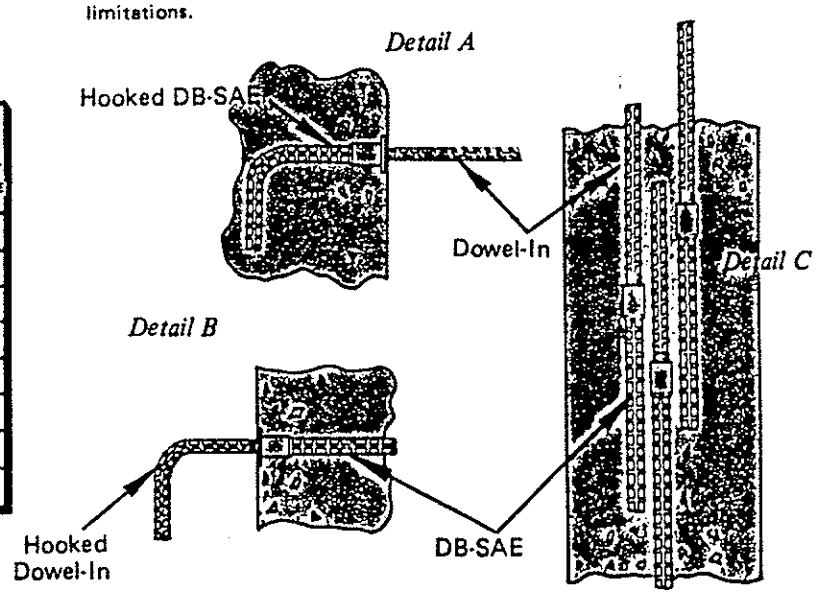
Tables 2 and 3 summarize required development and lap lengths for concrete strengths of 3,000 and 5,000 psi per ACI Standard 318-77.

Tension: $\ell_d = .04A_b \frac{f_y}{\sqrt{f'_c}}$; min. $.0004f_y d_b$ or 12 inches.

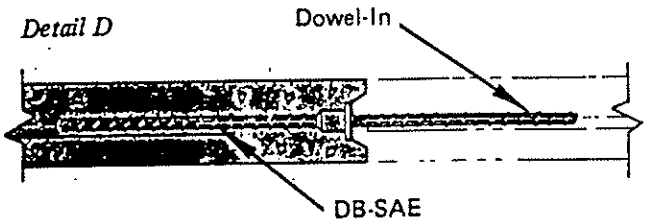
Compression Development Length: $\ell_d = .02f_y \frac{d_b}{\sqrt{f'_c}}$; min. $.0003f_y d_b$ or 8 inches.

Compression Splice: Compression ℓ_d; min. $.0005f_y d_b$ or 12 inches.

Consult ACI Standard 318-77, Chapter 12, for multipliers and limitations.



Detail D



Detail E

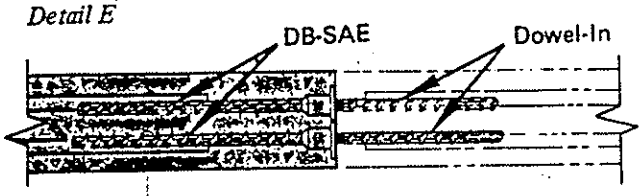


Table 4 identifies the maximum tensile force for hooked rebar as a function of concrete compressive strength. These values were generated by applying the equations and information found in Chapter 12 of ACI Standard 318-77.

Table 5 is arranged to address tension splices such as depicted in Detail F. The other details show but a few examples of the many splice configurations possible.

GRADE 40 REBAR SIZE	CONCRETE STRENGTH		
	3,000 PSI	4,000 PSI	5,000 PSI
	ALL BARS	ALL BARS	ALL BARS
4	3,944	4,354	5,091
5	6,113	7,058	7,891
6	8,676	10,018	11,201
7	11,831	13,661	15,274
8	15,577	17,987	20,110
9	19,718	22,768	25,456
10	25,042	28,916	32,329
11	30,760	35,519	39,711

GRADE 60 REBAR SIZE	TOP BARS	OTHERS	TOP BARS	OTHERS	TOP BARS	OTHERS
4	5,915	5,915	6,831	6,831	7,637	7,637
5	9,169	9,169	10,589	10,587	11,837	11,837
6	10,845	13,014	12,523	15,027	14,001	16,801
7	11,831	17,746	13,661	20,492	15,274	22,910
8	15,577	23,366	17,987	26,981	20,110	30,165
9	19,718	29,577	22,768	34,153	25,456	38,184
10	25,042	33,389	28,916	38,554	32,329	43,105
11	30,760	35,887	35,519	41,438	39,711	46,330

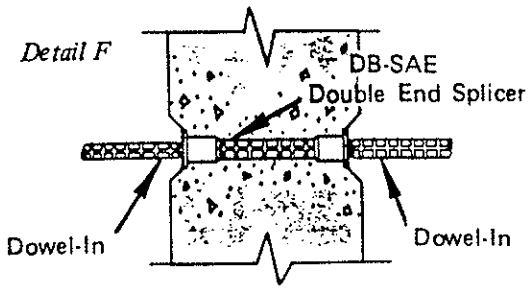
TABLE 4: Grades 40 and 60 Rebar Maximum Tensile

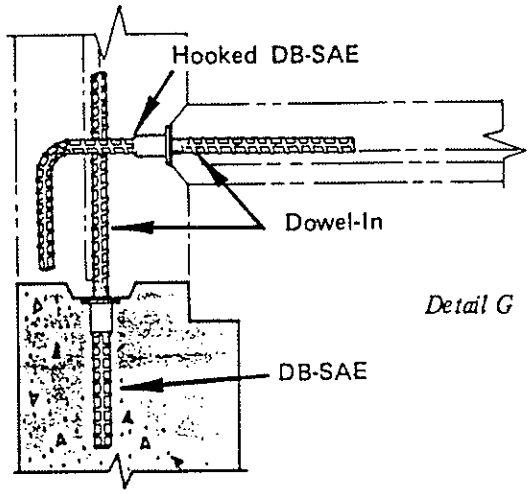
SPLICER SIZE	SPLICER THREAD SIZE	SPLICER ULT. LOAD
# 5	5/8" - 11UNC	20,340
# 6	3/4" - 10 UNC	30,060
# 7	7/8" - 9UNC	41,490
# 8	1" - 8UNC	54,450
# 9	1-1/8" - 8UN	71,100
# 10	1-1/4" - 8UN	90,000
# 11	1-7/16" - 8UN	114,300
# 11	1-9/16" - 8UN	140,400

DOWEL - IN SIZE	REBAR LOADS - lbs.	
	GRADE 60	
	P_y	1.25 P_y
# 4	12,000	15,000
# 5	18,600	23,250
# 6	26,400	33,000
# 7	36,000	45,000
# 8	47,400	59,250
# 9	60,000	75,000
# 10	78,200	95,250
# 11	93,600	117,000

TABLE 5: Direct Splice Comparisons

Detail F



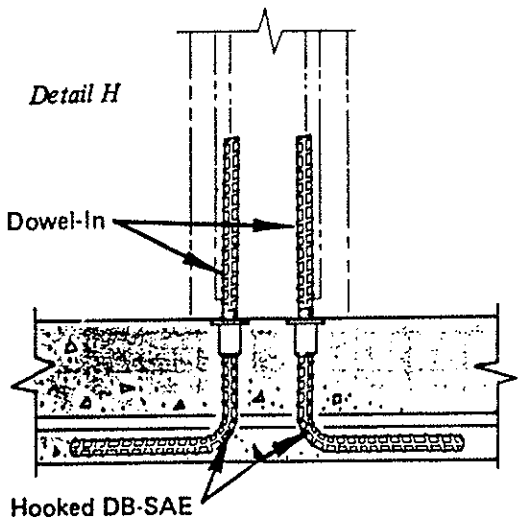


Detail G

ASTM STANDARD REINFORCING BARS			
BAR SIZE DESIGNATION NUMBER	WEIGHT	NOMINAL DIAMETER	
	POUNDS PER FOOT	DIAMETER INCHES	CROSS SECTIONAL AREA – Sq. Inches
3	0.376	0.375	0.11
4	0.668	0.500	0.20
5	1.043	0.625	0.31
6	1.502	0.750	0.44
7	2.044	0.875	0.60
8	2.670	1.000	0.79
9	3.400	1.128	1.00
10	4.303	1.270	1.27
11	5.313	1.410	1.56

TABLE 6: Reinforcing Steel Data

Detail H

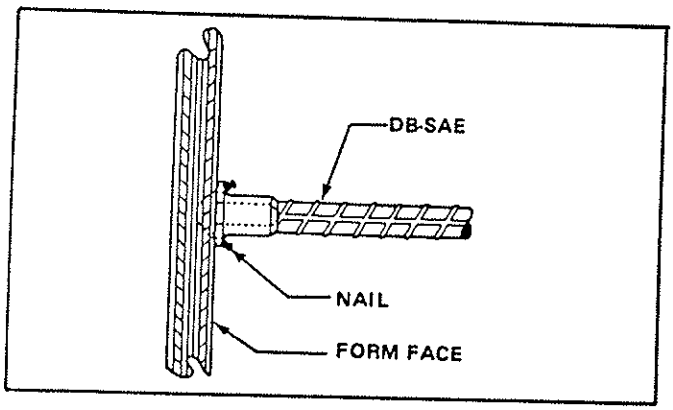


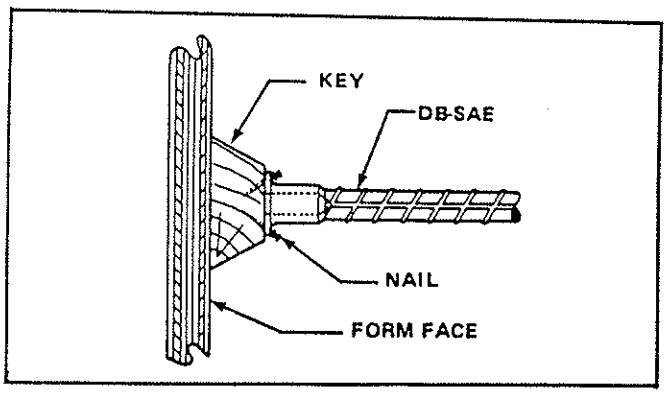
TYPICAL SETTING METHODS:

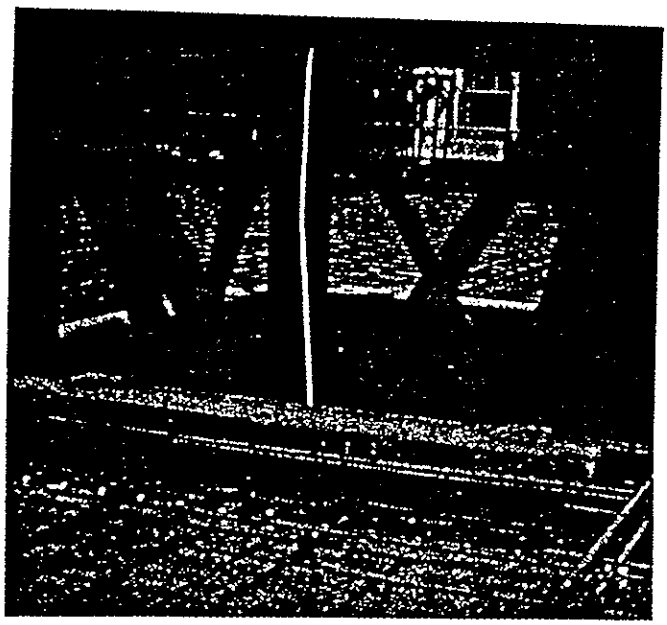
Setting methods for the Dowel Bar Splicer are simple and straight forward. The unit can easily be nailed directly to the form face utilizing the nail holes in the integral flange. See sketch below.

