RANDOLPH AUSTIN COMPANY

www.RandolphAustin.com

Operations Manual

Pump Series: **600**

Model #610-103

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

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.

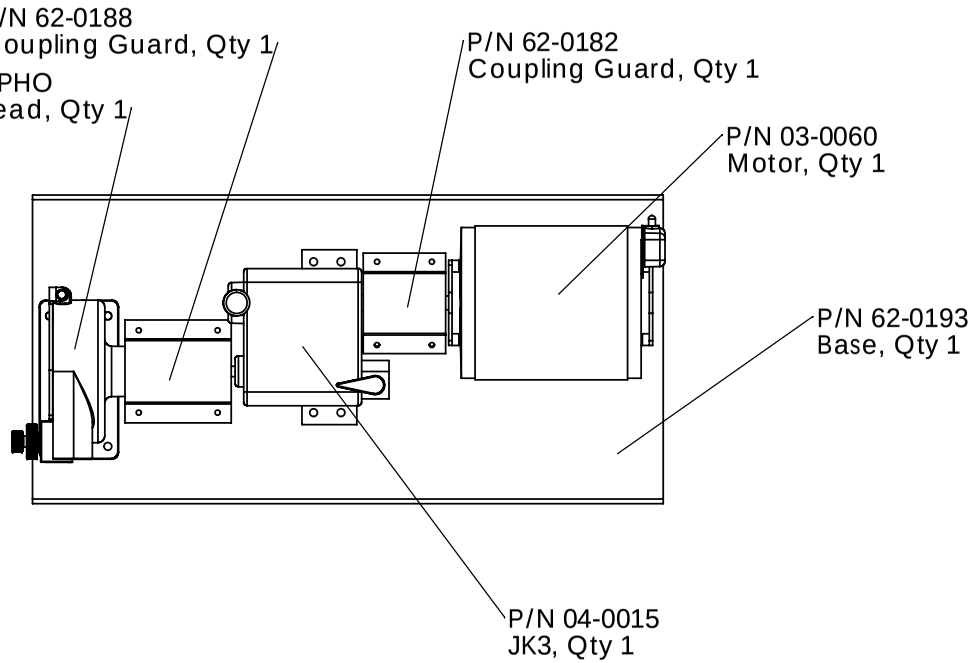
STAINLESS STEEL MODELS

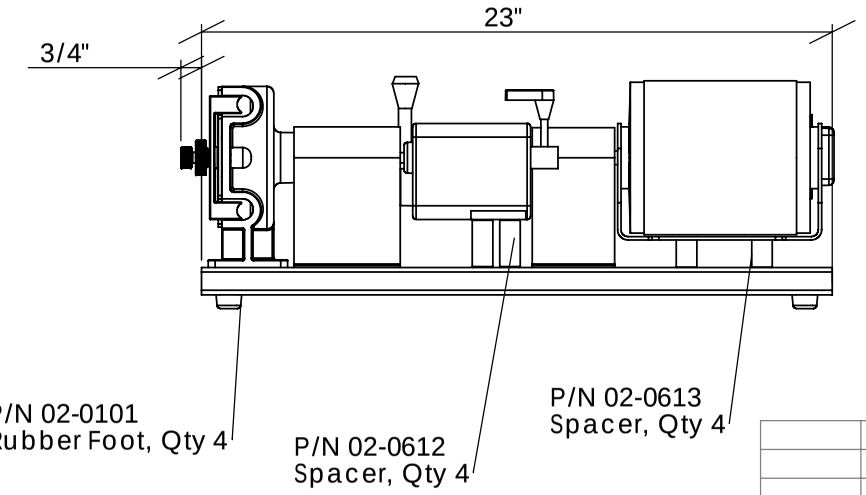
Randolph Austin Company offers the 615 and 755 model pumps in a 316 stainless steel housing. This material is well suited for washdown applications. Model 615 and 755 pumps have the same performance characteristics as the standard model 610 and 750 pumps respectively.

