

P-80 Rubber Assembly Lubricants

Providing Assembly and Cleaning Solutions since 1923



Company Overview

International Products Corporation (IPC), incorporated in 1923, manufactures specialty chemicals. IPC has over 90 years experience manufacturing and selling precision cleaners and formulated lubricants to various industries.

All products are manufactured in the U.S.A. at their New Jersey headquarters and are available worldwide.

International Products Corporation is an ISO 9001:2008 Certified Company



Company Headquarters



Distributor Locations



Why Use Rubber Assembly Lubricants

- Rubber materials are inherently difficult to install, remove, or otherwise manipulate – even when wet
 - Common Assembly Problems Include
 - > Rolling O-rings
 - > Uneven cuts
 - > Misaligned parts
 - Damaged parts
 - > Sore muscles, worker injury
 - Repetitive Stress Injury (RSI)





A Rubber Lubricant Should:

Reduce Installation Force

- Reduce surface tension
- Slide parts into place easily, providing a tight fit

Achieve Closer Fits

- Design lower tolerance parts
- Increase torque installation
- Temporary lubrication only resulting in a tight fit

Improve Product Performance

• Reduce or eliminate damage to parts

Increase Production Rates

• Allow for faster, more productive assembly







A Rubber Lubricant Should:

Avoid Injuries

- Avoid musculoskeletal, slippage, and repetitive stress related injuries
- Safe to handle

Reduce Rejects

- Must be compatible with surfaces and liquids with which it may come in contact
- No shrinking, softening, swelling, crazing or rusting
- Should dry without residue when properly applied

Environmentally Friendly, Easy to Dispose







Items to Consider when Choosing a Lubricant

- 1. Surface compatibility
 - Metals
 - Elastomers
 - Plastics
- 2. Dry time
- 3. Lubricant conductivity
- 4. Chemical composition concerns







Types of Commonly Used Lubricants

- Soap and Water
- Alcohol
- Kerosene
- Silicone
- Petroleum Oil
- Petroleum Jelly
- New, ester based, biodegradable choices





Efficiency of Lubricants

- **Solvents** (e.g. alcohol) Provide poor lubrication, are flammable with high VOCs and are a safety risk
- Soaps and detergents provide a nominal amount of lubricity but reactivate when wet
- **Petroleum distillates** lubricate, but are often not compatible with surfaces – and are not temporary
- Ester technology provides excellent reduction in friction, temporary lubrication, environmental and worker safety.

Comparison of Lubricants





- Belts
- Boots
- Bumpers
- Bushings
- Diaphragms
- Fasteners
- Foam grips
- Gaskets
- Grommets
- Hoses
- Insulators

- Mounts
- O-rings
- Plugs
- Rubber moldings
- Seals
- Sleeves
- Threaded connectors
- Tires
- Rubber washers
- Wire harnesses
- …And hundreds of other rubber and soft plastic parts















Why Use a Specially Formulated Temporary Rubber Lubricant?

- 1. Consistent Composition
- 2. Low Impurities
- 3. Green Chemistry
- 4. Favorable Compatibility
 - Petroleum-based products have a tendency to swell certain rubbers and damage plastics
 - Soap and water can cause corrosion and future slippage when wet
 - Silicon interferes with coating and painting







Formulated Temporary Rubber Assembly Lubricants

- 1. Why esters?
 - Molecular structure is conducive to lubrication
 - Structurally flexible functional groups;
 C-O-C bonds can rotate easier than other functional groups
 - Performance over volume a little goes a long way
 - Do not fluoresce
 - o Improving leak test results







Formulated Temporary Rubber Assembly Lubricants

- 2. Innovative Emulsion Technology
 - Synthetic esters blended with water
- 3. Why an emulsion?
 - Synergy!
 - Emulsion has better lubrication than esters by themselves
 - Reduces surface tension of rubber to allow esters to get into all of the nooks and crannies of the rubber
 - Allows a <u>thin</u> layer of esters to coat the rubber for hydrodynamic lubrication
 - Temporary lubrication Once water evaporates, ester film absorbs into elastomer