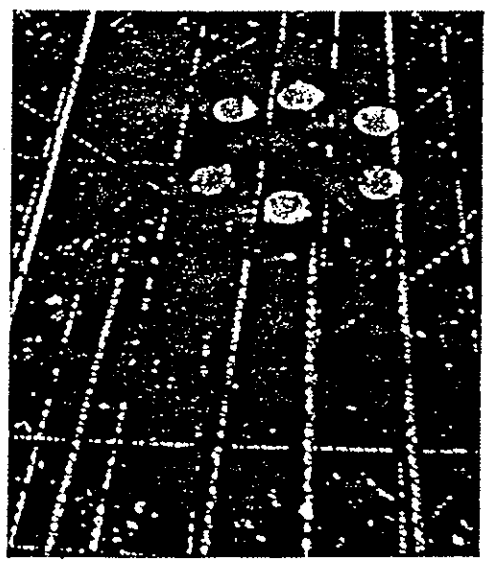
To incorporate a keyway it is again easily accomplished - no holes to drill, no dowels to drive in. Simply gang the DB-SAE Splicers to the keyway and nail the keyway to the form. See sketch below.

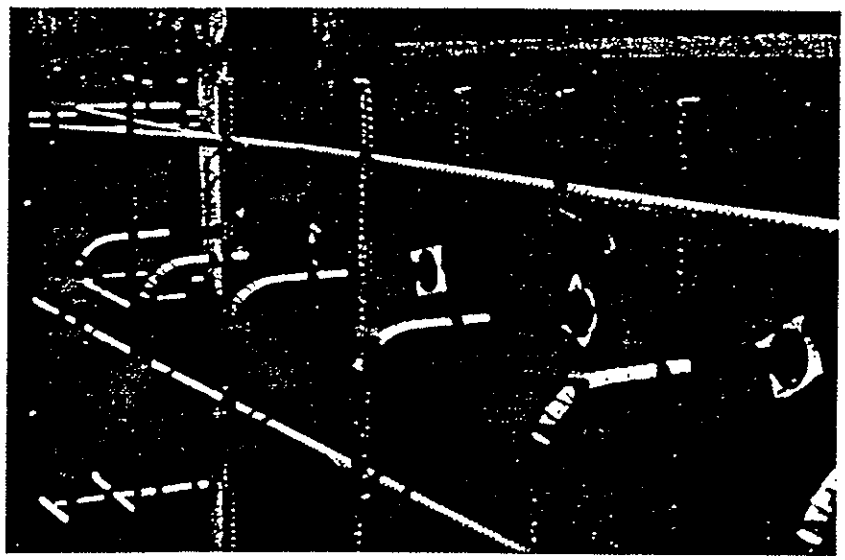
On metal faced modular forms small screws are often used to firmly set and position the splicer units.











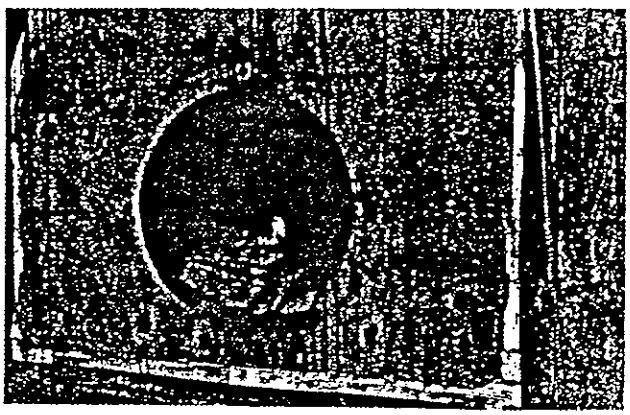
REBAR SPLICE SPECIFICATIONS:

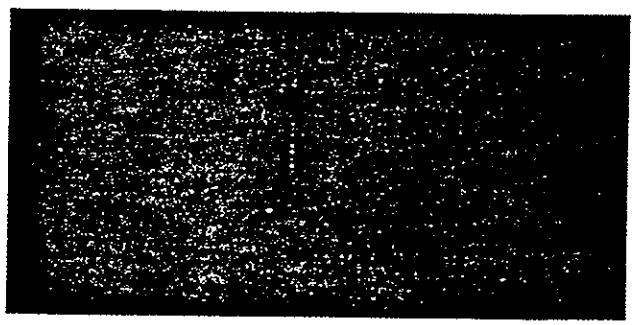
In order to facilitate ease of construction and to provide continuity of reinforcing steels through construction joints and routine splices, the appropriate authority may at their option utilize the Dowel Bar Substitution and Splice System as manufactured by Richmond Screw Anchor Co., Inc. or and approved equal.

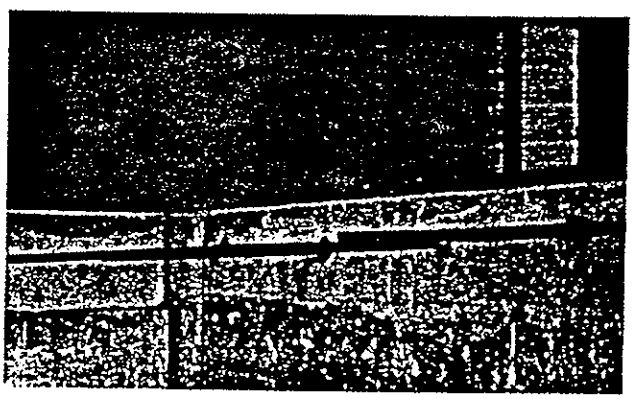
For dowel bar substitution and rebar splice systems, other than Richmond Screw Anchor Co., Inc.'s DB-SAE Splicer, the contractor shall submit manufacturer's literature, product samples and certified test reports to the appropriate authority.

Test reports shall show yield and ultimate tensile load capacities. All male threads shall be rolled (UN or UNC), cut threads are not permitted.

Tension failure must occur in the nominal bar diameter of the Dowel-In.





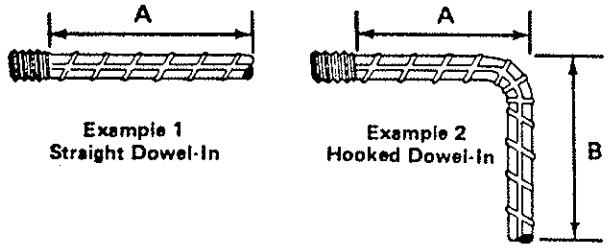


HOW TO ORDER:

Reference Table 1 on page 3 for correct Dowel-In/ DB-SAE sizes.

DOWEL-IN (DI)

Give desired bar size (should be equivalent to rebar being substituted for on the structural drawings), length, symbol and name. If a hooked configuration is required also give A and B dimensions shown below.

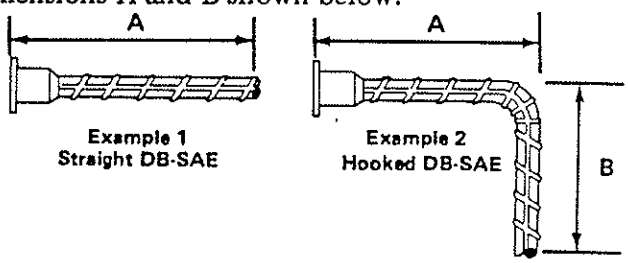


Example 1 : #6 bar, 24" DI Dowel-In

Example 2: #6 bar, 12" x 9", DI Hooked Dowel-In

DOWEL BAR SPLICER (DB-SAE)

Give bar size of DB-SAE required (normally one size larger than the Dowel-In, check Table 1 for correct size), length, symbol, name and size of Dowel-In to be used in conjuction with the splicer. If a hooked configuration is required also give dimensions A and B shown below.

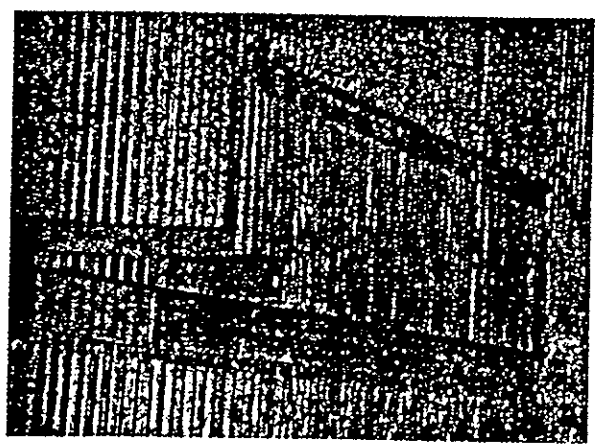


Example 1: # 7 x 24" DB-SAE Dowel Bar Splicer for a # 6 Dowel-In.

Example 2: #7 x 12" x 9" hooked DB-SAE Dowel Bar Splicer for #6 Dowel-In.

NOTE:

All tolerances per CRSI Design Manual criteria. All bends assumed 90° unless otherwise stated.



ADVANTAGES:

Richmond's Dowel Bar Splicer has been engineered, tested and proven to meet, or exceed, field standards and design/engineering practices. It achieves excellent compatibility with normal procedures and has the rewarding benefits of improved costs and time saving.

The unit is strong, easy to use and readily identified as rebar material. The application requires no special tools, the easy installation accomplishes forming simplicity. No extra elements, such as mechanical wedges, nuts, collars, couplers or thermite material, are required. Routine cutting, threading, bending, etc., can easily be handled in the field.