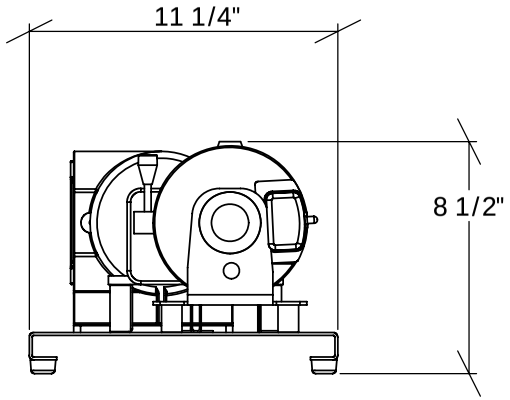
PLASTIC PUMP HEADS.

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







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

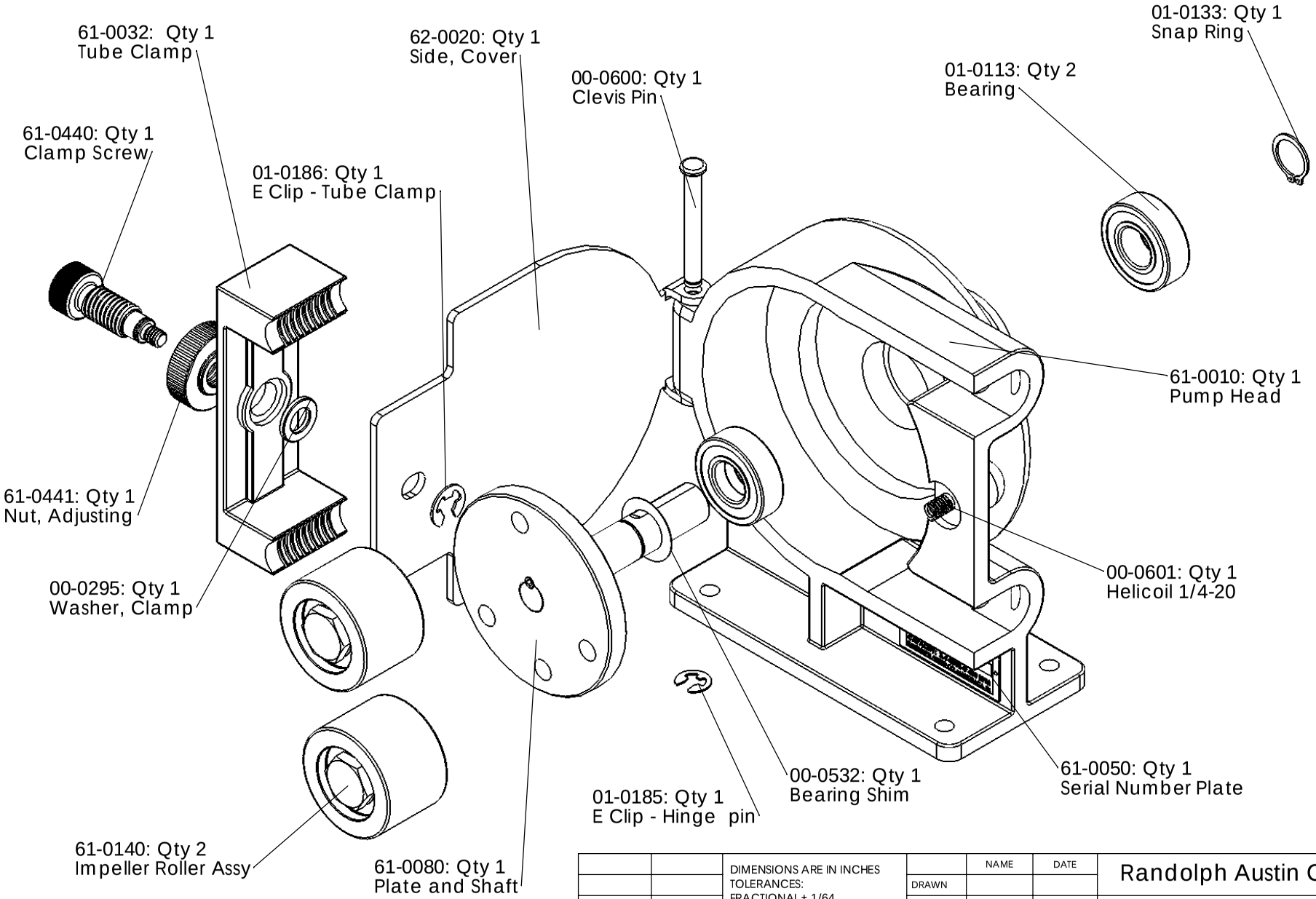
	NAME	DATE
DRAWN		
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