Lubricant Comparison Chart

ESTER BASED TEMPORARY RUBBER ASSEMBLY LUBRICANTS	TRADITIONAL RUBBER ASSEMBLY LUBRICANTS
Provide lubricity and reduce friction.	Provide lubricity and reduce friction.
Temporary lubrication, once dry will not reactivate, resulting in tight fitting parts.	Continual lubrication, can reactivate in presence of water — resulting in problems with quality and consistency of finished product.
Will not dry out rubber or corrode metal parts.	Can dry out rubber and corrode metal parts.
Any residue is non-conductive.	Many additives are conductive.
Non flammable, negligible VOCs.	May contain VOCs. May be flammable.
Excess lubricant washes away easily.	In some cases may be difficult to wash away excess lubricant.
Compatible with elastomers and plastics. Will not swell rubber.	May not be compatible with elastomers and plastics. Can swell rubber.
Treated surfaces can be coated and painted afterwards.	May interfere with downstream coating and painting processes.
Environmentally friendly and non-hazardous.	Environmental and health hazards can exist.



IPC's P-80[®] Family of Temporary Rubber Assembly Lubricants

P-80® Emulsion Temporary Rubber Assembly Lubricant

- P-80® THIX Temporary Rubber Lubricant Gel
- P-80[®] Grip-it Quick-Drying Temporary Rubber Assembly Lubricant
- P-80® RediLube Temporary Rubber Assembly Lubricant
- P-80[®] Emulsion IFC* Temporary Rubber Assembly Lubricant
- P-80® THIX IFC* Temporary Rubber Lubricant Gel



*IFC for Incidental Food Contact Applications. Registered with NSF for use in USDA H1 applications and meet FDA regulation 21 CFR 178.3570 which controls lubricants in contact with food surfaces.



P-80[®] Temporary Rubber Assembly Lubricant Product Specifications

	P-80® EMULSION	P-80® THIX	P-80® GRIP-IT	P-80® REDILUBE	P-80® EMULSION (IFC)	P-80® THIX (IFC)
Viscosity, cps @ 25° C	150	12,000	20	20	150	15,000
Biodegradable	Yes	Yes	No	Yes	Yes	Yes
Reduction of Friction	~70%	~70%	~40%	~55%	~70%	~70%
Estimated minimum dry time	1 hour	2 hours	20 minutes	20 minutes	1 hour	2 hours
pH (neat)	7.5 to 9.5	7.5 to 9.5	9.8 to 11.3	7.5 to 9.5	7.5 to 9.5	8.2 to 9.4
Appearance	Milky white to beige	White to beige gel	Clear, colorless	Milky white to light yellow	Milky white to beige	White to beige gel
Shelf life	2 years	2 years	2 years	1 year	2 years	2 years



Lubrication over time chart





Lubrication -vs- Drying Time



Reduction of friction data was created using a force gauge comparing both the dry and wet removal forces of hoses on an end cap. The equipment used; Mecmesin AFG 1000N force gauge, a Mecmesin Multi Test 2.5-d automatic test stand, and accessories to hold the cap and hose in place. The test stand is set to a fixed speed and path distance to control variability.



Benefits of P-80®

- Reduces friction during assembly
- Improves ergonomics and avoids injuries
- Increases outputs and reduces rejects
- Obtains closer fits
- Safe and economical to use
- Once dry, will not re-lubricate, even in the presence of water
- Compatible with most surfaces
- No petroleum distillates
- No silicon or CFCs
- Ready to use no need to dilute



