RANDOLPH AUSTIN COMPANY

www.RandolphAustin.com

Operations Manual

Pump Series: **600**

Model #610-101

- 610 Pump Head
- 0-400 Rpm Mechanical Speed Control
- ¼ Hp, 60 Hz, 1 ph,115 VAC Motor.
- Single Direction

Randolph Austin Company
2119 FM 1626
Manchaca, Texas 78652
(512) 282-1590

Table of Contents

Randolph Austin Company

Peristaltic Pumps

WHY CHOOSE A PERISTALTIC PUMP?

Peristaltic pumps work by using a flexible tubing inside a raceway, which is alternately compressed by a set of rotating rollers. This flexing action insulates the materials being transferred from the moving parts of the pump. The advantages are important when transferring sterile solutions, abrasives, inks or any other fluid, which would ordinarily contaminate or destroy the internal components of a pump. Because of the action of the Randolph pump, it is an excellent choice for shear sensitive fluids and applications where fluid metering is necessary.

PERFORMANCE PARAMETERS

Several factors such as viscosity, pressure, speed, pump configuration, and tubing selection, influence the flow rate of a Randolph pump. These factors must be considered to determine the selection of a pump.

Fluids with increased viscocity will result in reduced flow rates. Careful consideration needs to be made to the distance and height of the pump relative to fluids being pumped, especially if they are viscous. The further the pump is from the source, the greater the flow loss.

The discharge pressure capabilities of the Randolph pump will vary with the type and size of tubing selected as well as the operating conditions of the pump. Excessive discharge pressure may rupture tubing or reduce the effective tubing life.

Tubing selection must consider the fluid compatibility, temperature, and pressure, which the pumping application will see. It is recommended that the tubing be immersed in the fluid to be pumped for a minimum of 24 hours as a method of determining chemical compatibly. However, there is no guarantee that tubing which passes a "soak" test will perform in the same manner inside the pump. The soak test, while providing valuable information, does not replicate the dynamic situation inside the pump.

WHY YOU SHOULD CHOOSE A RANDOLPH PERISTALTIC PUMP

Randolph pumps are manufactured to exacting tolerances with high quality materials. The rugged construction of the Randolph pump makes it an ideal choice for applications where trouble free performance is necessary.

With over forty years' experience, in peristaltic pumps, Randolph Austin Company has a proven track record of value and service to our customers.

STANDARD CONSTRUCTION

Randolph pumpheads are available in a variety of material constructions. Models 250, 500, 610, and 750 are machined from aluminum housings and use stainless steel internal components for corrosion and wear resistance. The model 880 pump is machined from an aluminum casting, and uses plated steel components for its impeller plate and shaft.

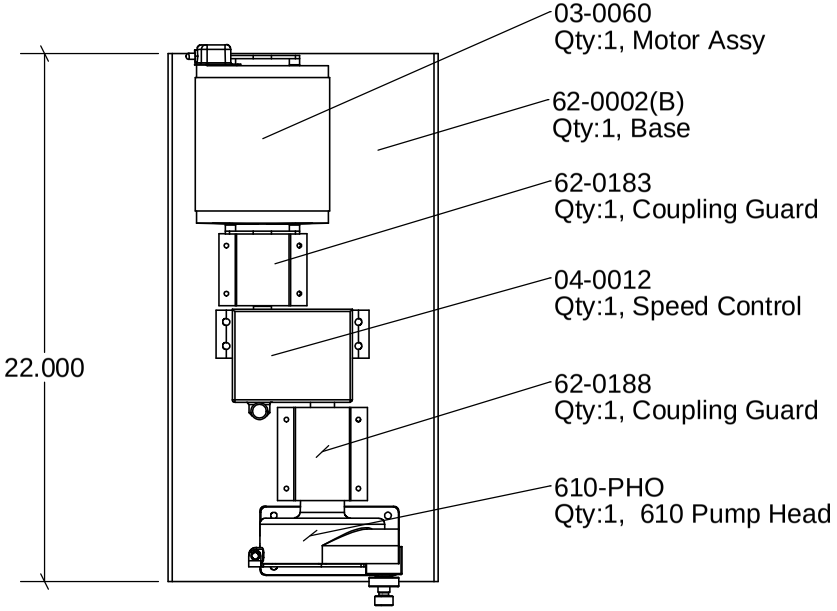
STAINLESS STEEL MODELS

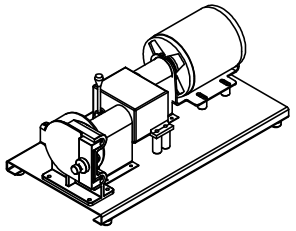
Randolph Austin Company offers the 615 and 755 model pumps in a 316 stainless steel housing. This material is well suited for washdown applications. Model 615 and 755 pumps have the same performance characteristics as the standard model 610 and 750 pumps respectively.

PLASTIC PUMP HEADS.

The 300 and 400 series pumps housings are made from polycarbonate. These pumps offer the O.E.M. cost effective, quality units to incorporate into their design. The 300 series pump is designed to mount directly of motor and can be configured in a variety of forms. The 400 series pump is a panel mount pump with a standard three-impeller roller yoke and hinged side cover. The 400 series is the newest pump in the Randolph Austin catalog.

