

PREPURCHASE SPECIFICATION
FOR
VACUUM PUMP PACKAGE - DISTILLATION MECHANICAL PLANNER FILE

Project No.: 004707.02	LOCKWOOD GREENE EQUIPMENT DATA SHEET FOR VACUUM PUMP PACKAGE	By: B. Sahawneh
Owner: Bayer		Date: 11-7-97
Specification No.: P-34B		Equipment No.: 0242-37-285,
Distillation Area Vacuum Pump Package		0242-37-286, 0242-32-287, 0242-19-291, 0242-22-292
Vendor to Furnish: <input checked="" type="checkbox"/> Pump <input checked="" type="checkbox"/> Separator <input checked="" type="checkbox"/> Heat Exchanger <input checked="" type="checkbox"/> Valves, piping & inst.		

GENERAL		MATERIALS	
Number Required:	2 vac pumps, 1 heat exch, 1 separator, 1 ANSI pump	Casing:	Ductile Iron
Operating:	1	Impeller:	Ductile Iron
Spare:	1	Shaft:	Steel with Alloy Sleeve
Service:	Distillation Area Vacuum Pump**	Separator:	CS
PROCESS DATA		Shaft Sleeve:	316 SS
Gas:	9.2 mole % water vapor; balance air	Heat Exchanger:	316L SS shell/316L SS tubes
Molecular Weight:	28 avg	CONSTRUCTION	
Suction Temperature:	44.5°C	Type Seal:	Crane Type 9
Weight % solids:	Nil	Seal Piping:	API Plan 11
Seal liquid:	Water	Bearings:	Greased
Viscosity:	approx. 0.02 mPas (cP)	Coupling:	Bayer Spec 5.2.1
Heat Exchger Coolant:	Water	Coupling guard:	OSHA Approved
Coolant Inlet Temp:	29.4 °C	Base plate:	Structural CS
Coolant Outlet Temp:	35 °C	Vents/Drains:	1/2" NPT casing & base plate
Coolant Inlet Press:	4 bar	DRIVER	
PERFORMANCE		Motor HP:	30 HP, 286T frame
Design Capacity:	510 m ³ /hr / 300 ACFM	Volts/Phase/Hertz:	460/3/60
Discharge Head:	0.96 bar / 28.44 in Hg	RPM/BHP:	1800
Suction Head:	101.2 mbar / 3.00 in Hg	Enclosure:	TEFC High Efficiency
Total Head:	0.859 bar / 25.44 in Hg	NEMA Design:	B
No. of Stages:	1	Insulation Class:	F
Seal Liquid Rate:	8 gpm	Ambient Temperature:	100°F
DESIGN		Service Factor:	1.15
Pump Type:	Liquid Ring	Hazard Classification:	Class I, Div. II, Group D
Class of Pump:	Vacuum Pump	REMARKS	
Impeller Type:	Closed	** Skid to include inlet pressure transmitter/switches, two inlet isolation valves with pneumatic actuators and solenoid valves, two diff pressure switches, two pressure gages and a duplex panel unit. Include bypass pressure control valve between separator and inlet. Provide solenoid valves, sight glasses, PI/TI with temp transmitter on seal water inlet for modulating control of cooling water outlet, separator to include LT and LI with auto valve for pump out and inlet make-up solenoid.	
Impeller Diameter:	Proprietary		
RPM:	1600		
Inlet Connection:	125 lb. FF		
Discharge Connection:	125 lb FF		
Design Pressure:	3.5 bar / 50 psig		
Design Temperature:	93.3°C / 200°F		
Site Altitude:	46 ft above sea level		

Issue:	Date:	Released for:	LG Approval:	Client Approval:
0	2-26-98	Initial Issue	CPL	
1	6-1-98	Purchase	WH	
2	2/26/99	Update for Change Order	<i>[Signature]</i>	

PUMP MODEL

MARK III <REV. VANE> 1K1.5X1-82RV
SIZE GROUP 1K
ANSI NO. AA
WEIGHT 103
DCI

CASING

ALLOY DCI
STANDARD
150FF FLANGE
TAP I 1/2"
TAP III 1/4"