Typical Automotive Assembly Applications





Typical Truck Assembly Applications









• BOOT ASSEMBLY • DRIVE SHAFT







•SEAL ASSEMBLY • Drive shaft • Axle







- HOSE FITTINGS
 Radiator
 Cooler
 - Fluid lines

SEALS





- DOOR SEALS
- TRUNK SEALS
- WINDOW SEALS
- WEATHER STRIPING

P-80[®] Storage and Handling

- P-80® lubricants should be stored at temperatures between 2°— 30° (36°— 86°F) in the original sealed container.
 Do not store outdoors in direct sunlight during warm weather.
- For proper inventory control, use oldest material first. Each container has a lot number that gives the date (yymmdd) that the material was produced. For instance, lot number 140105 was produced in 2014 (14), during January (01), on the fifth day (05). If your plant personnel know this dating system, they can avoid using new material while older stock is available. For shelf life, please refer to the appropriate Safety Data Sheet.
- Before dispensing P-80 Emulsion and P-80 Emulsion IFC from drums, stir with a mixing recirculation pump or folding propeller mixer for 5 to 10 minutes to ensure a homogenous mixture is drawn off. If a hold tank is used, agitate the lubricant before it is fed to assembly equipment. Smaller containers should be shaken or stirred prior to use. <u>Never</u> use air agitation on any P-80 product. Bubbling compressed air through P-80 lubricants may introduce bacteria that can overpower the preservatives causing separation or spoilage.
- Store P-80 lubricants in a sealed container when not in use. Do not pour dispensed product back into the original container.
- P-80 Emulsion IFC and P-80 THIX IFC meet the requirements of 21 CFR 178.3570, which controls lubricants for incidental food contact. Use the minimum amount of lubricant needed to lubricate the part. Apply it in a way that minimizes food contact.
- All equipment and storage tanks, including transfer lines, containers, reservoirs, mixers, and pumps in contact with P-80 lubricants should be cleaned at least once a month using a mild detergent such as International Products' LF2100® Liquid Low-Foam Cleaner or Micro-90® Concentrated Cleaning Solution. Rinse with potable water. Samples of each cleaner are available from International Products Corporation. Follow cleaning with a sanitizer rinse (see section B for details). This procedure is particularly important in hot or dirty work areas.
- Do not mix P-80 with other chemicals.
- Do not dilute P-80 with water.
- Excess P-80 can be wiped or washed away with soap and water.
- For safety details and shelf life, please refer to the appropriate Safety Data Sheets.



P-80[®] Plastic Compatibility At Room Temperature

CONCLUSION: P-80 lubricants were found to be compatible with the plastics listed below when immersed for a total of ten days at room temperature. *Customers are encouraged to conduct their own tests before using P-80 lubricants*.