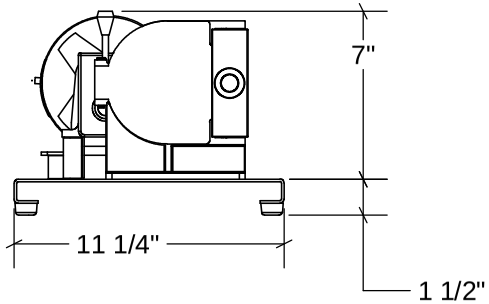
Post Office Box 988 - 2119 F.M. 1626 - Manchaca, TX 78652
Fax (512) 280-0678 - Tel (512) 282-1590 - (800) 531-5263

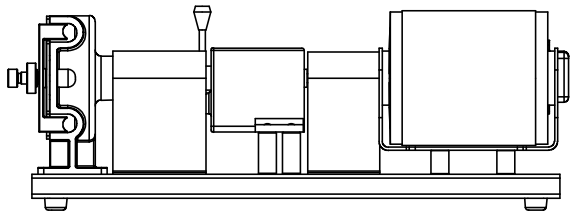




Notes:

1) CCW Rotation Only
2) Speed Range of 0-400 rpm





Items Not Shown

Part No	Qty	Description
00-0332	1	Coupling - 5/8"
00-0312	2	Coupling - 3/8"
00-0380	2	"Spyder" for Coupling
00-0322	1	Coupling - 1/2"

UNLESS OTHERWISE SPECIFIED DIMENSIONAL TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
MILLIMETERS: N/A ±.1 ±1.0°
INCHES: ±1/64 ±.005 ±1.0°
MATERIAL
FINISH
NEXT ASSY | USED ON
APPLICATION | DO NOT SCALE DRAWING

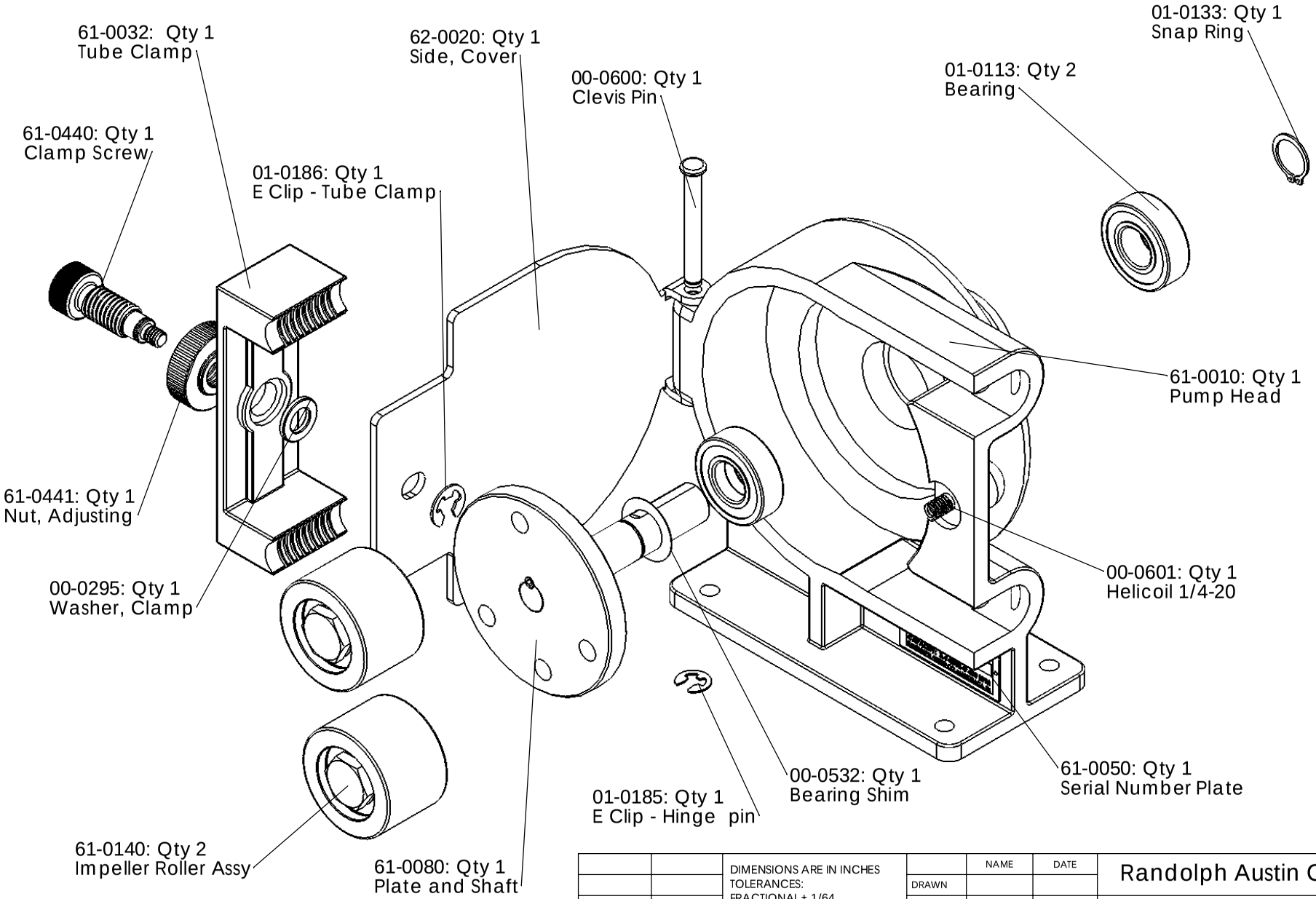
CAD GENERATED DRAWING, DO NOT MANUALLY UPDATE

APPROVALS	DATE
DRAWN	
CHECKED	
RESP ENG	
MFG ENG	
QUAL ENG	

Randolph Austin Company
PO 988 2119 FM 1626 MANCHACA TX.