The "bottom line" — the Dowel Bar Splicer assures strong, safe and fast dowel bar substitutions. Broken-off and/or bent dowel bars are eliminated and bruised shins, gouged backs and scraped scalps will be less likely. Best of all, though, you will improve forming costs and reduce forming and form stripping hassles.

Call or write for additional information, Richmond provides engineered layouts and details for dowel bar substitution requirements.

"QUALITY CONCRETE ACCESSORIES."

RICHMOND

SCREW ANCHOR CO., INC.

7214 Burns St., Richland Hills,

Ft. Worth, Tex. 76118

Telephone 817/284-4981

MEMBER CRSI

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SPEC DATA®

This Spec-Data sheet conforms to editorial style prescribed by The Construction Specifications Institute. The manufacturer is responsible for technical accuracy.

1. PRODUCT NAME

Richmond Screw Anchor Company Rebar Splicing Systems: DB-SAE—Dowel Bar Splicer System* Coupler Splice System** Half Coupler (for welding) Splice System**

2. MANUFACTURER

Richmond Screw Anchor Company
7214 Burns Street
Fort Worth, Texas 76118
Phone: (817) 284-4981
FAX: (817) 284-4504

3. PRODUCT DESCRIPTION

Mechanical connection devices for splicing reinforcement bars in concrete structures. The DB-SAE Dowel Bar Splicer System is a two-piece, standard splicing technique (splicing bars of equal size) that eliminates protruding dowels. The Coupler Splice System and Half Coupler Splice System are a means to achieve standard splicing (equal bar sizes) and/or transition splicing (bars of different sizes).

Richmond Rebar Splice Systems are manufactured in the USA from domestic rebar material and are composed of a Splicer (DB-SAE or Coupler) and a Dowel-In (DI).

Basic Use: Richmond mechanical connections are suitable for joining reinforcement bars end to end. The mechanical connections accommodate bar sizes #4 through #14. Mechanical connections are a convenient alternative to lap splicing and/or butt welding. Typical applications include the splicing of reinforcement bars in monolithic structures, rebar anchorage, future expansion and dowel bar substitution at construction joints.

Composition and Materials: Richmond mechanical connections are manufactured from deformed or smooth bar meeting ASTM A615 material specifications; other grades are available upon request. Mechanical connections and reinforcement bars may be epoxy coated to meet applicable corrosion resistant criteria.

Limitations: Usage of mechanical connections may be controlled by governing building codes.

4. TECHNICAL DATA

Applicable Standards/Guides/Codes: (ACI 318 Building Code Requirements for Reinforced Concrete) American Concrete Institute; (ICBO) International Conference of Building Officials; City of Los Angeles Department of Building and Safety; New York Board of Standards and Appeals; (AASHTO) American Association of State Highway and Transportation Officials; (ASTM A615) American Society for Testing and Materials; Corp of Engineers CW-03210 Civil Works Construction Guide for Steel Bars; (CRSI) Concrete Reinforcing Steel Institute.

Load Test Data: Richmond Screw Anchor Company provides test data and appropriate test reports. Static, dynamic, fatigue and seismic test data is available. Such data is derived from tests performed in accordance with ACI, ICBO, AASHTO, ASTM and CRSI.

Safety Factors: The ACI building code establishes the minimum splice capacity as follows: "A full mechanical connection shall develop in tension or compression, as required, at least 125 percent of specified yield strength (fy) of the bar." For mechanical anchorage, the ACI code establishes the following safety criteria: "Any mechanical device capable of developing the strength of the reinforcement without damage to concrete may be used as anchorage." Splicing or anchorage, Richmond Screw Anchor Company mechanical connections achieve full strength of the bars connected. For ASTM A615 grade 60 material the full capacity is at least 150 percent of the specified yield (fy).

5. INSTALLATION

Monolithic: Rebar mats/cages may be placed or prefabricated; individual reinforcement bars may be mechanically spliced, incorporating various Richmond splice devices. The mechanical connection is achieved by screwing the male (Dowel-In) into the female (Splicer or Coupler). Pretorque is not necessary; however, all elements must be fully engaged and secure.

Dowel Bar Substitution and Anchoring: The female (Splicer) will be positioned and secured to the formwork, rebar or bulkheads prior to placing concrete. After concrete has cured, the forms are removed. Prior to a secondary pour, the Dowel-In (DI) will be threaded into the Splicer. Wrench-tightening is not required; however, all elements must be fully engaged and appropriately aligned.

6. AVAILABILITY AND COST

Availability: Richmond Screw Anchor Company splice devices are available worldwide. See page 6 for the nearest plant and/or sales office.

Cost: Prices are available at the branch office locations.

7. WARRANTY

Richmond Screw Anchor Company splice devices are manufactured according to strict quality assurance specifications. They are warranted to be free from manufacturing defects and to perform as represented in writing (provided that the product is installed and used in accordance with the manufacturer's instructions).

8. MAINTENANCE

No special requirements.

9. TECHNICAL SERVICES

Additional product information or technical information is available by contacting Richmond.

10. FILING SYSTEMS

Electronic SPEC-DATA®
SPEC-DATA® II
Concrete Construction Source Book

03200

*Patented **Patent pending

BAFFLED OUTLETS-
SUPPLEMENTAL INFORMATION

Richmond Screw Anchor Company
August 1990
3
CONCRETE REINFORCEMENT
Mechanical Rebar Splicing System

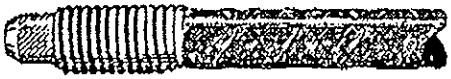
Dowel Bar Splicer (DB-SAE)

DB-SAE Dowel Bar Splicer

The DB-SAE Splicer is a one-piece unit integrally forged from grade 60 rebar material. It is available in #4 through #11 sizes and is designed to achieve 150 percent of specified yield (full mechanical ultimate). DB-SAEs are available straight (cut to length), hooked, double-ended, thread-ended or bolt-headed in plain or epoxy coated. It is also possible to order the Splicer with a reduced washer and/or a clipped washer.

Dowel-In (DI)

DI Dowel-In - #4, #5 and #6 configuration with chamfered nose.

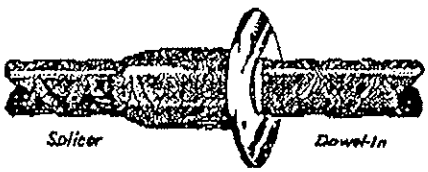


DI Dowel-In - #7 through #11 configuration with pilot nose.

The Dowel-In (DI) is manufactured from grade 60 rebar material and is available in sizes corresponding to the DB-SAE Splicer. The end of the Dowel-In is enlarged by forging before threading so that the cross-sectional area of the bar is not reduced during threading operations, thus assuring a strength capacity of 150 percent of the specified yield. Dowel-Ins are configured to facilitate easy installation of the splice. They can be easily assembled by hand. On large projects, such as highway paving, a centrifugal chuck on an electric or air powered drill motor will speed installation.

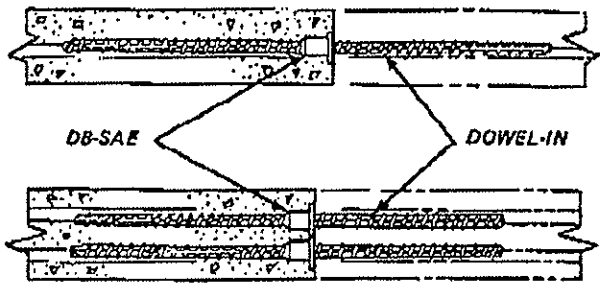
Dowel-Ins are available straight or hooked, plain or epoxy coated.

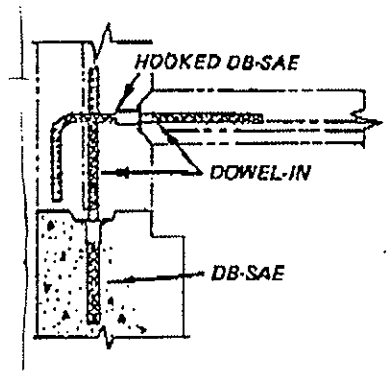
Completed Splice



Both pieces of the completed splice are manufactured from equal size bar stock.

Typical Applications





Splice Size Recommendations

SPECIFIED OR REQUIRED DOWEL BAR SIZE				RECOMMENDED DOWEL BAR SPLICER AND DOWEL-IN SIZES						
BAR SIZE	GRADE 60 REBAR LOADS – lbs.			SYSTEM THREAD SIZE	DB-SAE BAR SIZE	DOWEL-IN BAR SIZE	SYSTEM STRESS AREA (sq. in.)	GRADE 60 REBAR LOADS – lbs.		
	F_y	$1.25\ F_y$	$F_{min.}$					F_y	$1.25\ F_y$	$F_{min.}$
#4	12,000	15,000	18,000	5/8" 11UNC	#4	#4	.20	12,000	15,000	18,000
#5	18,600	23,250	27,900	3/4" 10 UNC	#5	#5	.31	18,600	23,250	27,900
#6	26,400	33,000	39,600	7/8" 9 UNC	#6	#6	.44	26,400	33,000	39,600
#7	36,000	45,000	54,000	1" 8UNC	#7	#7	.60	36,000	45,000	54,000
#8	47,400	59,250	71,100	1-1/8" 8UN	#8	#8	.79	47,400	59,250	71,100
#9	60,000	75,000	90,000	1-1/4" 8UN	#9	#9	1.00	60,000	75,000	90,000
#10	76,200	95,250	114,300	1-7/16" 8UN	#10	#10	1.27	76,200	95,250	114,300
#11	93,600	117,000	140,400	1-5/16" 8UN	#11	#11	1.56	93,600	117,000	140,400

TABLE 1: Recommended Dowel Bar Splicer and Dowel-In Sizes

Typical Setting Methods

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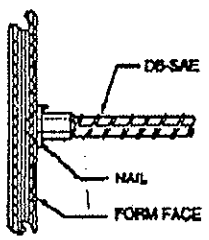

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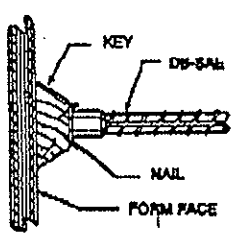

Test Data

Supportive test data consists of static tensile testing, static compression testing, progressive step function, cyclic tensile tests and fatigue tests suitable for establishing S-N curves.