		1 Day, %∆					10 Days, %∆					
PLASTIC	PROPERTY	P-80 Emulsion	Р-80 Тніх	P-80 Grip-It	P-80 Redi- Lube	Tap Water	P-80 Emulsion	Р-80 Тніх	P-80 Grip-It	P-80 Redi- Lube	Tap Water	
ABS	%∆ Mass %∆ Hardness %∆ Swell	+ 0.2 - 2.5 + 0.4	+ 0.2 - 1.4 + 0.5	+ 0.2 - 0.4 + 0.1	+ 0.3 - 3.3 + 0.1	+ 0.2 -0.6 - 0.1	+ 0.3 - 1.2 + 0.1	+ 0.4 - 3.7 + 0.7	+ 0.5 + 0.6 0.0	+ 0.1 - 1.4 - 0.2	+ 0.4 - 1.5 - 1.1	
Polymethyl Methacrylate*	%∆ Mass %∆ Hardness %∆ Swell	+ 0.1 - 1.1 0.0	+ 0.2 + 0.7 + 0.3	+ 0.2 - 1.1 0.0	+ 0.2 - 1.4 + 0.1	+ 0.1 - 0.7 0.0	+ 0.5 - 1.8 + 0.3	+ 0.7 0.0 + 0.1	+ 0.7 - 0.5 + 0.2	+ 0.7 - 0.5 + 0.2	+ 0.5 - 2.5 - 0.4	
Acetal	%∆ Mass %∆ Hardness %∆ Swell	+ 0.1 0.0 + 0.2	+ 0.1 0.0 0.0	+ 0.1 - 1.3 0.0	+ 0.1 - 0.2 + 0.1	+ 0.1 + 0.6 0.0	+ 0.3 - 0.9 + 0.5	+ 0.4 - 0.4 + 0.2	+ 0.3 - 1.1 + 0.3	+ 0.3 - 0.2 + 0.1	+ 0.4 - 2.1 + 0.1	
HDPE	%∆ Mass %∆ Hardness %∆ Swell	0.0 - 2.8 - 0.1	0.0 - 2.3 + 0.3	0.0 + 1.1 - 0.1	0.0 - 2.1 - 0.4	0.0 + 3.4 + 0.1	0.0 - 5.6 - 0.2	0.0 - 4.9 + 0.1	0.0 + 2.7 - 0.2	0.0 - 2.3 - 0.6	0.0 - 0.8 + 0.5	
PETG	%∆ Mass %∆ Hardness %∆ Swell	+ 0.1 - 1.8 - 0.3	+ 0.1 - 0.9 + 0.1	+ 0.1 + 0.4 - 0.1	+ 0.1 0.0 0.0	+ 0.1 - 0.4 + 0.1	+ 0.2 - 2.5 + 0.1	+ 0.3 - 2.1 + 0.1	+ 0.2 - 1.7 - 0.2	+ 0.2 - 1.9 + 0.1	+ 0.2 - 3.1 + 0.1	
Polycarbonate*	%∆ Mass %∆ Hardness %∆ Swell	+ 0.1 - 1.2 0.0	+ 0.1 - 0.4 - 0.1	+ 0.2 + 0.2 0.0	+ 0.1 - 0.4 0.0	+ 0.1 - 0.8 - 0.1	+ 0.1 - 1.9 + 0.2	+ 0.2 - 1.2 0.0	+ 0.1 - 1.2 0.0	+ 0.1 + 0.6 + 1.0	+ 0.1 - 0.6 0.0	
Polyetherimide	%∆ Mass %∆ Hardness %∆ Swell	+ 0.2 - 0.7 + 0.1	+ 0.2 - 0.2 + 0.1	+ 0.1 + 0.5 - 0.1	+ 0.2 - 0.4 + 0.3	+ 0.2 - 0.9 - 0.1	+ 0.5 - 1.1 + 0.4	+ 0.7 - 0.4 + 0.4	+ 0.5 0.0 + 0.1	+ 0.4 - 0.2 + 0.2	+ 0.5 - 0.9 - 1.5	
Polypropylene	%∆ Mass %∆ Hardness %∆ Swell	0.0 - 1.9 + 0.5	0.0 - 1.5 0.0	0.0 + 4.1 0.0	0.0 0.0 - 0.1	0.0 + 4.1 - 0.6	+ 1.0 - 1.7 + 0.1	0.0 - 0.4 + 0.2	0.0 + 4.1 0.0	0.0 - 1.3 - 0.1	0.0 + 2.0 - 0.7	
PPO*	%∆ Mass %∆ Hardness %∆ Swell	0.0 - 0.4 0.0	0.0 - 0.9 - 0.1	0.0 + 0.2 + 0.1	0.0 - 0.6 - 0.2	0.0 + 0.2 + 0.4	+ 0.1 - 0.4 0.0	0.0 - 1.3 0.0	+ 0.1 + 0.2 0.0	0.0 + 0.6 - 0.3	+ 0.1 + 0.4 0.0	
PVC	%∆ Mass %∆ Hardness %∆ Swell	0.0 - 0.6 + 0.4	0.0 - 1.1 0.0	0.0 + 1.0 0.0	0.0 + 0.2 - 0.2	0.0 - 0.8 - 0.4	+ 0.1 - 0.6 0.3	0.0 - 0.8 0.0	0.0 + 0.4 0.0	+ 0.1 + 0.6 - 0.3	+ 0.1 - 0.6 - 0.4	
Polytetra- fluoroethylene	%∆ Mass %∆ Hardness %∆ Swell	0.0 + 2.0 - 0.1	0.0 + 1.3 0.0	0.0 - 3.9 - 0.4	0.0 - 2.6 0.0	0.0 + 7.9 - 0.5	0.0 - 0.3 + 0.2	0.0 + 0.3 + 0.2	0.0 - 3.6 - 0.4	0.0 - 2.0 0.0	+ 0.1 + 1.8 - 0.4	
Polyamide 6	%∆ Mass %∆ Hardness %∆ Swell	+ 0.6 - 1.6 + 0.5	+ 0.7 - 2.2 + 0.4	+ 0.6 - 2.7 + 0.6	+ 1.4 - 3.4 + 0.5	+ 0.6 - 1.7 + 0.3	+ 2.2 - 8.6 +1.4	+ 2.4 -12.8 + 1.3	+ 2.3 - 8.6 + 1.3	+ 2.6 -10.7 + 1.3	+ 2.2 -11.5 + 1.2	