REAR COVER/STUFFING BOX

ALLOY DCI
SEALSENTRY - FML
COVER GASKET TM

IMPELLER

TRIM 5.5 MAX: 8.1875
REVERSE VANE DCI
IMPELLER GASKET <GRAFOIL>
<SPECIAL PRICING AUTHORIZATION: P.B. >

SHAFT

FRICTION WELD SHAFT ZH<1018/316>

BEARING HOUSING

MARK IIIA-DCI2 DUCTILE CAST IRON
OIL BRGS. OPEN

SEAL

GROUP 1K UNBALANCED
CRANE MOUNTED BY DURIRON
SINGLE. INT. O-RING CBL OR FML BOX
TYPE 9T 316SS
Q/X5 F31 1 C 1 316SS
ROTARY CARBON
SEAT CERAMIC
SEAT MOUNTING KALREZ O-RING
SHAFT PACKING TEFLON
METAL PARTS 316SS
SET SCREWS/SPRINGS 316SS
SEAL GLAND BY FLOWSERVE
316SS W/FLUSH TAP
<SPECIAL PRICING AUTHORIZATION: P.B. >

BYPASS LINE

ANSI PLAN 7311
1/4" SS TUBING
TAP III TO TAP VIII

MOTOR

HORIZONTAL-RELIANCE FURN. & MTD. BY DURCO
DIV 2.XEX.CL1.GPS C&D.T3A 1.15 SF. CLASS F INS.
1800 RPM
3 HP 182T,3/60/230/460
WINDING THERMISTORS
ROUTINE MOTOR TEST
VIBRATION TEST
BREATHING DRAIN
<SPECIAL PRICING AUTHORIZATION: N1017 >

BASE

TYPE A - STANDARD FOUNDATION MTD
SIZE #139 WGT 111#
STEEL
STD MTG HARDWARE SS SHIMS <MOTOR ONLY>

COUPLING

WOODS - SPACER SURE-FLEX TYPE "SC"
SC5
GROUP I - GUARD STEEL

CUSTOMER:

THE NASH ENGINEERING COMPANY
700 MCKEESPORT ROAD
ELIZABETH, PA 15037
USA

DESTINATION:

BAYER CORPORATION
Asset No.: 0019325800
TAG NUMBER 242-19-291

QUANTITY

1

INQUIRY NO

FAX: LOU ANN SCALISE

JOB/PROJ NO

BAYER

REQUEST DATE

12/31/98

TERRITORY

PITTSBURGH

SALES REP

RICH HOLBERT

PREPARER

RICH HOLBERT

SERVICE REP

CYNTHIA HAGANS

MECHANICAL PLANNER FILE

OPERATING CONDITIONS

CAPACITY	10 gpm	2.3 cu m/h
TDH REQUIRED	33 ft	10.1 m
TDH OFFERED	33 ft	10.1 m
hp/kW	.5 hp	.3 kW
hp/kW MAX	.8 hp	.6 kW
NPSH AVAILABLE		
NPSH REQUIRED	1.6 ft	.5 m
SUCT PRESSURE		
CURVE NO	M37042AV	
FLUID PUMPED	SEAL WATER	
TEMPERATURE		
CONCENTRATION		
SOLIDS PERCENT		
SOLIDS DESC		
VISCOSITY	1.0 cP	1.0 cP
SPEC GRAVITY	1.00	1.00

DOCUMENTATION REQUIRED

QTE APP REV FIN
C/R C/R C/R C/R

SENT BY: DAYTON
DATE NEEDED: 12/23/98
DATA SHEETS 1/ 1
PUMP DIMENSIONAL DRAWING 1/ 1
PUMP CURVE 1/ 1
SEAL DRAWING 1/ 1
ANSI FLUSH PLAN 7311 1/ 1
MOTOR DRAWING 1/ 1
ROUTINE MOTOR TEST REPORT 1/ 1
MOTOR VIBRATION TEST REPORT 1/ 1
IOM MANUALS 10
SEND FINAL CERTIFIEDS TO:
NASH US
ATTENTION: ROB PETRICK
700 MCKEESPORT ROAD
ELIZABETH, PA 15037