610 Pump with Mechanical Speed Reducer

SIZE A | DWG. NO. 610-101 | REV.
SCALE | CAD FILE: | SHEET | OF



NEXT ASSY	USED ON
APPLICATION	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/64
ANGULAR: MACH ± 1°
TWO PLACE DECIMAL ± .010
THREE PLACE DECIMAL ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

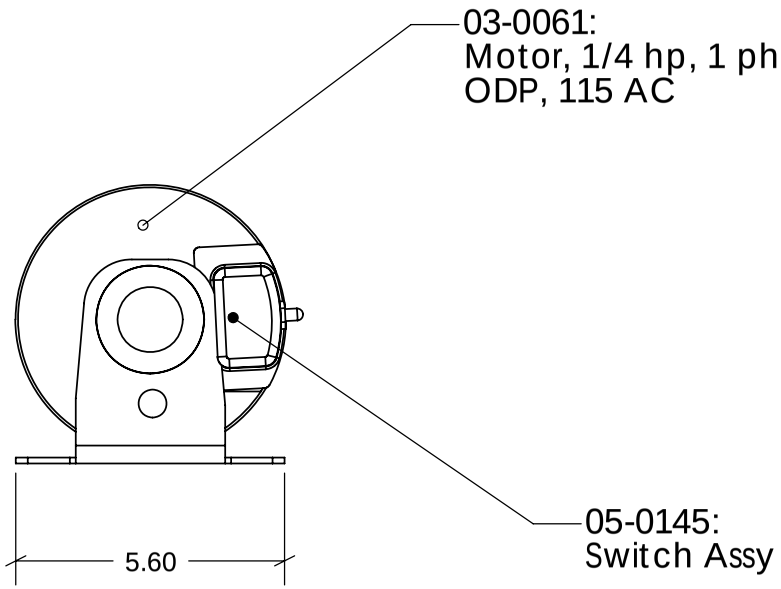
COMMENTS:

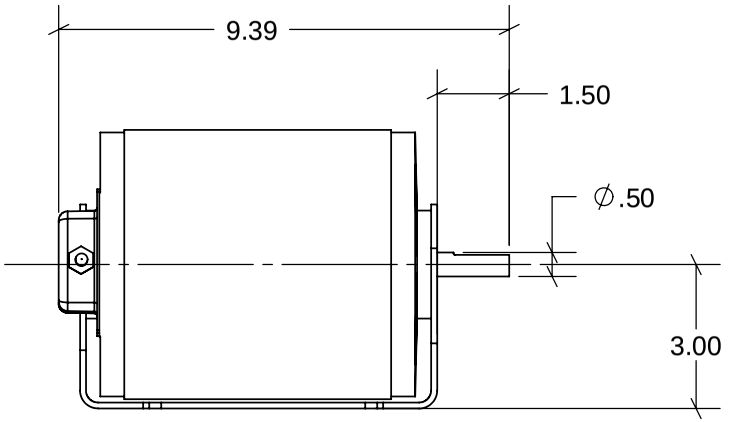
Randolph Austin Company

610 Pump Head
Exploded Assembly View
Pumps after Aug-2008

SIZE	DWG. NO.	REV.
A	610-PHO-XP	
SCALE:1:5	WEIGHT:	SHEET 1 OF 1

		REVISIONS		
ZONE	REV.	DESCRIPTION	DATE	APPROVED





Motor & Switch Assy:

Motor: 03-0061
General Dim & Specifications:
Base Mounted, Split Phase, Dripproof, Resilient
1/4 Hp, 1ph, 115 VAC, 60 Hz
SF: 1.0
Full Load Amps: 5.7
Frame: 48

Toggle Switch: 05-0145

NEXT ASSY	USED ON
APPLICATION	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/64
ANGULAR: MACH ± 1
TWO PLACE DECIMAL ± .01
THREE PLACE DECIMAL ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

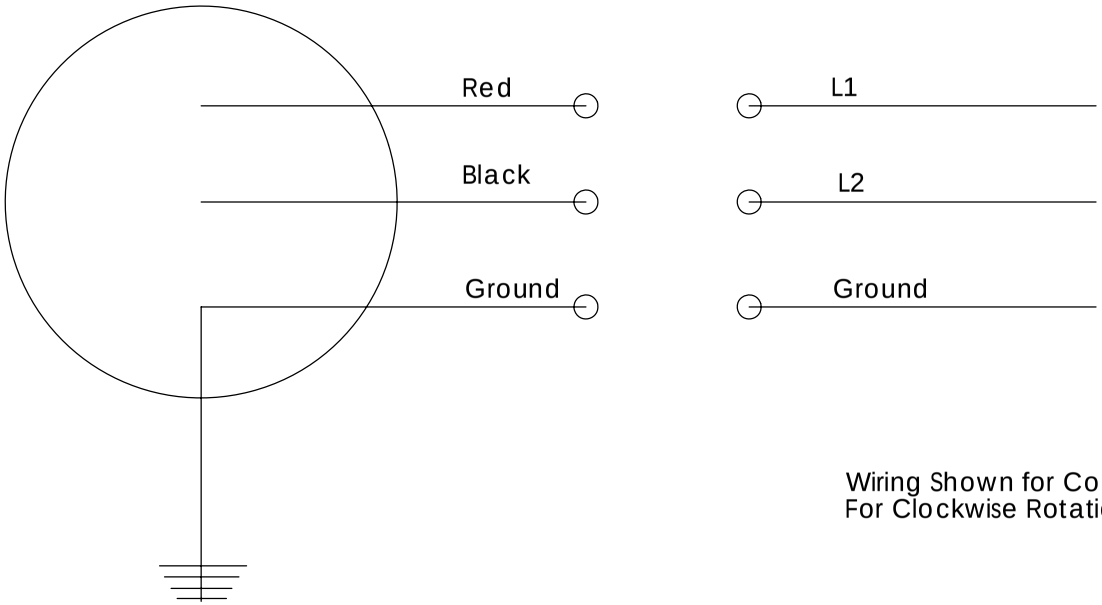
Randolph Austin Co

03-0060: 1/4 Hp Motor Assembly

SIZE	DWG. NO.	REV.
A	03-0060	

SCALE:1:4	WEIGHT:	SHEET 1 OF 2

		REVISIONS		
ZONE	REV.	DESCRIPTION	DATE	APPROVED



Wiring Shown for Counter Clockise Rotation
For Clockwise Rotation - Interchange Red and Black