<u>KEY</u>

ABS - Acrylonitrile butadiene styrene
HDPE - High Density Polyethylene
PETG - Polyethylene terephthalate glycol-modified
PPO - Polyphenylene Oxide – Styrene
PVC - Polyvinyl chloride
*Under strain, these plastics may show crazing.

METHOD

Modified version of ASTM D543-95, Practice A; Room Temp. Mass: Analytical Balance, 0.0001 grams; CoV – 4.0E-6% Hardness: Shore D Durometer, 1 – 100 HD; CoV – 0.32% Swell: Mitutoyo Micrometer, 0.001 mm, CoV – 0.11%

P-80[®] Elastomer Compatibility At Room Temperature

CONCLUSION: While there are no standard specifications for excessive swell and hardness data, minimal changes are regarded as between -5 to +20% and -5 to +10 points, respectively¹. (Vecchio, 2001) Based on these criteria, P-80 lubricants have acceptable swell and hardness compatibility results after 10 days. Mass compatibility results are favorable compared to the tap water control samples. *Customers are encouraged to conduct their own tests before using P-80 lubricants*.

		1 Day, %∆					10 Days, %∆					
ELASTOMER	PROPERTY	P-80 EMULSION	Р-80 Тніх	P-80 Grip-It	P-80 Redi- Lube	Tap Water	P-80 EMULSION	Р-80 Тніх	P-80 Grip-It	P-80 Redi- Lube	Tap Water	
Buna N	%∆ Mass	+ 0.2	+ 0.2	+ 0.2	+ 0.9	+ 0.1	+ 0.9	+ 0.8	+ 0.7	+ 3.5	+ 0.2	
	∆ Hardness, pts	+ 1.8	+ 0.2	- 1.0	- 1.0	+ 1.2	+ 0.5	- 1.5	- 1.2	- 3.0	+ 2.7	
	%∆ Swell	0.0	- 0.3	+ 0.9	+ 0.1	+ 0.1	- 0.2	- 0.3	+ 0.1	+ 2.2	- 0.8	
Butyl	%∆ Mass	+ 0.1	+ 0.1	0.0	+ 0.5	0.0	+ 0.4	+ 0.5	+ 0.2	+ 2.1	+ 0.1	
	∆ Hardness, pts	+ 0.7	- 0.7	- 4.3	- 2.0	- 0.3	- 2.1	- 1.7	- 1.2	- 1.7	- 0.5	
	%∆ Swell	+ 0.1	+ 0.5	- 0.1	+ 0.3	+ 0.2	- 0.5	+ 0.7	- 1.1	+ 2.2	- 0.2	
ECH	%∆ Mass	+ 0.4	+ 0.6	+ 0.7	+ 1.1	+ 0.4	+ 1.1	+1.2	+ 2.2	+ 2.2	+ 1.4	
	∆ Hardness, pts	- 0.7	- 0.3	- 4.0	+ 0.5	+ 4.7	- 4.0	- 4.3	- 1.3	- 1.0	+ 4.8	
	%∆ Swell	- 0.5	- 0.3	- 0.1	+ 0.1	+ 0.3	- 0.2	- 0.2	+ 0.6	+ 0.4	+ 0.8	
EPDM	%∆ Mass	+ 0.1	+ 0.1	0.0	+ 0.7	0.0	0.0	+ 0.6	+ 0.2	+ 2.6	+ 0.1	