Project No. 004707-02
Lockwood Greene Engineers, Inc.
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FILE P-34B-8
ACK. AW

DURCO ORDER

WCP22029

CUSTOMER PO

NKI-137560

SERIAL NUMBER

454835

PROMISE DATE



PRIME SET



TYPE SIZE ALLOY FLANGE TYPE TYPE A	MARK III 1K1.5X1-82 DCI 150FF TYPE A	WEIGHT 103 (47)
BASEPLATE TYPE SIZE	139 REL. 1.82T 3/1600 3/60/230/460 CRANE	111 (50)
DRIVER MFG. HP/IRPM PH/Hz/VOLTS MFG. TYPE	RELIANCE 3/1600 3/60/230/460 CRANE	86 (39)
SEAL MFG. TYPE	WOODS - SPACER SC5	
COUPLING MFG. TYPE		

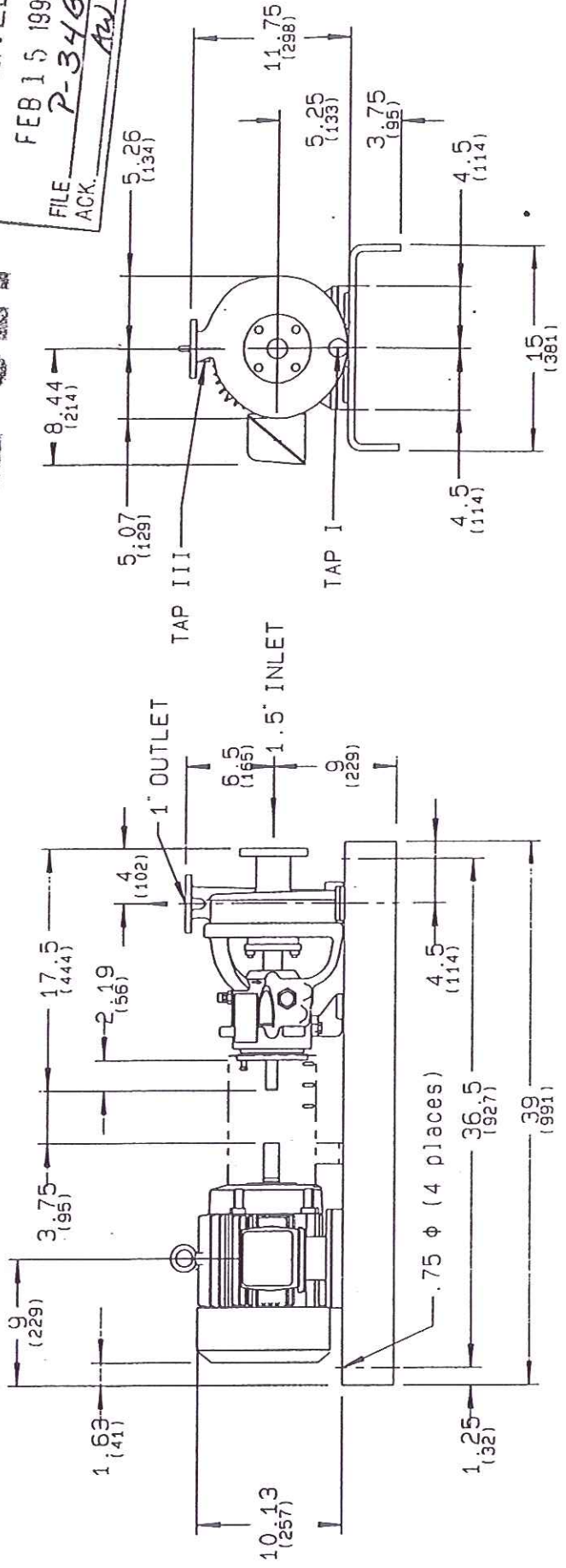
MAX. FORCES & MOMENTS COMBINED AT CENTER OF PUMP					
FX	FY	FZ	MX	MY	MZ
120 (534)	295 (1312)	235 (1045)	590 (800)	295 (400)	295 (400)
FLANGE LOADING					
FR+MR/3 (SI UNITS FR+1.09MR)					
SUCTION DISCHARGE					
325(1445) 220(978)					