NEXT ASSY	USED ON
APPLICATION	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/64
ANGULAR: MACH ± 1
TWO PLACE DECIMAL ± .01
THREE PLACE DECIMAL ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

Randolph Austin Co

Wiring Schematic

SIZE	DWG. NO.	REV.
A	03-0060	
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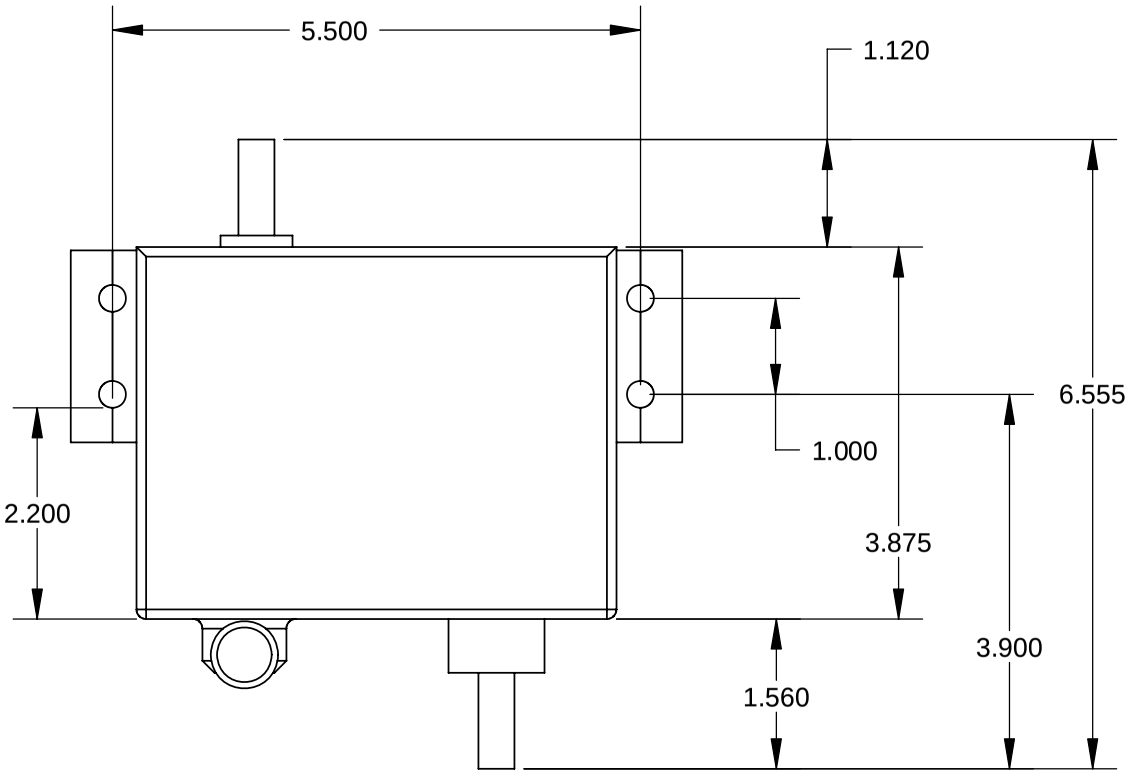
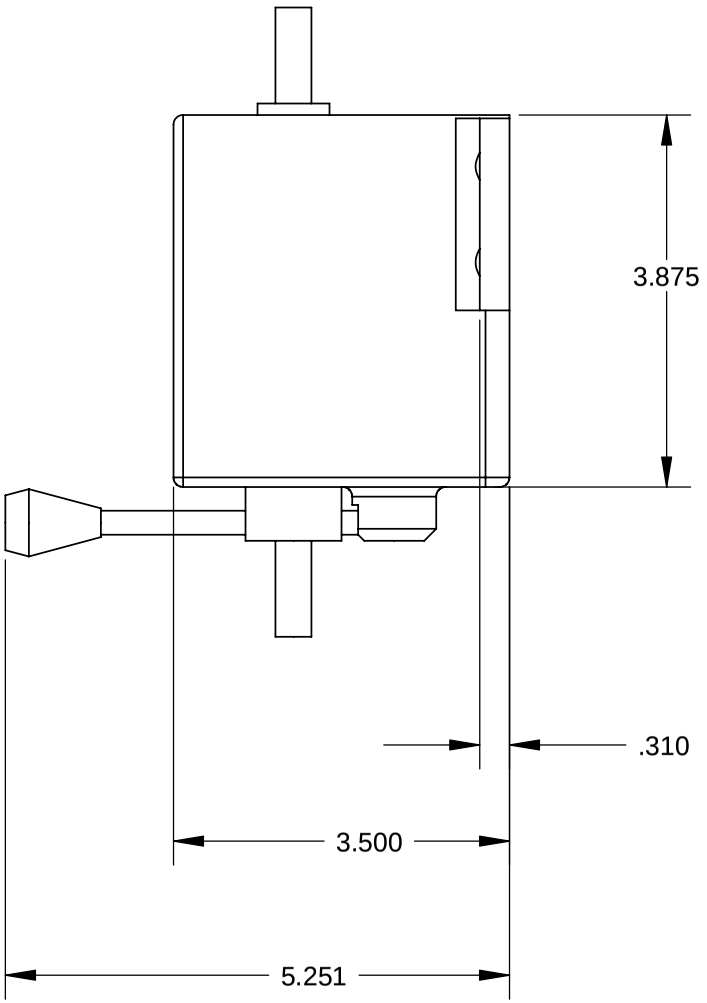
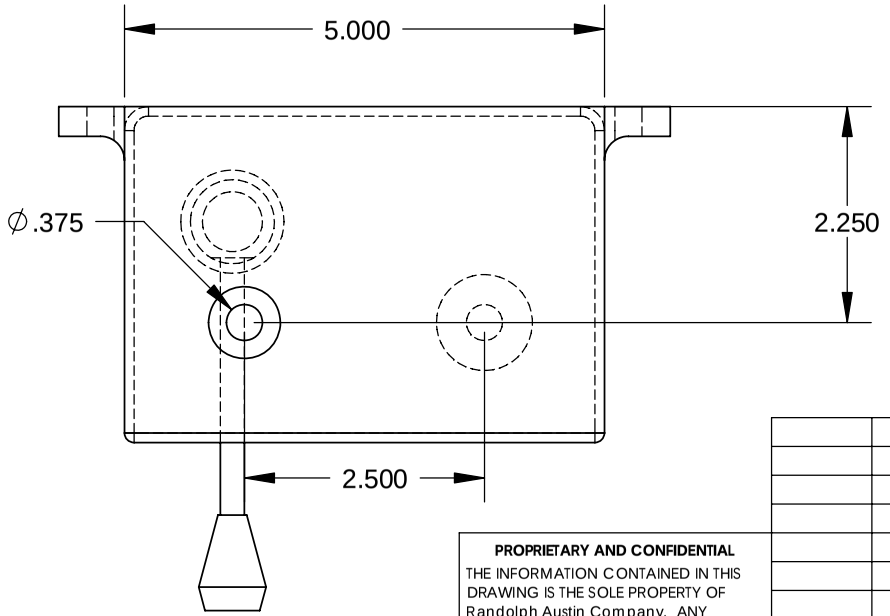
REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED







NEXT ASSY	USED ON
APPLICATION	

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/64
ANGULAR: MACH ± 1
TWO PLACE DECIMAL ± .01
THREE PLACE DECIMAL ± .005

MATERIAL --

FINISH --

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

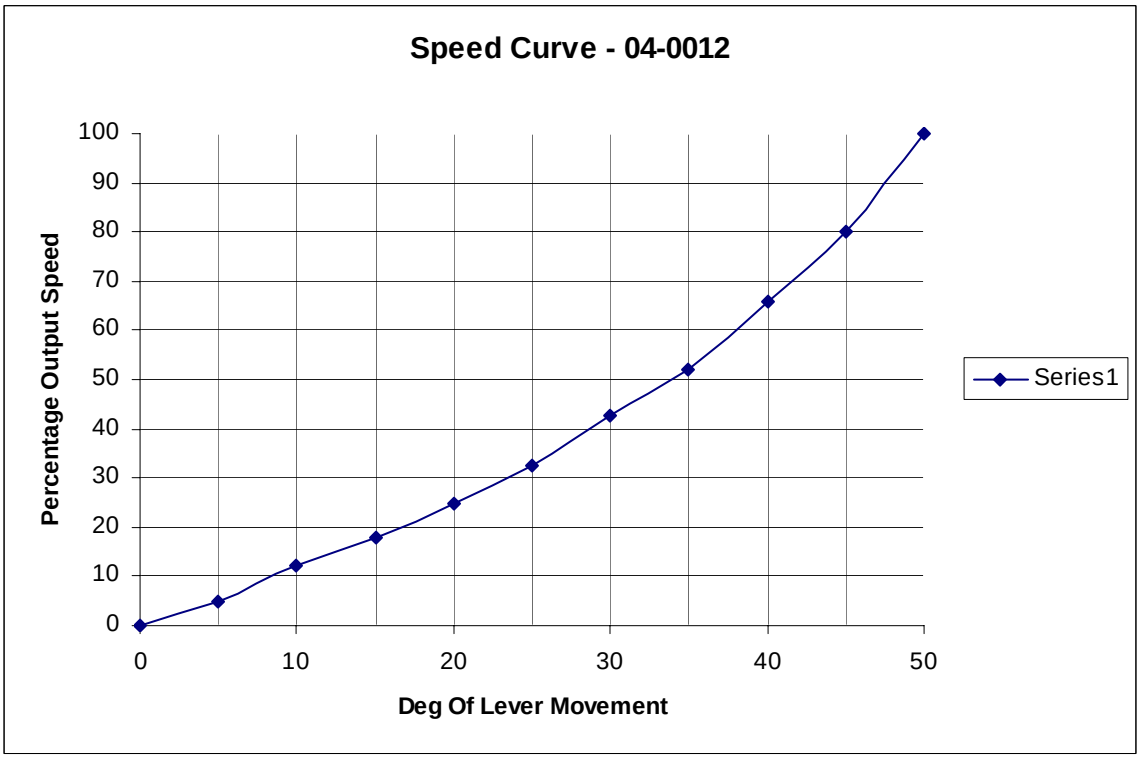
Randolph Austin Co

JK1- ZeroMax 610-101 / 610-201 Layout

SIZE	DWG. NO.	REV.
A	04-0012	
SCALE:1:2	WEIGHT:	SHEET 1 OF 1

Control Linearity

Movement of the control lever through the 50 Degrees of motion available produces a non-linear change in speed.