Randolph Austin Company

610-103, Layout drawing

SIZE	DWG. NO.	REV.
A	610-103	
SCALE:1:10	WEIGHT:	SHEET 1 OF 1



NEXT ASSY	USED ON
APPLICATION	

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

MATERIAL --

FINISH --

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CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

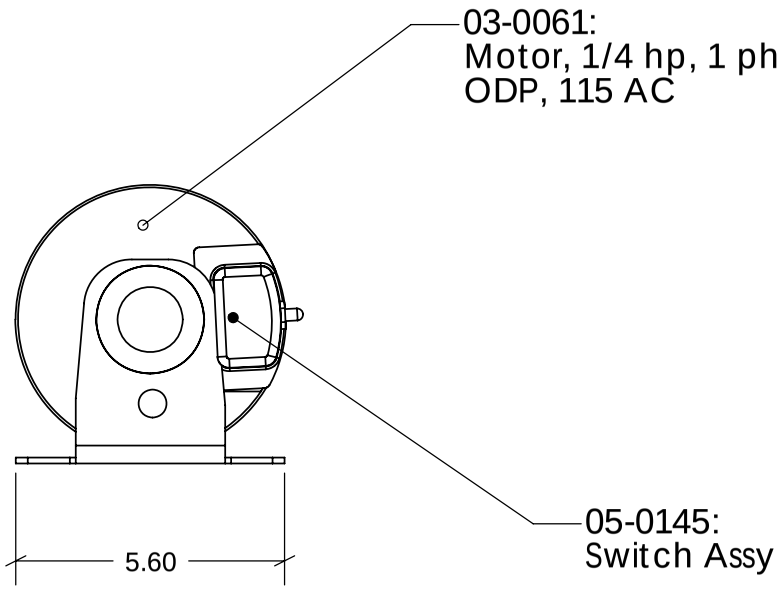
COMMENTS:

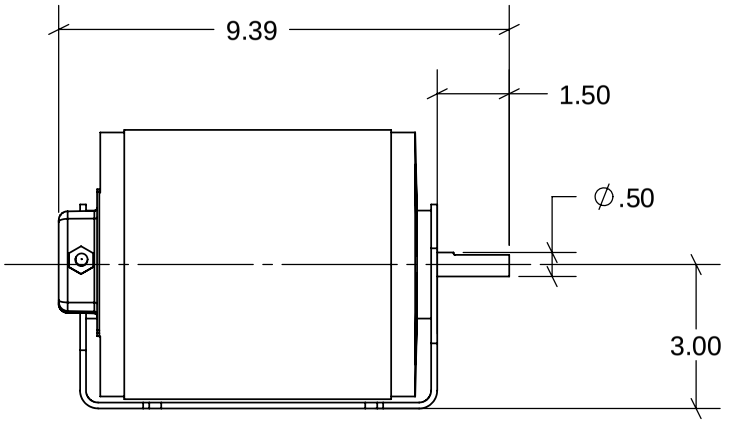
Randolph Austin Company

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:

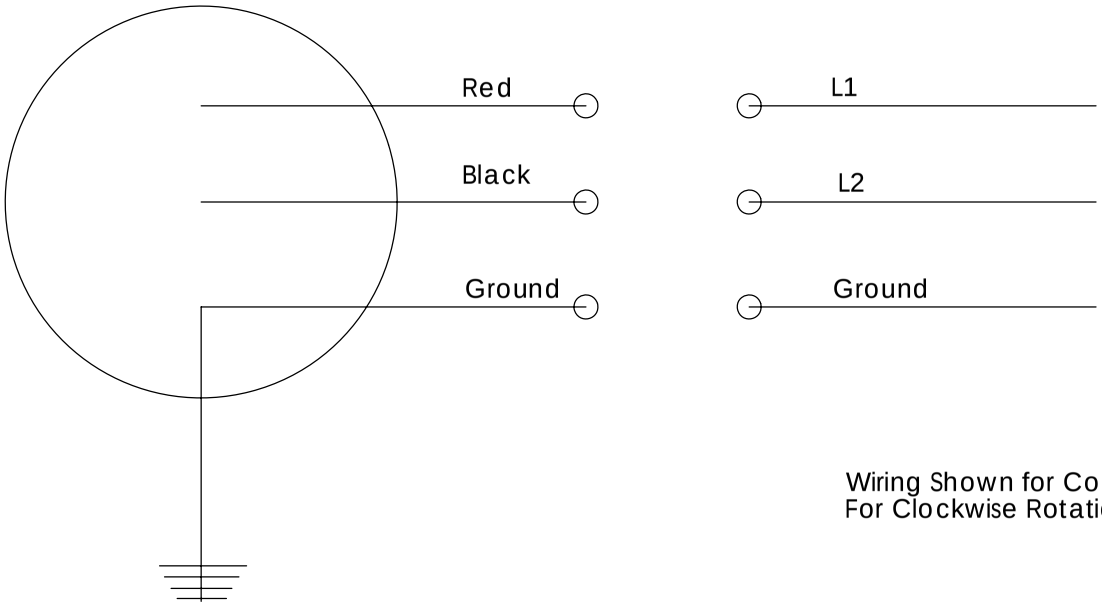
Randolph Austin Co

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

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CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