(DB-SAE) SPLICER SIZE	(DI) DOWEL-IN SIZE	CROSS SECT. AREA (sq. in.)	THREAD SIZE	AVERAGE YIELD LOAD (lbs.)	AVERAGE ULT. LOAD (lbs.)
#4	#4	0.20	⅜"-11 UNC	13,220	19,300
#5	#5	0.31	½"-10 UNC	20,700	31,470
#6	#6	0.44	⅝"-9 UNC	36,450	48,700
#7	#7	0.60	1.0"-8 UNC	48,870	61,750
#8	#8	0.79	1⅛"-8 UN	51,840	77,800
#9	#9	1.00	1¼"-8 UN	62,800	94,950
#10	#10	1.27	1⅜"-8 UN	83,020	124,540
#11	#11	1.56	1⅝"-8 UN	100,160	146,830

TABLE 9: DB-SAE/Dowel-In Splice Static Test Summary

Static tensile tests are continuously being compiled to insure quality. These test programs easily exceed known building code requirements.

STRESS LEVEL		.55fy	.75fy	.90fy	1.00fy	RESERVE STATIC TENSILE LOAD
CYCLES/SEC.		8-28	8-28	8-28	8-28	
CYCLES		25,000	12,500	4,000	1,000	
CUMULATIVE CYCLES		25,000	37,500	41,500	42,500	
DB-SAE BAR SIZE	DI BAR SIZE	NUMBER OF CYCLES SURVIVED VERSUS NUMBER OF SAMPLES				RESERVE STATIC TENSILE LOAD
#4	#4	6/6	6/6	6/6	6/6	19,800
#5	#5	6/6	6/6	6/6	6/6	28,700
#6	#6	6/6	6/6	6/6	6/6	40,500
#7	#7	6/6	6/6	6/6	6/6	48,900
#8	#8	6/6	6/6	3/6	3/6	55,800
#9	#9	6/6	6/6	3/6	3/6	86,700
#10	#10	5/5	5/5	0/5	0/5	—
#11	#11	6/6	6/6	6/6	6/6	135,100

TABLE 10: DB-SAE/Dowel-In Dynamic Test Summary

The purpose of the progressive cyclic tests was to demonstrate the seismic resistance capacities of the Richmond Splice System. Cyclic testing began at 55 percent of the specified yield (60,000 psi) for 25,000 cycles, stepping to 75 percent (fy) for an additional 12,500 cycles, stepping again to 90 percent (fy) for another 4,000 cycles, finally stepping to 100 percent (fy) for 1,000 cycles. As a result of this test series, each splice reached a stress range of 90-100 percent of the specified yield (60,000 psi) and the total number of cycles of each splice exceeded 41,500 cycles. Units exceeding 42,500 cycles were further tested to evaluate the reserve static tensile load.

Number of Cycles @	Splice Bar Size / Stress Level	#5	#6	#8	#11
	15,000 psi	2,000,000	2,000,000	2,000,000	2,000,000
	RESERVE STATIC TENSILE				
		27,900 lbs.	42,000 lbs.	80,100 lbs.	144,900 lbs.

Number of Cycles @					
	25% Fy	2,000,000+	2,000,000+	2,000,000+	TESTS IN PROGRESS
	50% Fy	103,710	216,510	179,290	
	75% Fy	59,540	45,240	29,765	
	RESERVE STATIC TENSILE				
		0	0	0	0

TABLES 11 AND 12: DB-SAE/Dowel-In Fatigue Test Summary

The fatigue test programs were performed to illustrate the merits of the Richmond Splice System design philosophy of upset and upsized threads relative to the nominal rebar area. All specimens exceeded 2,000,000 cycles at 15,000 psi, 25 percent of the specified yield (60,000 psi). Upon completing 2,000,000 cycles, the tests were stopped and the specimens were statically tensiled to failure to evaluate the reserve strength capacity. A second test series was initiated to develop S-N behavior characteristics of the splice system.

RICHMOND
SCREW ANCHOR CO.
7214 Burns Street,
Fort Worth, Texas 76118
(817) 284-4981

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Atlanta, GA 30318
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25585 Clover Road
Hayward, CA 94542
Phone 415/886-6688

5025 Easton Road
St. Joseph, MO 64507
Phone 816/233-0278
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Billerica, MA 01821
Phone 508/663-5236
Toll Free 800/969-3399

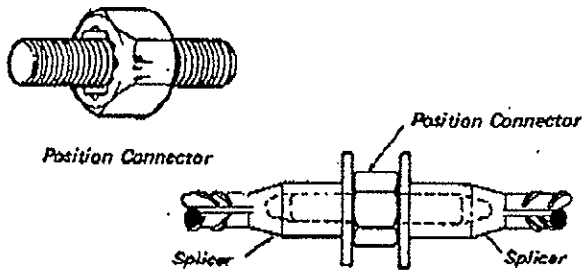
17051 Green Drive
City of Industry, CA 91745
Phone 818/964-8890
Toll Free 800/869-0319

7216 Burns Street
Fort Worth, TX 76118
Phone 817/284-9341
Toll Free 800/729-9048

504 East Kercher Street
Miamisburg, OH 45342
Phone 513/866-5936
Toll Free 800/869-8437

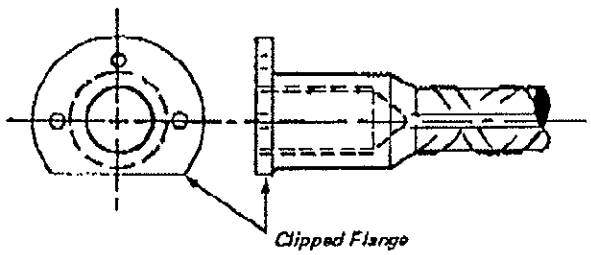
55 North Pine Street
Tremont, PA 17981
Phone 717/695-3163
Toll Free 800/669-3163

Position Connector



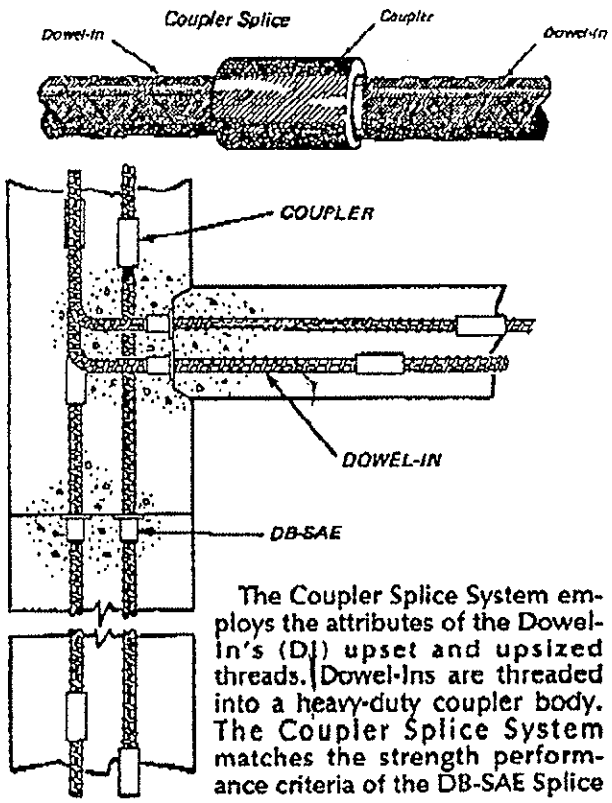
The Position Connector is a left and right hand threaded stud with a free fit hex nut keyed to the hex bar stock of the stud. Right hand and left hand DB-SAE Splicers may be connected and drawn together, using this method, when hooked bar alignment is critical.

Clipped Flange



The Splicer's flange may be supplied clipped as needed to insure adequate concrete cover or to avoid interferences with other objects. Flange may be clipped in more than one direction as required.

Coupler Splice System

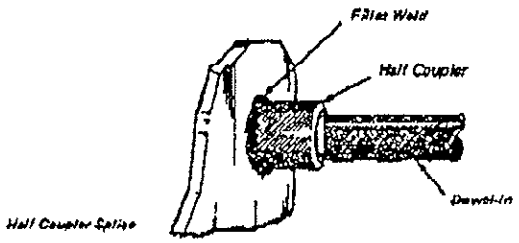


The Coupler Splice System employs the attributes of the Dowel-In's (DI) upset and upsized threads. Dowel-Ins are threaded into a heavy-duty coupler body. The Coupler Splice System matches the strength performance criteria of the DB-SAE Splice System in all aspects. A unique advantage of the Coupler is that it also behaves as a position connector. The Coupler can be advanced beyond the thread region of the Dowel-In and then returned to final position, joining a second Dowel-In to the first.

COUPLER SELECTION GUIDE				
DI Size	Thread Size	COUPLER Size	STRENGTH (lbs.)	
			1.25Fy	Fu
#4	5/8" -11UNC	7/8" x 2"	15000	18000
#5	3/4" -10UNC	1- 1/8" x 2-1/4"	23250	27900
#6	7/8" - 9UNC	1-1/4" x 2 1/2"	33000	39600
#7	1" - 8UNC	1- 1/2" x 4"	45000	54000
#8	1-1/8" - 8 UN	1-5/8" x 4-3/8"	59250	71100
#9	1-1/4" - 8 UN	1- 7/8" x 4-5/8"	75000	90000
#10	1-7/16" - 8 UN	2- 1/8" x 5-1/4"	95250	114300
#11	1-9/16" - 8 UN	2-1/4" x 5-1/2"	117000	140400
#14	1-7/8" - 8 UN	2- 7/8" x 6"	168750	202500

TABLE 7: Coupler Selection Guide

Half Coupler Splice For Welding

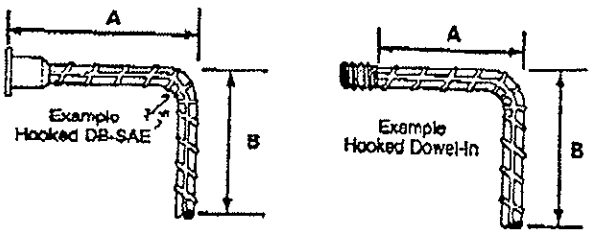


HALF COUPLER SELECTION GUIDE				
DI Size	Thread Size	COUPLER Size	STRENGTH (lbs.)	
			1.25Fy	Fu
#4	5/8" -11UNC	7/8" x 1-1/8"	15000	18000
#5	3/4" -10UNC	1- 1/8" x 1-1/4"	23250	27900
#6	7/8" - 9UNC	1-1/4" x 1-3/8"	33000	39600
#7	1" - 8UNC	1- 1/2" x 2-3/4"	45000	54000
#8	1-1/8" - 8 UN	1-5/8" x 3"	59250	71100
#9	1-1/4" - 8 UN	1- 7/8" x 3-1/8"	75000	90000
#10	1-7/16" - 8 UN	2- 1/8" x 3-1/2"	95250	114300
#11	1-9/16" - 8 UN	2-1/4" x 3-3/4"	117000	140400
#14	1-7/8" - 8 UN	2- 7/8" x 3-7/8"	168750	202500

TABLE 8: Half Coupler Selection Guide

The Half Coupler Splice is simply a shorter version of the Coupler Splice, suitable for welding to steel components such as soldier piles, weld plates, steel frame structure and special bulkheads. A Half Coupler accommodates only one Dowel-In. The capacity of the Half Coupler may be limited by field welding conditions.