THE NASH ENGINEERING COMPANY	
P. O. NO.	NK1-137560
TAG NO.	242-19-291
SERVICE	A SEAL WATER
ORDER NO.	WCP22029
SERIAL NO.	454835
QUOTE NO.	P1980069300
LINE ITEM	001-00-01

TOTAL WEIGHT 300 (136)

Project No. 004701-02
 Lockwood Greene Engineers, Inc.
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PRIME SET



INSTALLATION DIMENSIONS ARE .13 (3) UNLESS OTHERWISE NOTED. DIMENSIONS ARE IN INCHES (MILLIMETERS). FORCES ARE IN POUNDS (NEWTONS). MOMENTS ARE IN FOOT-POUNDS (NEWTON-METERS). WEIGHTS ARE IN POUNDS (KILOGRAMS).

PUMP INPUT SHAFT: 0.875 φ PUMP KEYWAY: 3/16 X 3/32
 FLANGE DRILLING PER ANSI B16.5 CLASS 150.

TAP CONNECTIONS	
TAP	DESCRIPTION
I	1/2" CASING DRAIN
III	1/4" DISCHARGE NOZZLE

FINAL DWG BY: <i>J.Sa</i>	DATE: Jan 04 99	ISSUE: 1/199
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Flowserve Corp., Rotating Equipment Division, Dayton, Ohio 5/98

THE NASH ENGINEERING COMPANY
 700 MCKEESPORT ROAD
 ELIZABETH PA 15037



The Duriron Company, Inc.

60 CYCLE MARK III <REV. VANE>
 1K1.5X1-82 DCI
 1750 RPM
 5 - 1/2" IMPELLER

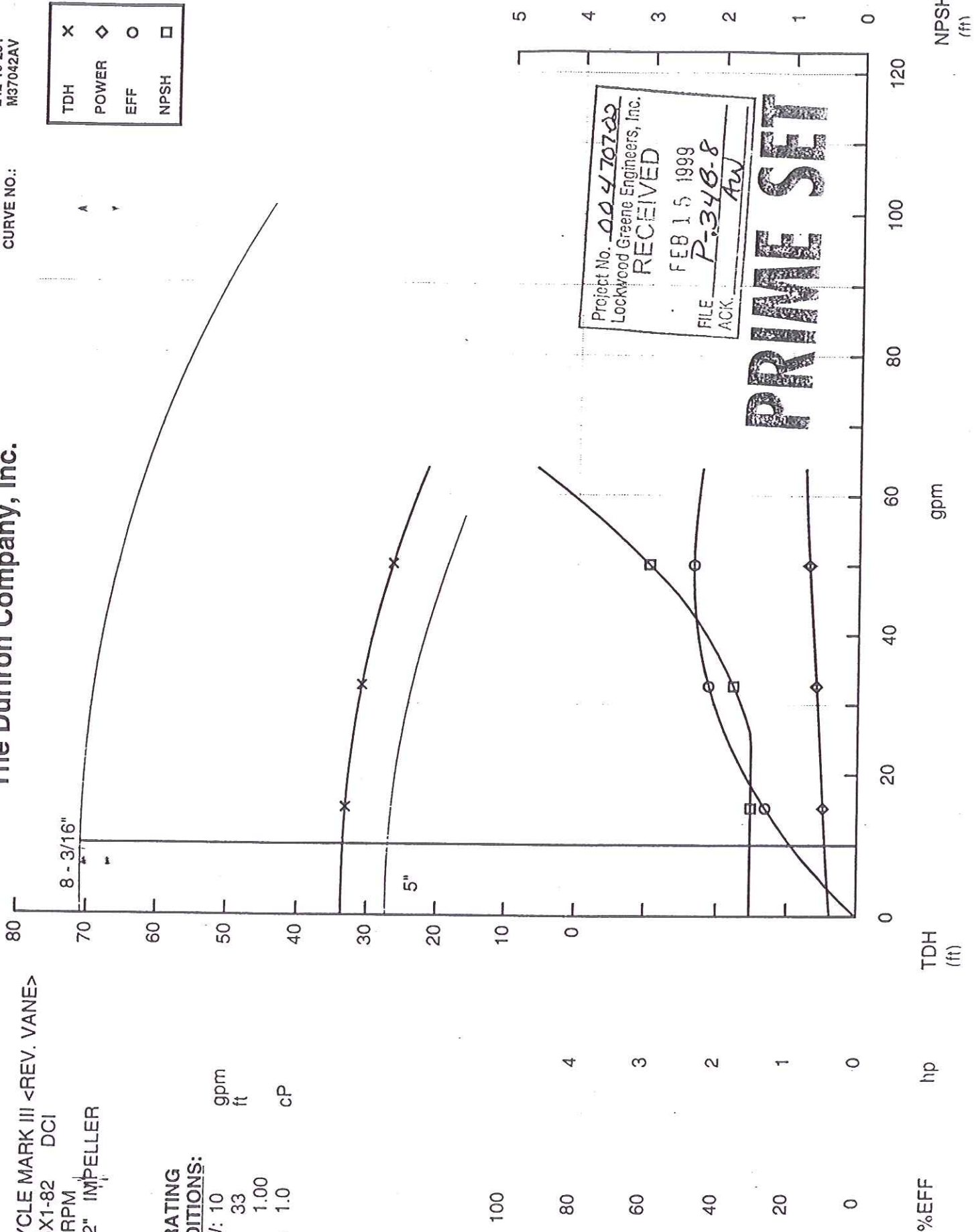
OPERATING CONDITIONS:

FLOW: 10 gpm
 TDH: 33 ft
 S.G.: 1.00
 VISC: 1.0 cP

CUSTOMER NO.:
 QUOTE NO.:
 ITEM NO.:
 TAG NO.:
 CURVE NO.:

002106
 P1980069300
 0010001
 242-19-291
 M37042AV

TDH	X
POWER	◇
EFF	○
NPSH	□



Project No. 00470700
 Lockwood Greene Engineers, Inc.
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PRIME SET

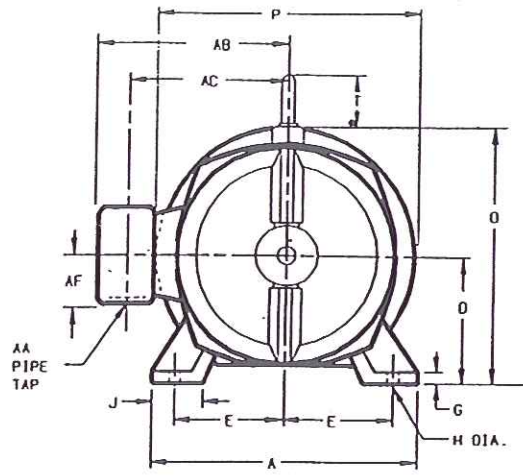
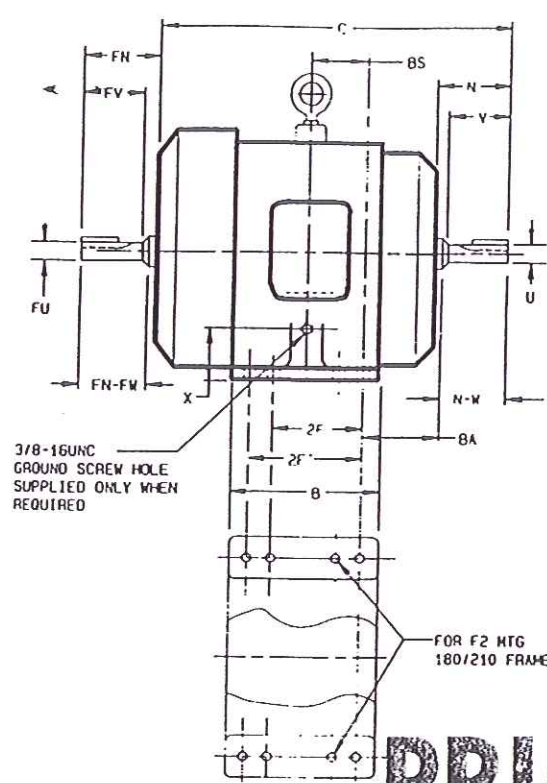
DUTY MASTER ALTERNATING CURRENT MOTORS