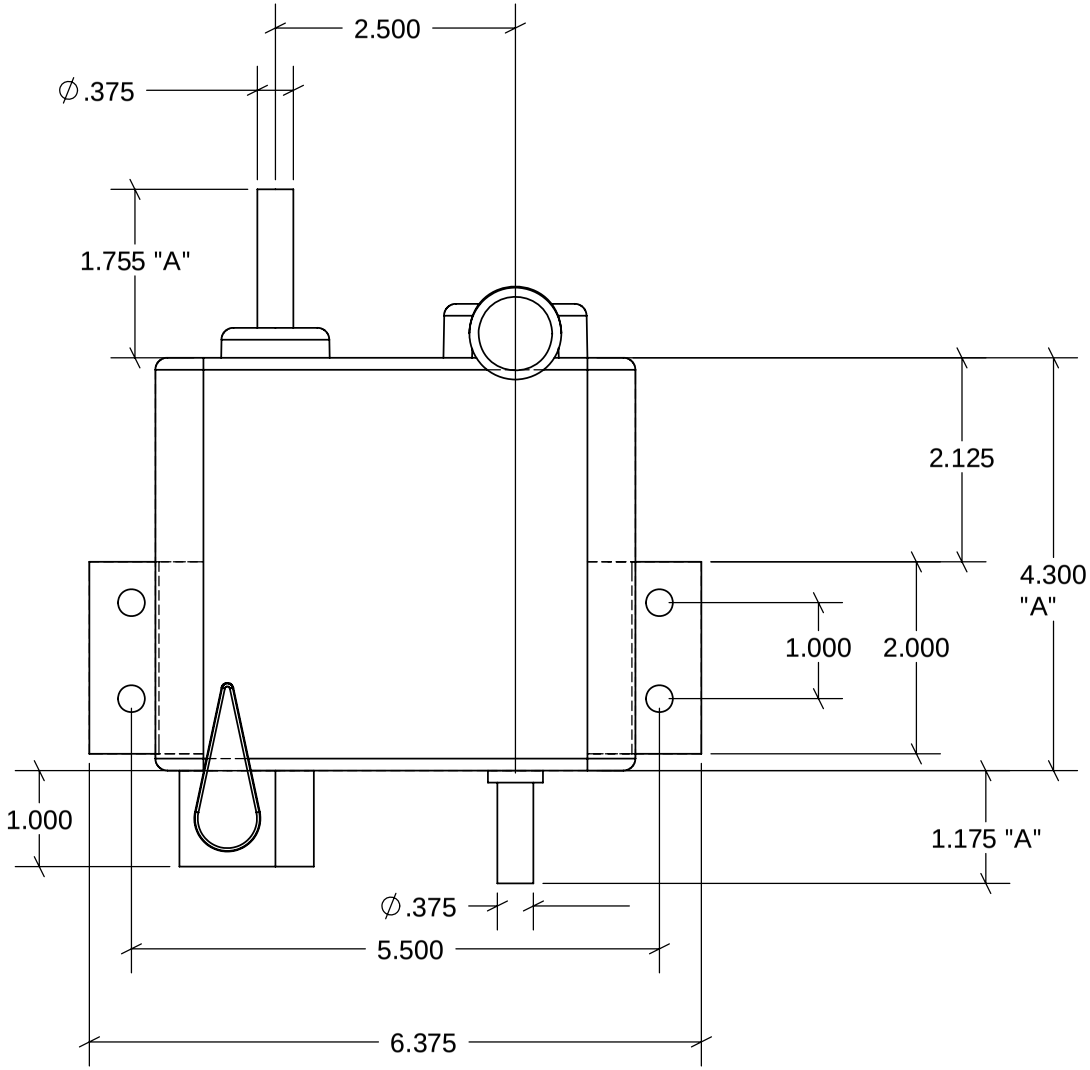
COMMENTS:

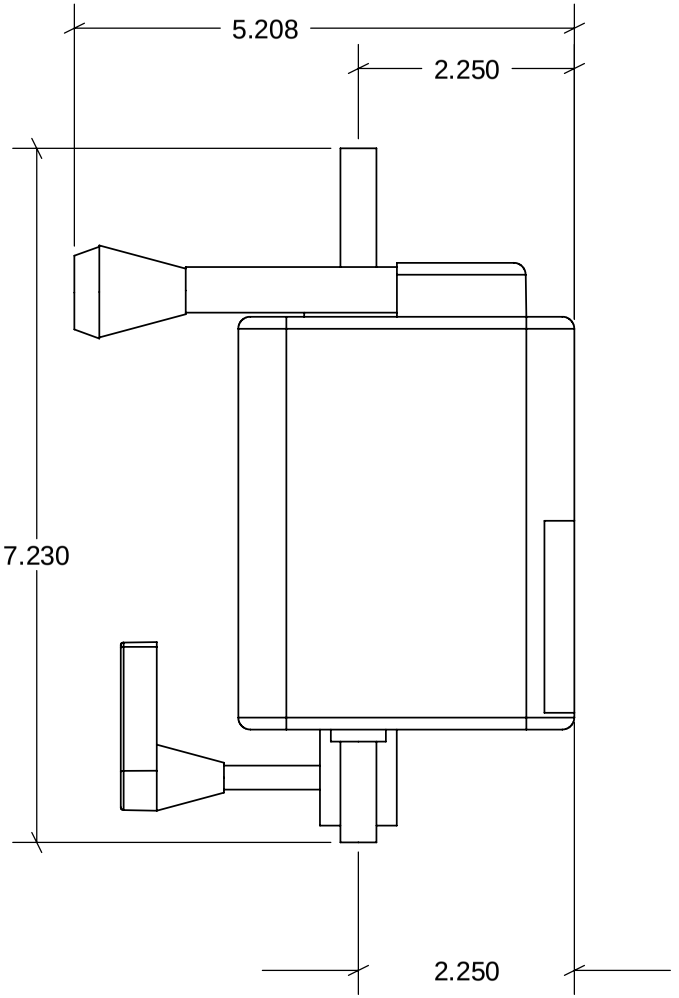
Randolph Austin Co

Wiring Schematic

SIZE	DWG. NO.	REV.
A	03-0060	
SCALE:1:4	WEIGHT:	SHEET 2 OF 2

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED





Dimensions "A" on model vary from data sheet. The dimensions are based on measured values.

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:

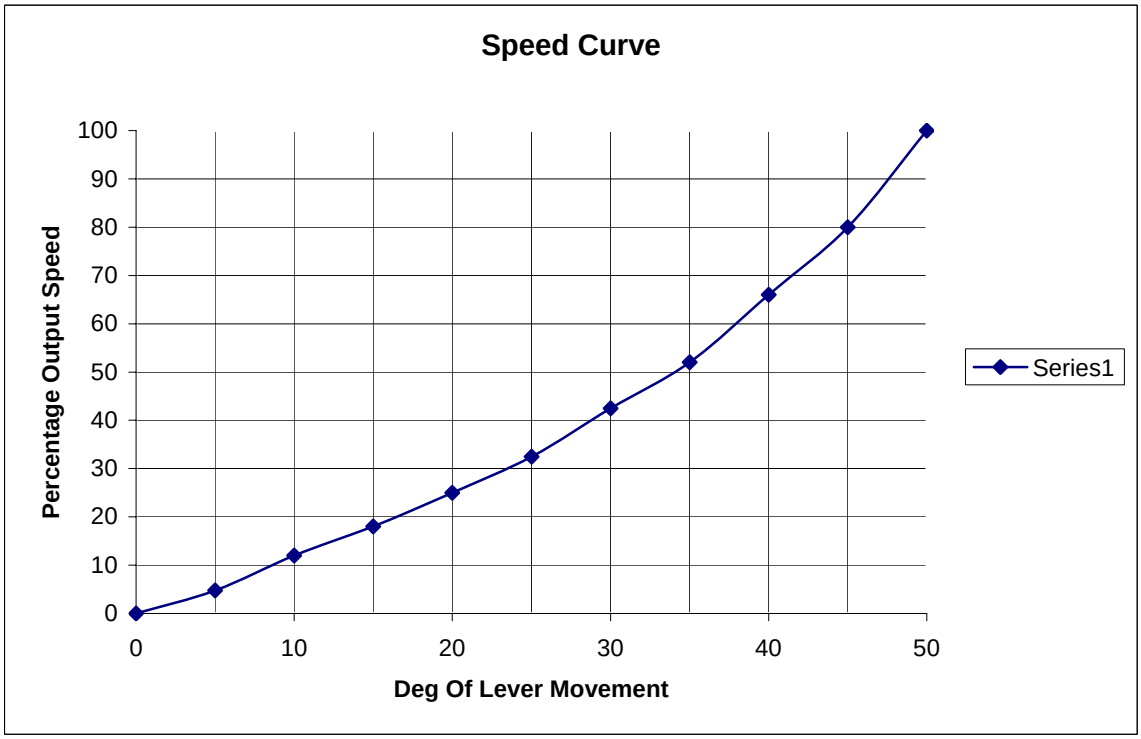
Randolph Austin Co

JK-3, Reversible,
Model for dimension

SIZE	DWG. NO.	REV.
A	04-0015	
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