Hooked Splicer and Hooked Dowel-In



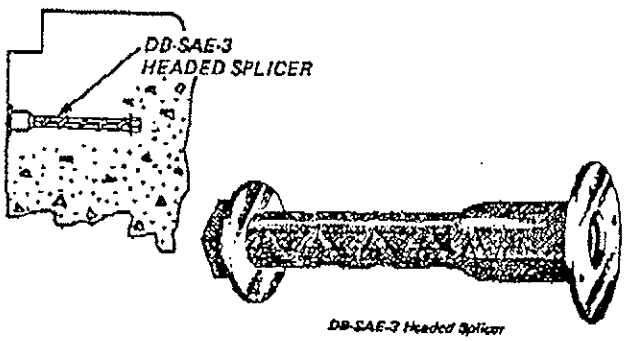
Hooked dowels may be substituted with a hooked DB-SAE or hooked Dowel-In. Hooked DB-SAEs and DIs will meet or exceed those requirements as defined in ACI 318. All bars are bent using the appropriate pin diameter. (See the table for dimensions). The "B" dimension can be any length necessary to meet building requirements.

Bar Size	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11
Min. "A" Dimension	5"	5"	6"	7"	9"	12"	14"	15"
Bend Diameter	6d					8d		

TABLE 2: Hooked Rebar Bend Dimensions

The "A" dimension may be reduced, using bending pin diameters less than ASTM and code requirements.

Headed Splicer



DB-SAE-3 Headed Splicer

RECOMMENDED DB-SAE-3 SPLICER AND DOWEL-IN SIZES						
SYSTEM THREAD SIZE	DB-SAE-3 BAR SIZE	EMBED LENGTH (12D)	LOAD CAPACITY	DOWEL-IN BAR SIZE	DOWEL-IN LOAD CAPACITY	
					1.25Py	1.5Py
⅝" 11UNC	#4	6"	18,000	#4	18,000	18,000
¾" 10 UNC	#5	7.5"	27,900	#5	23,250	27,900
⅞" 9 UNC	#6	9"	39,600	#6	33,000	39,600
1" 8UNC	#7	10.5"	54,000	#7	45,000	54,000
1⅛" 8UN	#8	12"	71,100	#8	59,250	71,100

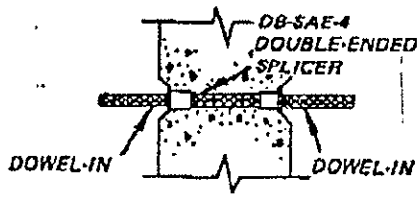
TABLE 3: Recommended DB-SAE-3 Headed Splicer and Dowel-In-Sizes

The Headed Splicer is a convenience connector. It is designed to eliminate hooked bar congestion. It also provides excellent end anchorage and may be used for common structural anchorage provisions for light standards, signs, posts, fixtures, etc. The anchor may be modified to support greater loads than shown.

Double-Ended Splicer

The Double-Ended Splicer is a device for establishing a direct load path through a concrete section, thus avoiding multiple hooked bars or protruding dowels. It also helps to eliminate bar congestion. Oftentimes it is configured in a "U" shape for special applications. See miscellaneous components.

DB-SAE-4 Double-Ended Splicer



Typical Specification

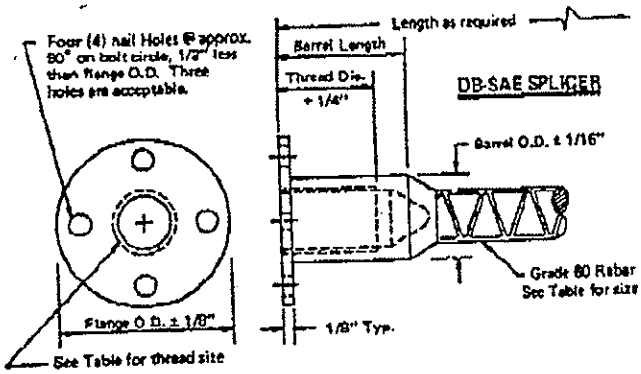
The Richmond Dowel Bar Splicer System, consisting of the Dowel Bar Splicer (DB-SAE) and Dowel-In (DI), shall be used in splicing of rebar. The Dowel Bar Splicer (DB-SAE) shall be forged from ASTM A615 Grade 60 deformed rebar material, free of external welding or machining. It shall be furnished with an integral nailing flange and threaded with UNC or UN thread to a depth equal to 1.0 times the nominal thread diameter plus ¼". The Dowel-In (DI) shall be fabricated from ASTM A615 grade 60 deformed rebar material with thread corresponding to the DB-SAE Splicer. The completed splice, utilizing the Dowel Bar Splicer and Dowel-In shall meet 150 percent of the specified bar yield strength (fy) exceeding tensile requirements of American Concrete Institute (ACI) Specification 318, "Building Code Requirements for Reinforced Concrete" and the Corp of Engineers Specification CW-03210, "Civil Works Construction Guide Specification for Steel Bars, Welded Steel Wire Fabric and Accessories for Concrete Reinforcement."

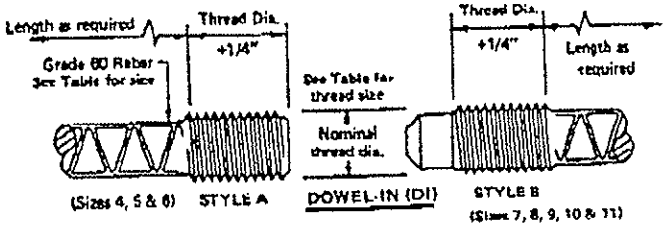
Compliance

Richmond Dowel Bar Splicer System complies with the following standards, guides, codes and/or specifications:

- American Concrete Institute ACI 318
- International Conference of Building Officials (ICBO) Report #4028
- City of Los Angeles Research Report RR24518
- State Departments of Transportation
- Corp of Engineers Specification CW03210
- Concrete Reinforcing Steel Institute

Splicer Dimensions

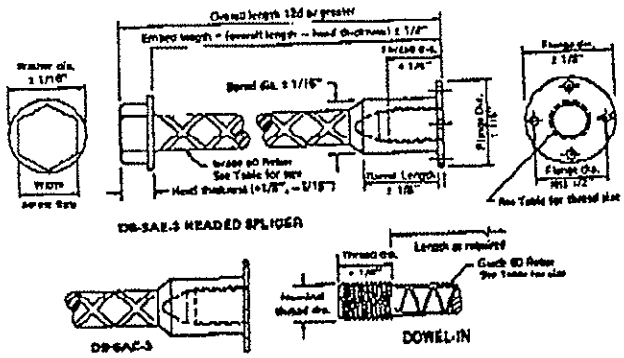




DB-SAE SPLICER					DOWEL-IN (DI)	
Bar Size	Thread Size	Barrel Length	Barrel O.D.	Flange O.D.*	Bar Size	Thread Size
# 4	5/8 - 11UNC	1-1/4"	7/8"	1-7/8"	# 4	5/8 - 11UNC
# 5	3/4 - 10UNC	1-1/2"	1"	2"	# 5	3/4 - 10UNC
# 6	7/8 - 9UNC	1-3/4"	1 1/4"	2-3/8"	# 6	7/8 - 9UNC
# 7	1 - 8UNC	1-15/16"	1-3/8"	2-1/2"	# 7	1 - 8UNC
# 8	1-1/8 - 8UN	2-1/16"	1-9/16"	2-1/2"	# 8	1-1/8 - 8UN
# 9	1-1/4 - 8UN	2-1/4"	1-11/16"	2-3/4"	# 9	1-1/4 8UN
#10	1-7/16 - 8UN	2-5/8"	1-15/16"	3"	#10	1-7/16 - 8UN
#11	1 9/16 - 8UN	2-11/16"	2-1/8"	3-1/8"	#11	1-9/16 - 8UN

*DB-SAE Splicer may be manufactured with reduced flange.

TABLE 4: DB-SAE Splicer and Dowel-In Dimensions



DB-SAE-3 HEADED SPLICER						HEX HEAD		
Bar Size (d)	Thread Size	Barrel Length	Barrel Dia.	Flange Dia.	Minimum Capacity* (12d)	Width Across Flats	Washer Dia.	Head Thk.
# 4	5/8"-11UNC	1-1/4	7/8	1-7/8	18,000	7/8	1-3/8	1/2
# 5	3/4"-10UNC	1-1/2	1	2	27,900	7/8	1-5/8	1/2
# 6	7/8"-9UNC	1-3/4	1 1/4	2-3/8	39,600	1-1/16	1-7/8	5/8
# 7	1"-8UNC	1-15/16	1-3/8	2-1/2	54,000	1-1/16	2	5/8
# 8	1-1/8"-8UN	2-1/16	1-9/16	2-1/2	71,100	1-5/16	2-1/8	5/8

*- Normalized for 3,000 psi normal weight concrete and restricted to mechanical capacity of bar and further limited to Dowel-In capacity.
d - Nominal diameter of bar.

TABLE 5: DB-SAE-3 Headed Splicer Dimensions

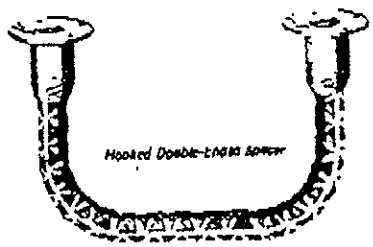
DB-SAE-3 Bar Sizes	Edge (Shear)* (12d)	Edge (Tension)* (5d)	Spacing (19d)
# 4	6.0"	2.5"	9.0"
# 5	7.5"	3.125"	10.0"
# 6	9.0"	3.750"	12.0"
# 7	10.5"	4.375"	14.0"
# 8	12.0"	5.000"	16.0"

* Shear and tension refers to the loading condition. If the Dowel-In is subjected to both shear and tension loading, the edge distance for shear will govern.