SQUIRREL-CAGE INDUCTION
XEX CONSTRUCTION

ENCLOSURE: TOTALLY ENCLOSED
MOUNTING: FOOT

COOLING: FAN COOLED

FRAME SIZE
182T



- * STANDARD FRAMES HAVE 8 HOLES FOR DUAL MOUNTING AND F-2 CONVERSION
- ** LONG FRAMES HAVE 6 HOLES FOR DUAL MOUNTING. NOT SUITABLE FOR F-2 CONVERSION

PRIME SET

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DIMENSIONS ARE IN INCHES

A	D(2)	E	G	H	J	O	P	T	CAST IRON TERMINAL BOX				BA	X
									AA	AB	AC	AF		
9.00	4.50	3.75	0.44	0.44	1.75	9.88	9.50	2.00	1.00	8.44	6.69	2.12	2.75	1.25

C	BS	B	2F	2F'	S.E. SHAFT AND KEY						FRONT END SHAFT AND KEY						WEIGHT LBS. (3)
					N	N-W	U(1)	V	SQ.	LGTH.	FN	FN-FW	FU(1)	FV	SQ.	LGTH.	
15.6	2.75	7.00	4.50	----	3.00	2.75	1.12	2.50	0.25	1.75	3.00	2.75	1.12	2.50	0.25	1.75	86.0

- (1) "U" AND "FU" MAY VARY + .0030, -.0005
 - (2) "O" MAY VARY + .00, -.03
 - (3) MOTOR WEIGHTS MAY VARY BY 15% FOR NON-STANDARD RATINGS
- STANDARD DOUBLE SHAFT SUPPLIED ONLY WHEN SPECIFIED

TERMINAL BOX LOCATED ON OPPOSITE SIDE WHEN F-2, W-1, W-4, V-5, V-7 OR C-1 MOUNTING IS SPECIFIED.

MAXIMUM PERMISSIBLE SHAFT RUNOUT WHEN MEASURED AT END OF STANDARD SHAFT EXTENSION IS .002 I.I.R.

IF MOUNTING CLEARANCE DETAILS ARE REQUIRED, CONSULT FACTORY.

CERTIFIED FOR- THE NASH ENGINEERING COMPANY					CUSTOMER ORDER- NKI-137560				
FRAME- 182T	TYPE- XEX	HP- 3	RPM- 1800	PH- 3	HZ- 60	VOLTS- 230/460			
DURIRON ORDER NUMBER- WCP22029			TAG NUMBER- 242-19-291						
APPROVED BY- <i>[Signature]</i>		ISSUE NUMBER- 1	DATE- 1/4/99						



DIMENSION SHEET 613051-501

KIT NO.

DESCRIPTION

ORDER NO.