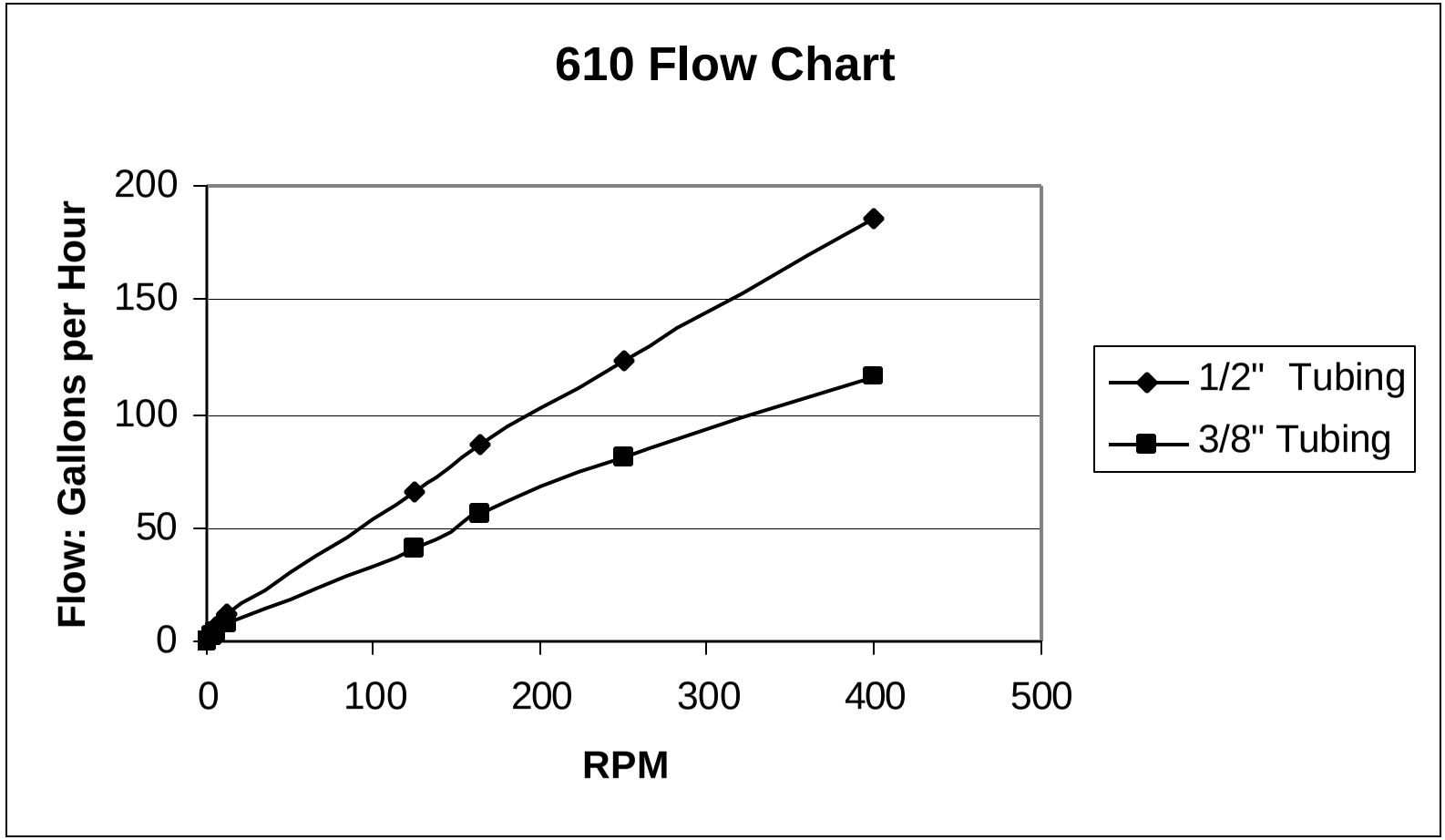
Lubrication: Units come sealed and pre-lubricated from the factory.