TABLE 6: DB-SAE-3 Headed Splicer Setting

Miscellaneous Components

Hooked Double-Ended Splicer



Hooked Double-Ended Splicer is used to alleviate restrictive concrete space envelopes, such as narrow beams and columns, etc. Other applications may be performed, i.e., insert or anchor cages for attaching sign posts, light poles or other structural fittings. These units may be laced together to provide patterns for 2, 4 or more bolts.

Thread-Ended Splicer

The Thread-Ended Splicer is used to provide a continuous mechanical splice connector to insure reinforcement continuity. The mechanical connector suitable for attaching to the thread end is shown in Table 7, Coupler Selection Guide.

DELTA TESTING LABO
23 SOUTH MACQUESTEN PARKWAY • MOUN
PHONE: (914) 699-0056 • FAX

Post-it® Fax Note 7671	Date 6/23	pages 3
To FRANK BARBELLA	From D. Reitenbach	
Co./Dept. BARBELLA	Co. DEL	
Phone #	Phone #	
Fax # 908-534-1697	Fax #	

SLURRY MIXING PLANT

DESIGN MIX REPORT

L-138_02168

Date: June 23, 1994

02168

Project No. KD-1

CLIENT: Barbella Environmental Technology, Inc.
P.O. Box 273
Salem Industrial Park, Bldg. 8
Whitehouse, NJ 08888
Att: Mr. Fred Barbella

PROJECT: Pelham Bay Landfill Remediation, NYC

SUBJECT: **Trial Mix Design in accordance with NYC Building Code Section C27-605.**

STRENGTH REQUIRED: 4000 + 1200 psi @ **28 days**

SUPPLIER: Casa Redimix Concrete Co.

MATERIALS: Typical as submitted by supplier:

CEMENT:	Norval Type II (Cal. No. 236-59-SM)
FINE AGGREGATE:	L.I. Natural
COARSE AGGREGATE:	New York Traprock, Clinton Point
ADMIXTURE:	W.R. Grace Daravair Air Entrainment
ADMIXTURE:	W.R. Grace WRDA Hycol - Water Reducer

PASSING SIEVE SIZE	F.A. (sand)	C.A. (#67 stone)
1"	—	100
3/4"	—	97.6
3/8"	100	21.3
#4	96.3	4.8
#8	81.5	—
#16	71.5	—
#30	51.1	—
#50	26.6	—
#100	7.7	—
Fineness Modulus	2.71	6.76
Specific Gravity	2.64	2.81
Unit Weight Dry Rodded	105.6#	99.0#

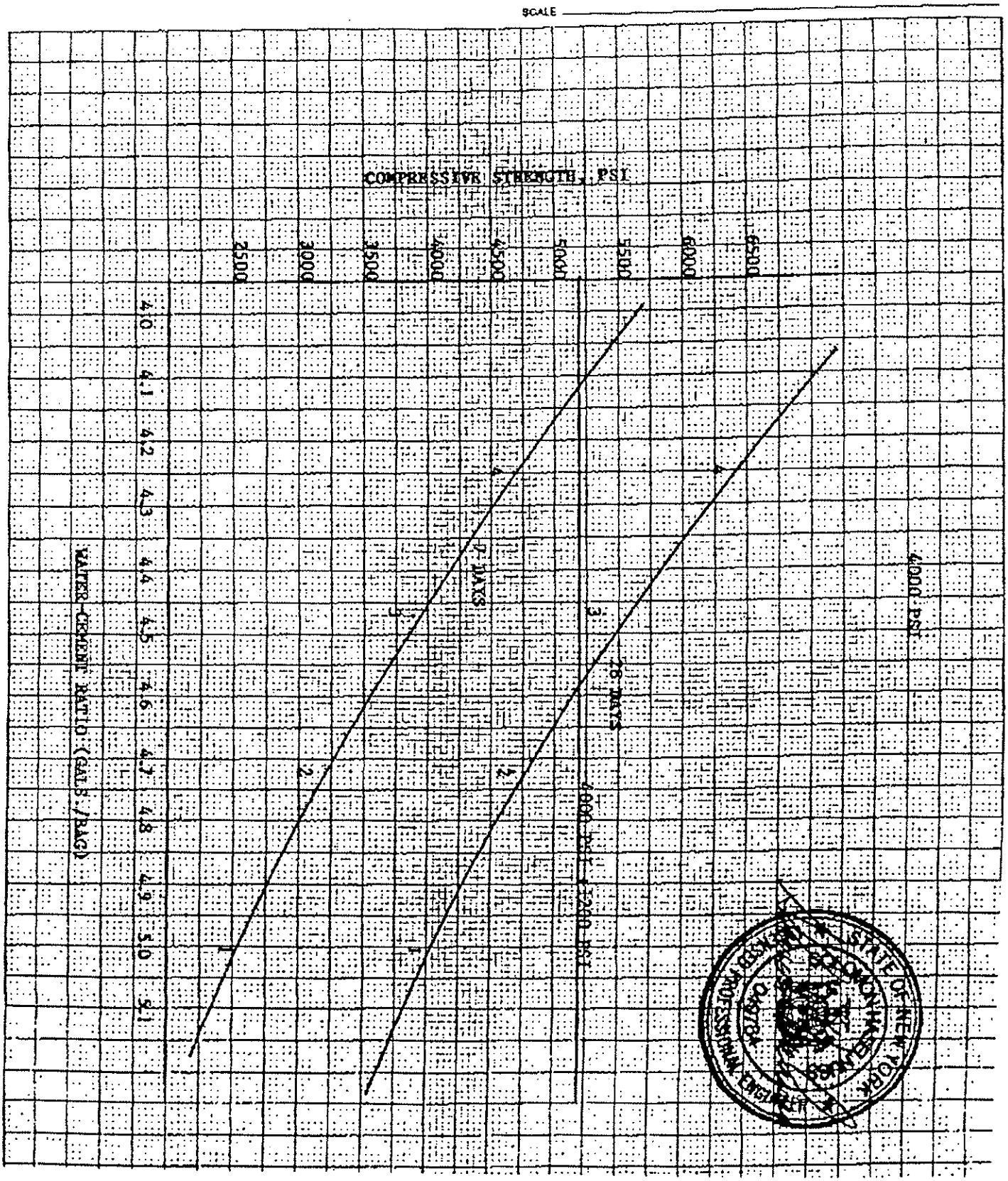
STATE OF NEW YORK — CLINTON HASELTON — LICENSED PROFESSIONAL ENGINEER

cc: bet(2),file,blg.

F-5

DELTA TESTING LABORAT RIES, INC.
23 South MacQuesten Parkway
Mount Vernon, New York 10550
Phone: (914) 699-0056

PROJECT PELHAM BAY LANDFILL REMEDIATION, NYC
SHEET NO. 3 OF 3
CALCULATED BY SH DATE 6/23/94
CHECKED BY DATE
SCALE



DELTA TESTING LABORATORIES, INC. **Project No.** KD-1

Date: 6/23/94

WEIGHTS PER CUBIC YARD

	1	2	3	4
Cement, lbs.	564	611	658	705
Sand, lbs.	1380	1310	1250	1240
Stone, lbs.	1800	1800	1800	1800
Total Water, gals. (lbs.)	30.1(250.7)	30.7(255.7)	31.3(260.7)	31.9(265.7)
Admix. DARAV. **oz.***	4.8	5.2	5.6	6.0
Admix. WRDA **oz.***	16.9	18.3	19 7	21 2
Air Content, %	5.5	6.0	6.5	6.5
Slump, inches	3.0	3.5	3.75	4.0
Unit Weight, #/c.f.	147.95	147.29	146.99	148.54
W/C Ratio, gals./bag	5.02	4.72	4.47	4.25
lbs./lbs.	.44	.42	.40	.38

***Based on manufacturer's recommendations**

COMPRESSIVE STRENGTHS

7 Days PSI	3000	3930	3840	4730
	3010	3400	3910	4640
Average	3005	3395	3875	4685
28 Days PSI	4200	4640	5310	6370
	4220	4780	5380	6510
	4340	4710	5420	6460
	4270	4680	5330	6430
Average	4260	4700	5360	6440

Based on the above results, we suggest mix # 3, for 4000 psi concrete +1200 psi.

DEP

New York City
Department of
Environmental
Protection

Bureau of
Environmental
Engineering

96-05 Horace Harding
Expressway
Corona, NY
11368-5107
718-595-6001

Marilyn Gelber
Commissioner

GLEN E. VOGEL, P.E.
Deputy Commissioner

July 1, 1994

Re: Contract 875 H.P.
Pelham Bay
Landfill Remediation
Concrete Mix Design

BARBELLA
Environmental Technology, Inc.
P.O. Box 273, Salem Industrial Park,
Whitehouse, New Jersey 08888

Attention: Mr. Michael Lattiers
Project Manager

Gentlemen:

Reference is made to your Letter of Transmittal, dated 6/23/94, (telefaxed copy received on 6/29/94) requesting approval of Normal Weight (4000 psi + 30%), Size #67 Coarse Aggregate, Concrete Mix for approval. We have reviewed the four trial runs of this mix that were run at the approved Delta Testing Laboratories, Inc.. Mix Run #3 is approved for use on the referenced contract as follows:

Normal Weight 875 H-P (Run #3)

Materials	Weight, per cubic yard
Cement, Norval, Type II ASTM C150:	658 Lbs.
Fine Aggregate, SSD L.I. Natural: (ASTM C33)	1250 Lbs.
Coarse Aggregate, SSD N.Y. Trap Rock (ASTM C33) Clinton Point:	1800 Lbs.
Admixtures	
1. Air Entraining Agent, WR Grace Daravair, 6.5% (ASTM C260) and (ASTM C185)	5.6 oz,
2. WRA, WR Grace WRDA Hycol ASTM C494, Type A:	19.7 oz.

Slump, in. (ASTM C187)	3.75 in.
Unit Weight, pcf	146.99 pcf
Water Cement Ratio	
gals/Bag	4.47
Lb/Lb	0.40
Yield, cu. ft.	27.13

Compressive Strength, psi
(ASTM C109)

7 day, Average of 2 cylinders:	3875 psi
28 day, Average of 4 cylinders:	5360 psi

Please note that the mix as indicated above is approved subject to full compliance with the pertinent specifications of the contract.