Torque (in lbs)	Max Input Speed – RPM	Reduction	Motor Input Shaft Direction	Motor output Shaft Direction
25	2000	4:1	CCW	CCW

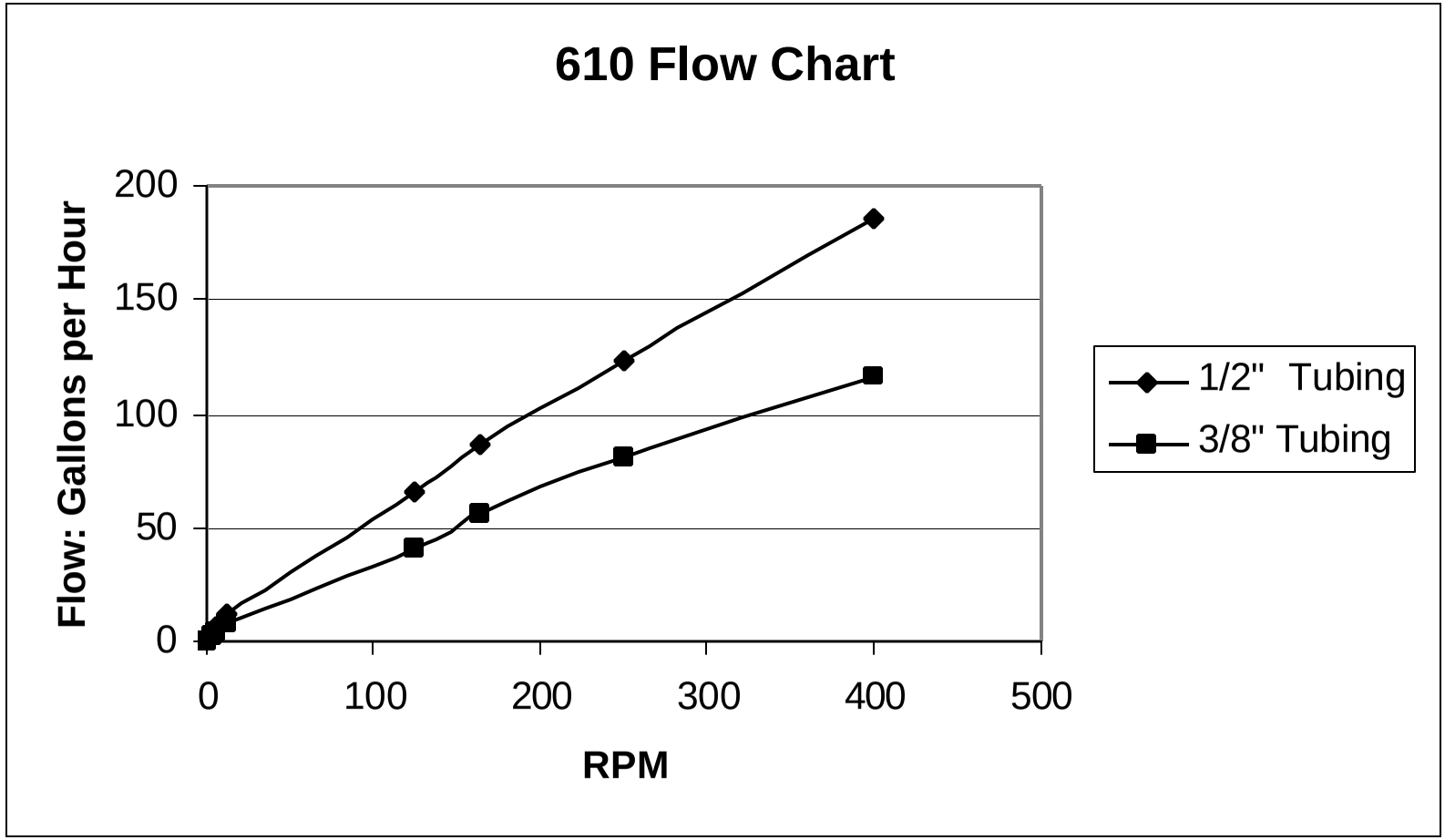
Lubrication: Units come sealed and pre-lubricated from the factory.

Lubricant	Volume
Cheveron Delo 100 – SAE 40 or Equivalent	18 fl. Ounces / .53 Liters

The control lever provide with the speed reducer may be replaced with either a screw control lever or a “micro-dial” screw control.

Part Number	Description
04-0023	Lever, Control Arm, Replacement
04-0021	Screw Control Speed Adjustment Kit.

Randolph Austin Company - 610 Series Pump



HOW TUBING IS INSERTED IN THE PUMP

1. Turn power off. Remove side plate and tubing clamp. Remove existing tubing by manually turning rollers while gently tugging on the tubing.
2. Manually move rollers so that they are horizontal in relation to the base of the pump. Carefully insert tubing through the top tubing clamp section and the top of the pump housing. Manually turn the rotor in a counter clockwise direction until the roller begins to compress the tubing and begin feeding the tubing behind the bottom roller.
3. When the pump has moved ½ turn the tubing should be in a compressed state at the 9:00 o'clock position.
4. Return the side plate and tubing clamp to the pump. Tighten the knurled nuts on the side plate and tube clamp.