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

Date of Preparation: 03-25-2009 **Revision: A**

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: Tube Lube ™ / Lubricant / Chemical Family - oxygenated hydrocarbon
Manufacturer: Randolph Austin Company, 2119 FM 1626, Manchaca, TX 78652 **Tel :** 512-282-1590 **Fax:** 512-280-0678

Section 2 – HAZARDOUS INGREDIENTS/INDENTITY INFORMATION

Hazardous Components/Ingredient Name	CAS Number	% wt *or* % vol
No Hazardous Ingredients	-	-

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Section 3 - Physical and Chemical Properties

Physical State: Liquid
Appearance and Odor: Colorless to Lightly Colored, Mild Odor
Odor Threshold: N/D
Vapor Pressure: N/D
Vapor Density (Air=1): N/A
Specific Gravity (H_2O=1): .959 @ 68 Deg F
Water Solubility: NIL
Boiling Point: > 450 Deg F
Melting Point: N/A
Evaporation Rate (Ethyl Ether = 1) : < 1.000
Freezing Point: 14 Deg F

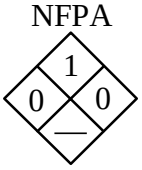
Section 4 - First Aid Measures

Inhalation: None.
Eye Contact: Wear safety goggles upon handling. Flush eyes out for at least 15 minutes while holding eyelids apart.
Skin Contact: Immediately flush skin with plenty of water.
Ingestion: If swallowed, DO NOT induce vomiting. If vomiting occurs spontaneously, keep head below hips to avoid breathing of vomit into lungs.
Carcinogen status: No components, present in excess of 0.1% by weight are listed as carcinogens by IARC, NTP or OSHA
After first aid, get appropriate in-plant, paramedic, or community medical support.

Section 5 - Fire-Fighting Measures

Flash Point: 555 Deg F
Extinguishing Media: Dry Chemical / Carbon Dioxide
Unusual Fire or Explosion Hazards: Vapors concentrated in a confined or poorly ventilated area can ignite upon contact with spark, flame, or heated surface
Hazardous Combustion Products: Carbon Dioxide, Carbon Monoxide, misc. organic compounds, some possibly toxic.

NFPA



Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.
Fire-Fighting Equipment: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

Section 6 - Stability and Reactivity

Stability: Material is stable below temperature of 400^0F.
Polymerization: Hazardous polymerization cannot occur.
Chemical Incompatibilities: inorganic acids and bases, bleaching agents (oxidizers)
Conditions to Avoid: Excessive heat, heated surfaces, static electricity, electric arcs, sparks and flames.
Hazardous Decomposition Products: Hydrogen Chloride.

Section 7- Health Hazard Data

Toxicity Data:

Routes of Entry/Inhalation:
Eye Effects: No hazard expected in normal use.
Inhalation: No hazard expected in normal use.
Skin Effects: No hazard expected in normal use.
Ingestion: Ingestion may cause diarrhea

NTP: No
IARC Monographs: No
OSHA Regulated: No

Section 8 - Handling and Storage

Handling Precautions: None
Storage Requirements: Store at room temperature. Keep away from lights, fire and sparks.
Regulatory Requirements: None

Section 9 - Accidental Release Measures

Spill /Leak Procedures: Wear protective equipment, contain spill. If liquid, soak up spill with sand, earth, or sawdust. Shovel, sweep or vacuum up and place in dry, clean container.

Section 10 – Control Measures

N/A

Section 11 - Disposal Considerations

Disposal: Material that cannot be used or chemically reprocessed should be disposed of at an approved facility in accordance with State and local regulations

Section 12 - Other Information

Date Prepared: March 25, 2009.
Revision Notes:

Additional Hazard Rating Systems:

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