Very truly yours,

ORIGINAL SIGNED BY

George Cakiades, P.E.
Chief, Division of Safety
and Materials Assurance

JPS/GC/im

xc: Ramaglia/Durig
Gordon
Gelfand/Meakin
Ciancia (Woodward Clyde)
Cakiades
Bhagtani
Stein
Sehgal
File

National Brand 45-605 Eye-Ease® 45-305 2-Pack Made in USA

875-HP TELHAM ROAD

REINFORCED SLAB FOR SLURRY WALL CAP

CONSTRUCTION DETAILS

	Initials	Date
Prepared By		
Approved By		

BARBELLA ENVIRONMENTAL TECHNOLOGY, INC

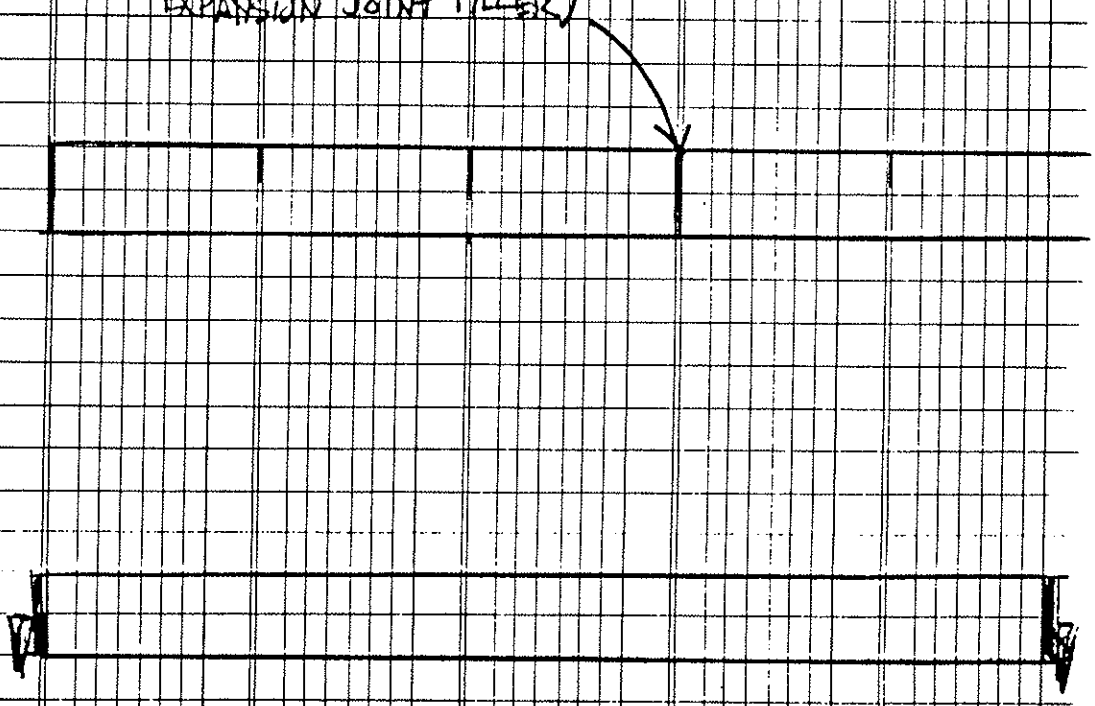
FORMWORK - WOODEN, STAKED & PINNED @ SLAB EDGES

FINISH - SCREED, FLOAT, TROWEL, BROOM

MATERIALS - CONCRETE IN ACCORDANCE WITH NYC BUILDING CODE SECTION C27-605
4000 PSI @ 28 DAYS

CONSTRUCTION JOINTS:
MAXIMUM SPACING @ 20' by SAWCUT METHOD @ 3/4" DEEP

AT 60' INTERVALS USE HORNBOARD (ASPHALT IMPREGNATED EXPANSION JOINT FILLER)



10/7/94

Slurry wall Construction.

BENTONITE Corporation

BARA-KADE® 90
Slurry Trench Soil Sealing Grade - 200 Mesh

Typical Physical and Chemical Properties*

X-RAY ANALYSIS

94%	Montmorillonite
4%	Quartz
1%	Feldspars
1%	Calcite

CHEMICAL ANALYSIS

SiO_2	63.31%
Al_2O_3	21.43%
Fe_2O_3	3.83%
CaO	0.63%
MgO	2.32%
Na_2O	2.45%
K_2O	0.31%
Bound Water	5.72%

SCREEN ANALYSIS	TYPICAL	SPECIFICATION
Dry Screen, percent minus 200 mesh	77	70 min
Wet Screen, percent plus 200 mesh	1.9	4 max
Wet Screen, percent plus 325 mesh	3.2	5 max

SLURRY PROPERTIES (6% Suspension)

Viscosity, FANN® 600 rpm	37	30 min
Apparent Viscosity, cps	18.5	
Plastic Viscosity (PV)	12	
Yield Point, lb/100 ft^2	13	3 x PV max
Filtrate, 30 minutes @ 100 psi	12	15.0 cm^3 max
Yield - 42 gal bbl of 15 cps slurry/ton	95	91 min
Filter Cake	3/32	
Marsh Funnel, seconds/quart	36	

OTHER PROPERTIES

Moisture, percent	8.0	10 max
Free Swell (ml)	25	
Specific Gravity	2.79	
pH, 6% suspension	9.2	
Bulk Density (lbs per ft^3) compacted	72	

* The typical physical and chemical values listed are not to be construed as rigid specifications. Metals listed in the chemical analysis are complexed in the mineral. They do not necessarily exist as free oxides.
BARA-KADE® 90 meets or exceeds API specification 13A, Section 4.

11/4/93.tpcp.23

1999 Broadway, Suite 4300 - Denver, Colorado 80202 - Phone (303) 291-2940 - Fax (303) 291-2950

DEP

New York City
Department of
Environmental
Protection

Bureau of
Environmental
Engineering

96-05 Horace Harding
Expressway
Corona, NY
11368-5107
718-595-6001

Marilyn Gelber
Commissioner

GLEN E. VOGEL, P.E.
Deputy Commissioner

July 1, 1994

Re: Contract 875 H.P.
Pelham Bay
Landfill Remediation
Concrete Mix Design

BARBELLA
Environmental Technology, Inc.
P.O. Box 273, Salem Industrial Park,
Whitehouse, New Jersey 08888

Attention: Mr. Michael Lattiers
Project Manager

Gentlemen:

Reference is made to your Letter of Transmittal, dated 6/23/94, (telefaxed copy received on 6/29/94) requesting approval of Normal Weight (4000 psi + 30%), Size #67 Coarse Aggregate, Concrete Mix for approval. We have reviewed the four trial runs of this mix that were run at the approved Delta Testing Laboratories, Inc.. Mix Run #3 is approved for use on the referenced contract as follows:

Normal Weight 875 H-P (Run #3)

Materials	Weight, per cubic yard
Cement, Norval, Type II ASTM C150:	658 Lbs.
Fine Aggregate, SSD L.I. Natural: (ASTM C33)	1250 Lbs.
Coarse Aggregate, SSD N.Y. Trap Rock (ASTM C33) Clinton Point:	1800 Lbs.
Admixtures	
1. Air Entraining Agent, WR Grace Daravair, 6.5% (ASTM C260) and (ASTM C185)	5.6 oz,
2. WRA, WR Grace WRDA Hycol ASTM C494, Type A:	19.7 oz.

Slump, in. (ASTM C187)	3.75 in.
Unit Weight, pcf	146.99 pcf
Water Cement Ratio	
gals/Bag	4.47
Lb/Lb	0.40
Yield, cu. ft.	27.13

Compressive Strength, psi
(ASTM C109)

7 day, Average of 2 cylinders:	3875 psi
28 day, Average of 4 cylinders:	5360 psi

Please note that the mix as indicated above is approved subject to full compliance with the pertinent specifications of the contract.

Very truly yours,

ORIGINAL SIGNED BY

George Cakiades, P.E.
Chief, Division of Safety
and Materials Assurance

JPS/GC/im

xc: Ramaglia/Durig
Gordon
Gelfand/Meakin
Ciancia (Woodward Clyde)
Cakiades
Bhagtani
Stein
Sehgal
File

875-HP TELHAM BOILER REINFORCED SLAB FOR SLURRY WALL CAP CONSTRUCTION DETAILS

	Initials	Date
Prepared By		
Approved By		

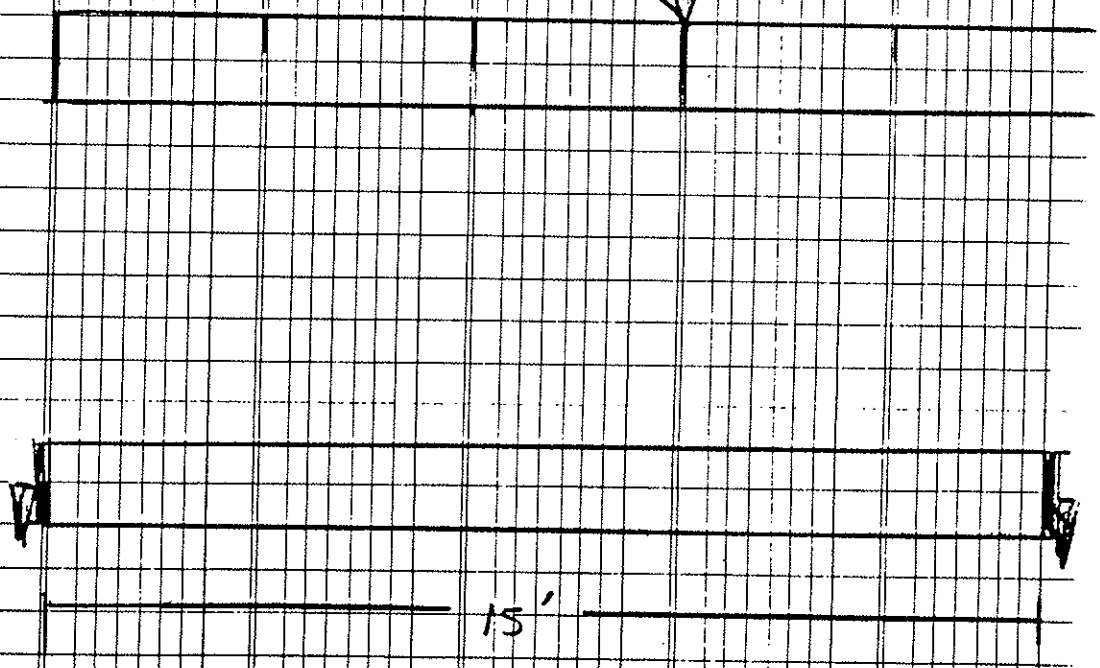
BARBELLA ENVIRONMENTAL TECHNOLOGY, INC

FORMWORK - WOODEN, STAKED & PINNED @ SLAB EDGES

FINISH - SCREED, FLOAT, TROWEL, BROOM

MATERIALS - CONCRETE IN ACCORDANCE WITH NYC BUILDING CODE SECTION C2T-605
4000 PSI @ 28 DAYS

CONSTRUCTION JOINTS:
MAXIMUM SPACING @ 20' by SAWCUT METHOD @ 3/4" DEEP
AT 60' INTERVALS USE HORNBOARD (ASPHALT IMPREGNATED EXPANSION JOINT FILLER)