BP1187AS

KIT-B.PASS ANSI PLAN 7311-GP1

WCP22029 AA

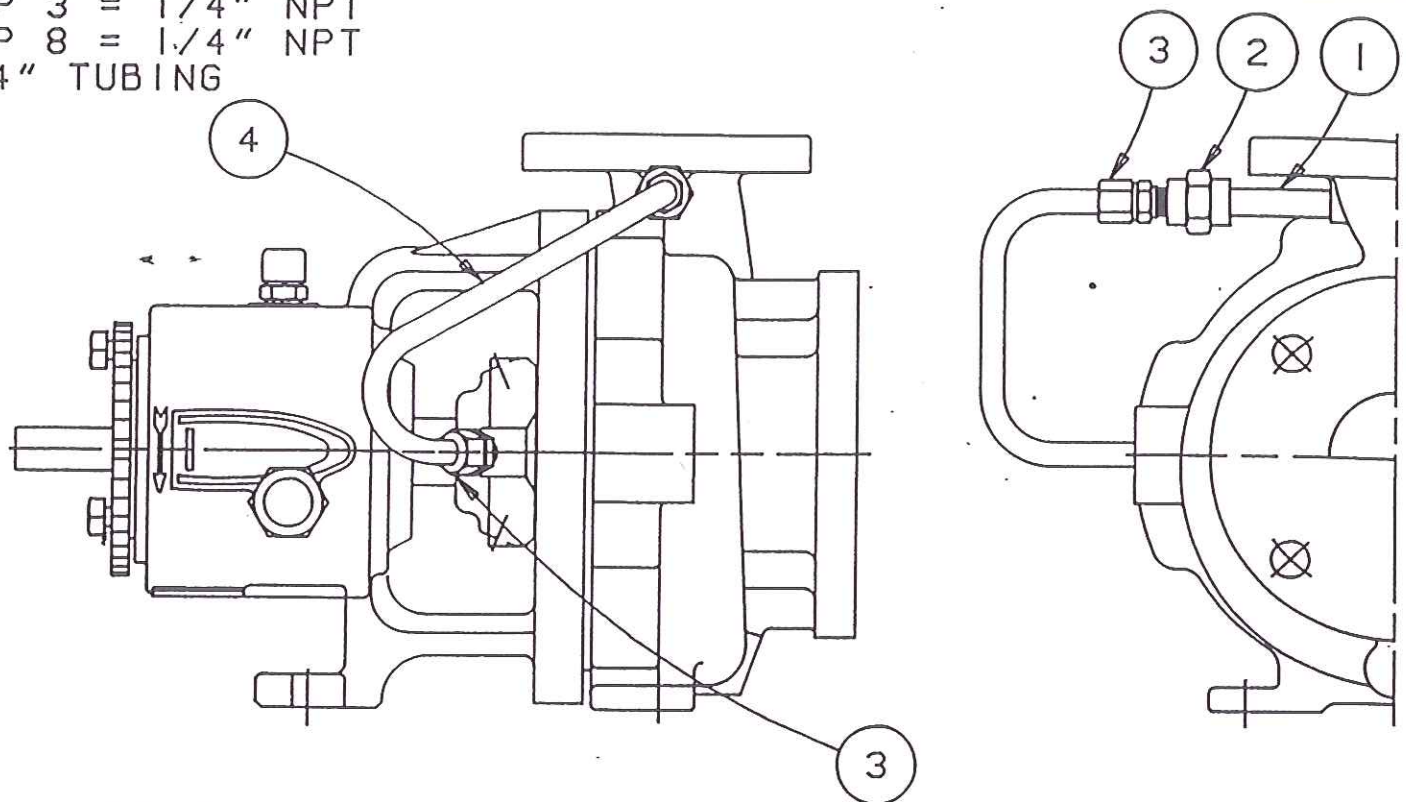
ISSUE: 1

DRAWN BY: D.M.T.

SCALE: .25 = 1

DATE: 11/25/91

TAP 3 = 1/4" NPT
 TAP 8 = 1/4" NPT
 1/4" TUBING



SR = CARBON STEEL, H = 316 STAINLESS STEEL

ITEM	REQ'D	MAT'L	PART NUMBER	DESCRIPTION	SOURCE OR VENDOR
1	1		Y24888B30	NIPPLE-1/4" (3" LG)	
2	1		AY45230C125	FITTING-PIPE-UNION ORIFICE-1/4"	
3	2		AY45236B	FITTING-TUBE-CNTR-1/4"	
4	25		AY45278A	TUBING-1/4"	
				The Nash Engineering Co. Tag#: 242.10.201 PO#: NKI-137560 Order#: WCP22029	
				Project No. <u>DO 4707-02</u> Lockwood Greene Engineers, Inc. RECEIVED FEB 15 1999 FILE <u>P-34B-8</u> ACK. <u>AW</u>	
				PRIME SET	