Tubing sizes and capacities of the Randolph Pump:

Pump Series	**Tubing Size**
250	.062" (3/16") ID x .187" (3/16") OD
250	.125" (1/8") ID x .250" (¼") OD
300	.250" (¼") ID x .437" (7/16") OD
400	.250" (¼") ID x .437" (7/16") OD
510	.187" (3/16") ID x .375" (3/8") OD
510	.250" (¼") ID x .437" (7/16") OD
610, 615, 620	.375" (3/8") ID x .625" (5/8") OD
610, 615, 620	.500" (½") ID x .750" (3/4") OD
750	.625" (5/8") ID x .937" (15/16") OD
750	.750" (3/4") ID x 1.062" (1 1/16") OD
880	.750" (3/4") ID x 1.125" (1 ¼") OD
880	1.00" (1") ID x 1.500" (1 ½") OD

Summary – Physical Properties of Randolph Austin Extruded Tubing

Physical Tubing Properties – Cilran ™

Specific Gravity	0.90
Tensile Strength(psi)	928
Ultimate Elongation (%)	374
Hardness(Shore 'A' Scale +/- 2)	55
Normal Working Temperature (F)	(-40° to 190°)
Tensile set @ 100%	11.9%
100% Modulus (psi)	20
Compression set(%)	103
Tear Strength(lbs per inch)	386

Cilran ™ is made from a thermoplastic elastomer which possesses exceptional chemical resistance to acids and bases. Cilran ™ has low gas permeability, good flex fatigue resistance and meets USP Class VI specifications. Ideal for use in many laboratory applications, it may be used in place of silicone for some applications. Cilran ™ is translucent white in color and available in lengths up to 500 feet.

Physical Tubing Properties – Prothane II ™

Specific Gravity	1.18
Tensile Strength(psi)	2434
Ultimate Elongation (%)	870
Hardness(Shore 'A' Scale +/- 2)	68 A
Normal Working Temperature (F)	
Tensile set @ 100%	7.2%
100% Modulus (psi)	380
Compression set(%)	19
Tear Strength(lbs per inch)	274
Color	Aqua-Blue

PROTHANE II ™ is a transparent, aqua blue, polyester polyurethane tubing that exhibits excellent abrasion resistance, has good low temperature properties and is resistant to ozone and oxidation. PROTHANE II ™ exhibits an excellent resilience to continuous flexing and impacting experienced in peristaltic pumps. Along with these exceptional features PROTHANE II ™exhibits good hydrolic stability, good oil and fuel resistance and high tensile and tear strength. PROTHANEII ™ is resistant to diesel fuel, kerosene, motor oil, mild solvents, aromatic hydrocarbons, gasoline, and concentrated acid and alkaline solutions. The tubing should be tested with the chosen fluid in all cases

Summary – Physical Properties of Randolph Austin Extruded Tubing

Physical Tubing Properties – ED-Plex ™

Specific Gravity	0.98
Tensile Strength(psi)	928
Ultimate Elongation (%)	374
Hardness(Shore 'A' Scale +/- 2)	65
Normal Working Temperature (F)	(-40° to 190°)
Tensile set @ 100%	11.9%
100% Modulus (psi)	386
Compression set(%)	20
Tear Strength(lbs per inch)	103

E-D Plex ™ is a multi-purpose tubing that is ideally suited for applications which range from transferring paint, ink, acids and bases. Some oil and hydrocarbons will work with E-D Plex ™, but should be tested before use. Combining the environmental resistance of EPDM with the chemical resistance of chloropreme, E-D Plex ™ possesses similar elastomeric performance found in more expensive vulcanized rubber, while still maintaining high flex fatigue resistance.. E-D Plex ™ has been proven very successful in peristaltic pump applications where continuous flexing is required.

Physical Tubing Properties – Vytex ™

Specific Gravity	1.18
Tensile Strength(psi)	1936
Ultimate Elongation (%)	465
Hardness(Shore 'A' Scale +/- 2)	60
Normal Working Temperature (F)	(-34° to 165°)
Tensile set @ 100%	97%
100% Modulus (psi)	484
Compression set(%)	N/A
Tear Strength PPI	115

Vytex ™ is a clear flexible polyvinyl tubing ideal for general purpose usage in applications with dilute aqueous solutions (both acids and alkali's) and for food and beverage usage. Strong acid solutions may be used with Vytex ™ for short intervals, but should be flushed with water after use. The smooth surface allows for easy flushing and cleanup for food and beverage applications. Vytex ™ is a durable, high flex tubing with a Shore "A" durometer of 60 allowing a long life expectancy for continuous flexing where peristaltic pumps are used. Available in lengths up to 500 feet.

Summary – Physical Properties of Randolph Austin Extruded Tubing

Physcial Properties – Povinal ™

Specific Gravity	1.01
Tensile Strength(psi)	928
Ultimate Elongation (%)	374
Hardness(Shore 'A' Scale +/- 2)	65
Normal Working Temperature (F)	(15° to 125°)
Tensile set @ 100%	11.9%
100% Modulus (psi)	386
Compression set(%)	20
Tear Strength(lbs per inch)	103

Povinal ™ is a polyvinyl alcohol based tubing which is excellent for use in applications with aliphatic, aromatic and chlorinated hydrocarbon solvents. Povinal ™ has good flex fatigue resistance and is suitable for many industrial applications. It may be used as a substitute for fluroelastomer polymers in some applications. Not recommended for use with water or solutions containing concentrations of water. Available in lengths up to 500 feet. Pump tubing is teal in color. Transfer tubing is amber.

Randolph Austin Company
Tubing Chemical Resistance Chart

Code indicates the percentage weight gain or loss after 24 hours immersion in the fluid.
(B) Best = 1-4%, (G) Good = 5-10%, (F) Fair = 11- 15%, (P) Poor = 16%+

The data contained herein are based on tests conducted on representative samples and are considered accurate. The results should indicate liquids that could be used with the tubing. However no guarantee is given or implied regarding the application of this data to the safe use of the tubing. It is suggested that the purchaser conduct tests to determine if this material is suited to this application.