10/7/94

Date: 10/5/94
Calculations by: MA
Checked by:
Date checked:

Project: Barbella Enviromental Technology Road
* PELHAM BAY LANDFILL

Given: #4 @ 18", Grade 60

$.20 in^2 \times \frac{60}{75} = .16 in^2 \times \frac{12}{18} = .107 in^2$

Equals: D11 @ 12", Grade 75

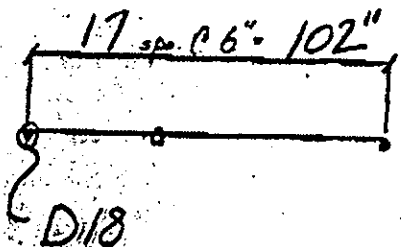
Given: #6 @ 12", Grade 60

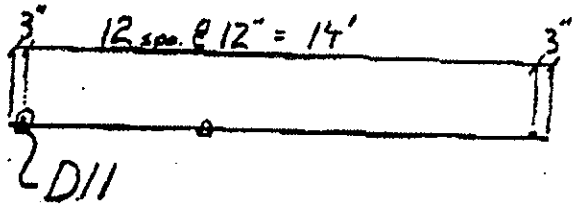
$.44 in^2 \times \frac{60}{75} = .352 in^2 \times \frac{6}{12} = .176 in^2$

Equals: D18 @ 6", Grade 75

Sheet Style: 6" x 12" D18/D11 8'-6" x 14'-6" (3.3)

Sheet Sketch:



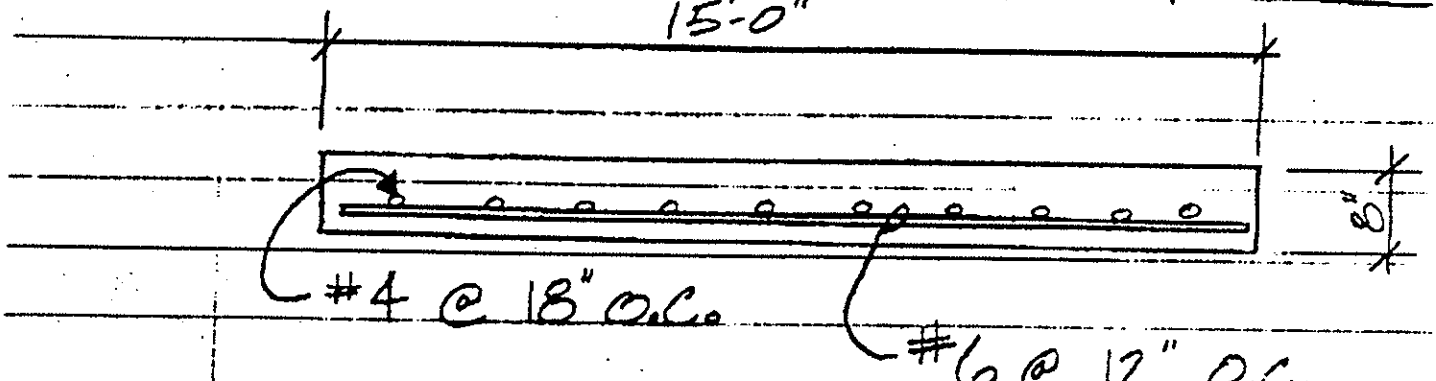


Structural Reinforcement

Roadway For:

Baebella Environmental Technology

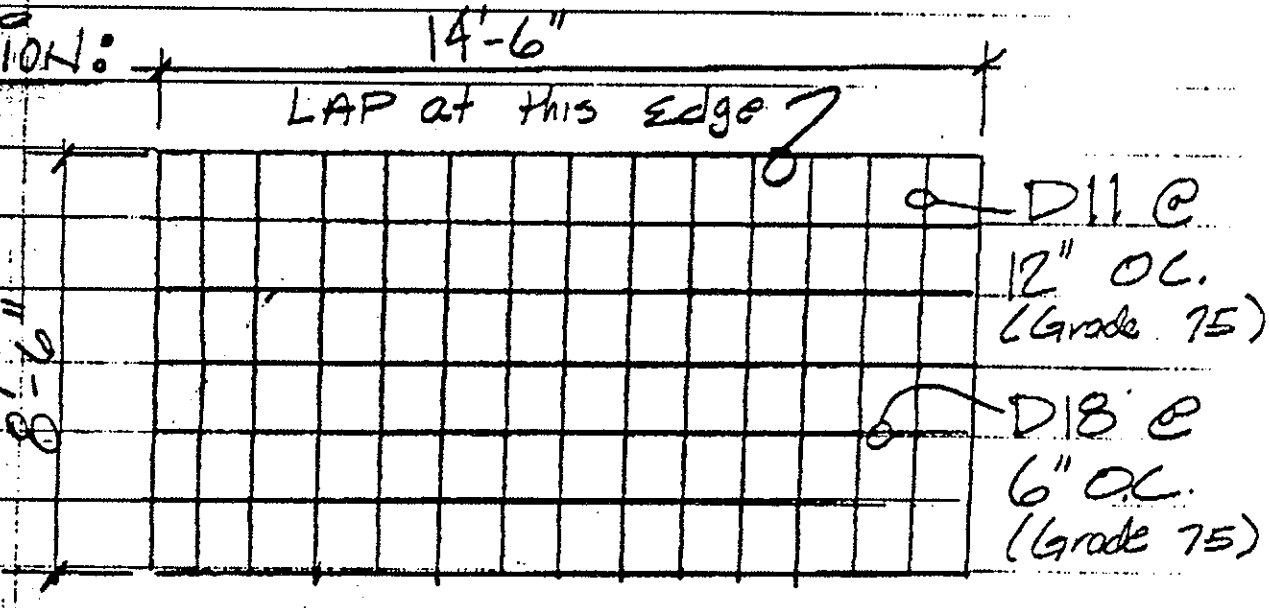
* Pelham Bay Landfill



Total of 1350 LF of this slab.

REBAR ON PLANS

CONVERSION:



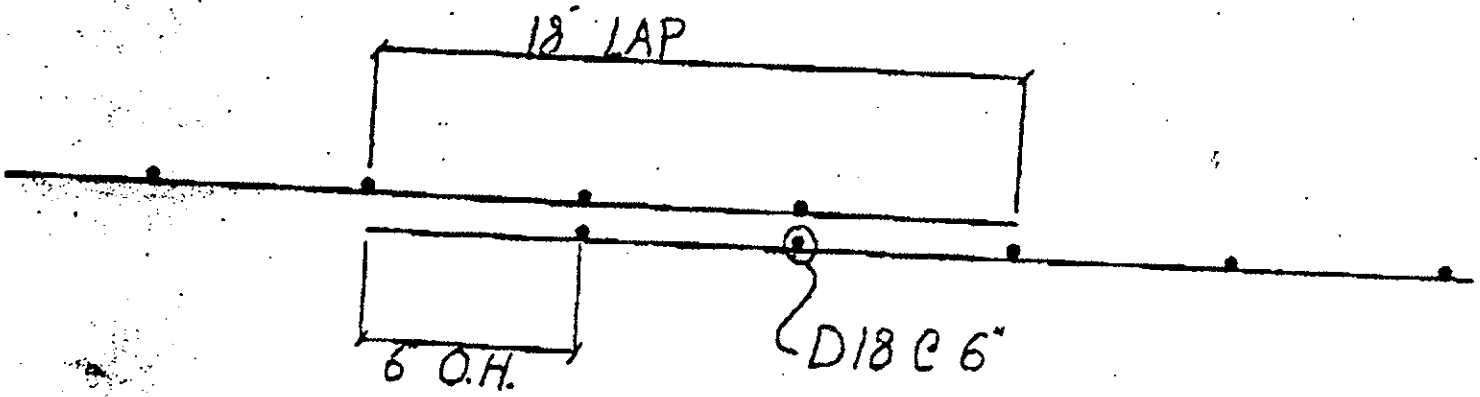
TOTAL - D11 x D18

DETAIL OF MAT

Date:
Calculations by:
Checked by:
Date checked:

* BARBERA ENVIRONMENTAL
- PELHAM BAY LANDFILL

18" LAP SPLICE DETAIL



Structural Reinforcement

HORN INC

HORNBOARD

Asphalt Impregnated Fiber Expansion Joint Filler

DESCRIPTION

HORNBOARD Asphalt impregnated Fiber Expansion Filler is composed of tough, resilient, cellulose fibers securely bonded together with a uniform impregnation of bituminous binder and performed into strips or sheets. The material is strong but lightweight; cuts and handles easily; resists breakage. It will not extrude from the joint under normal compression and service temperatures, and does not embrittle in cold weather.

Installation is easy: HORNBOARD will not twist, break or deform with ordinary handling. It cuts cleanly, places readily, stays strong and sound through many years of repeated expansion / contraction cycles.

USE

HORNBOARD is a general, multi-purpose filler for expansion joints in all types of heavy concrete construction. It is specifically engineered for commercial, industrial and public works applications.

LIMITATIONS

HORNBOARD should not be used in conjunction with polysulfide, acrylic or other polymer-base joint sealants.

SPECIFICATIONS

Designed to comply with:
AASHTO Spec. M 213-74
ASTM Spec. D 1751-83
Fed. Spec. H H-F-341f, Type I
Corps of Engineers Spec. CRD C 508-72
FAA Spec. P 501-2.4 & P610-2.7 (1968)

SIZES

Lengths: 10' & 5'
Widths: 3" to 48" in 1/2" increments
Thickness: 3/8", 1/2", 3/4", 1"

B-1085-21

A.C. Horn Inc.
Atlanta, Dallas, Los Angeles, Passaic, NJ
Bensenville, IL, Beltsville, MD

HEADQUARTERS: 12116 CONWAY ROAD, BELTSVILLE, MD 20705-1302
TELEPHONE: (301) 470-3377 TOLL FREE: 800-654-0402

591 Printed in USA

Slurry wall Construction.

BENTONITE Corporation

BARA-KADE® 90
Slurry Trench Soil Sealing Grade - 200 Mesh

Typical Physical and Chemical Properties*

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