	Cilran™	ED-Plex™	Povinal ™	Prothane II ™	Vytex™
Aqueous Solutions					
Water	B	B	P	B	B
Sodium Chloride (Saturated)	B	B	F	B	B
Aluminum Sulfate	B	B	P	B	B
Acids & Bases					
Sulphuric Acid (66° Be)	B	B	P	G	B
Acetic Acid, Glacial	B	P	P	P	F
Hydrochloric Acid (30° Be)	B	B	P	P	G
Nitric Acid (40° Be)	B	B	P	P	G
Sodium Hydroxide (50% sol.)	B	B	P	B	B
Ammonia Hydroxide	B	B	P	B	B
Aliphatic Hydrocarbons					
Diesel Fuel	P	P	B	G	G
Naptha	P	P	B	G	G
Mineral Oil	P	P	B	G	B
Aromatic Hydrocarbons					
Toluene	P	P	B	P	P
Xylene	P	P	B	P	G
Chlorinated Solvents					
Trichloroethylene	P	P	B	P	P
Carbon Tetrachloride	P	P	B	P	P
Methylene Chloride	P	P	B	P	P
Ketones					
Acetone	B	B	F	P	P
Methyl Ethyl Ketone (MEK)	G	G	F	P	P
Esters					
Amyl Acetate	P	B	F	P	P
Butyl Acetate	P	B	F	P	P
Ethyl Acetate	P	F	F	P	P
Alcohol					
Butyl Alcohol	G	G	P	G	B
Isoproply Alcohol	G	B	F	B	B
Methyl Alcohol	B	B	F	G	B
Ethyl Alcohol (90%)	B	B	G	G	G
Glycol					
Ethylene Glycol	B	B	G	B	B
Glycerine	B	B	G	B	B
Vegetable Oil					
Safflower Oil	B	B	B	B	G

8-Mar-01

(800)-531-5263 - (512)-282-1590 – Fax (512)-280-0678

MATERIAL SAFETY DATA SHEET

Randolph Austin Company - 2119 F.M. 1626 – Manchaca, TX 78652

PRODUCT NAME: Tube Lube **Date: Nov-02-2001**
PRODUCT CODE: N/A

SECTION I

HAZARDOUS INGREDIENTS

Ingredient	Percent	TLV
None (at this time)		

SECTION II

HEALTH HAZARDS

Threshold Limit Value: N/E
Effect of Overexposure

Eyes: Prolonged exposure may cause eye irritation.
Skin: Prolonged exposure may cause skin irritation
Inhalation: UNK
Ingestion: Harmful if swallowed in sufficient quantities.

First Aid

Eyes: Flush with plenty of water for 15 minutes while lifting eyelids to insure entire eye surface is washed.
Skin: Wash with soap and water
Inhalation: UNK
Ingestion: Consult physician.
Other Information: None

SECTION III

SPECIAL PROTECTION INFORMATION

Respiratory Protection: No special respiratory protection is required under normal situations. During the generation of large quantities of oil mist, use a MSHA/NIOSH approved respirator.
Ventilation Requirement: No special ventilation is required
Protective Clothing:

Eyes: Normal Protection against foreign substances – safety goggles.
Skin: Chemical resistant gloves should be used
Additional Protective Measures: Eye Wash Station and safety shower should be provided

SECTION IV

FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method): 540 ° F (c.c.)
Flammable Limits (% Volume in Air): N/A
Upper: N/A **Lower:** N/A

Extinguishing Media: Water – Fog, Foam, Carbon Dioxide and Dry Chemical
Special Fire Fighting Procedures: Standard fireman's body protection. Self-contained breathing apparatus must be used to protect from products of combustion.
Unusual Fire and Explosion Hazards: Keep away from heat, sparks and open flame

MATERIAL SAFETY DATA SHEET

Randolph Austin Company - 2119 F.M. 1626 – Manchaca, TX 78652

SECTION V

PHYSICAL DATA

Boiling Point: N/A
Specific Gravity (Water =1): 0.959
Vapor Pressure (MM HG): UNK
Evaporation Rate: N/A
Solubility in Water: UNK
Vapor Density (Air =1): N/A
pH: UNK
Weight per Gallon: 7.95 lbs
Percent Volatile by Volume: N/A

Appearance and Odor: Light Yellow, Oily, No Apparent Odor

SECTION VI

REACTIVITY DATA

Stability: Stable
Incompatibility: N/A
Conditions to Avoid: Keep from contact with oxidizing materials.
Hazardous Decomposition Products: Product of incomplete combustion can include CO, CO_2 and dense smoke.
Hazardous Polymerization: Will not occur.

SECTION VII

SPILL AND LEAK PROCEDURES

Steps to be taken if material is released or spilled: Soak up spill with sand, earth or sawdust. Flush with detergent and water.
Waste Disposal Method: Dispose of in accordance with Federal, State and local regulations

SECTION VIII

D.O.T. SHIPPING INFORMATION

Proper Shipping Name: None
Hazard Class: None
ID Number: None
Label Requirements: None
Other Information: None

SECTION IX

ADDITIONAL INFORMATION

This information may be of importance to you:
Precautions to be taken in handling and storing: Store in closed containers, protect from moisture and foreign matter. Keep away from heat and excessively warm areas.
Other precautions: Do not transfer to unmarked containers.
Conditions to Avoid: Keep from contact with oxidizing materials

N/A = Not Applicable N/D = Not Determined N/E= Not Established UNK = Unknown

Date Issued: 03/07/1986 Date revised: 11/01/2001

512-282-1590 - Fax (512) 280-0678 - 24 Hour Emergency 800-424-9300 / 703-527-3887