	∆ Hardness, pts	- 1.8	- 2.3	- 3.7	- 0.8	- 1.5	- 2.5	- 5.3	- 4.5	- 1.8	- 3.3	
	%∆ Swell	+ 0.2	- 0.3	+ 0.4	+ 0.2	- 0.8	+ 0.2	- 0.2	+ 0.8	+ 0.9	- 0.8	
Natural Gum Rubber	%∆ Mass ∆ Hardness, pts %∆ Swell	+ 0.1 - 1.8 - 0.1	+ 0.2 - 1.2 - 0.7	+ 0.4 - 2.2 + 0.5	+ 0.9 - 0.8 + 0.7	+ 0.1 + 1.3 + 0.0	+ 0.8 - 1.3 - 0.2	+ 1.2 - 3.3 - 0.6	+ 1.5 - 3.0 + 0.7	+ 4.4 - 3.8 + 1.7	+ 0.2 - 0.7 + 0.1	
Neoprene	%∆ Mass	+ 0.2	+ 0.3	+ 0.4	+ 1.1	+ 0.1	+ 1.2	+ 1.4	+ 1.5	+ 4.3	+ 0.5	
	∆ Hardness, pts	- 2.2	+ 0.5	- 2.7	- 2.3	- 1.7	- 4.7	- 3.7	- 4.7	- 6.5	- 3.5	
	%∆ Swell	- 0.1	+ 0.3	+ 0.8	0.0	+ 0.1	+ 0.8	+ 0.6	+ 1.1	+ 2.8	- 0.1	
SBR	%∆ Mass	+ 0.2	+ 0.3	+ 0.2	+ 1.1	+ 0.1	+ 1.0	+ 1.2	+ 0.6	+ 4.2	+ 0.2	
	∆ Hardness, pts	- 2.8	- 0.2	- 2.2	- 2.3	+ 4.0	- 9.0	- 2.0	- 5.8	- 7.8	+ 1.8	
	%∆ Swell	+ 0.1	+ 0.3	- 0.1	+ 1.4	+ 0.1	+ 1.5	+ 1.2	+ 0.5	+ 5.2	+ 0.1	
Silicone	%∆ Mass	+ 0.3	+ 0.2	+ 0.1	+ 1.2	0.0	+ 0.9	+ 1.0	+ 0.6	+ 4.9	0.0	
	∆ Hardness, pts	- 2.2	+0.2	+ 1.0	- 4.1	+ 0.7	- 1.3	- 0.3	+ 5.3	+ 4.2	- 0.7	
	%∆ Swell	- 0.1	+ 0.6	0.0	+ 0.2	+ 0.4	+ 0.7	+ 0.9	+ 0.3	+ 5.0	+ 0.6	
Viton	%∆ Mass	+ 0.1	+ 0.1	0.0	+ 0.1	0.0	+ 0.2	+ 0.3	+ 0.2	+ 1.1	+ 0.1	
	∆ Hardness, pts	- 2.2	- 1.3	- 1.0	- 3.8	+ 1.3	- 2.7	- 3.0	- 3.5	- 1.8	- 05	
	%∆ Swell	- 0.1	- 0.3	+ 0.5	- 0.5	- 0.1	- 0.5	0.0	+ 0.4	+ 0.8	+ 0.6	

P-80[®] Metal Compatibility At Room Temperature

Customers are encouraged to conduct their own tests before using P-80 lubricants. Underlined = Not Recommended *P-80 RESIDUE WILL DISCOLOR COPPER AND COPPER ALLOYS.

			14 Days, %∆								
METAL	PROPERTY	P-80 EMULSION	Р-80 Тніх	P-80 Grip-It	P-80 Redi- Lube	Tap Water	P-80 EMULSION	Р-80 Тніх	P-80 Grip-It	P-80 Redi- Lube	Tap Water
	%∆ Mass	0.00	0.00	<u>- 0.15</u>	- 0.01	0.00	0.00	0.00	<u>- 0.44</u>	- 0.02	- 0.05
1100	Δ Appearance	No change	No change	<u>Darker</u> <u>overall</u>	No change	Several pinpoints	No change	No change	Black	No change	Pinpoint s
*BRASS	$\%\Delta$ Mass	- 0.01	- 0.35	- 0.04	- 0.01	0.00	- 0.02	- 0.36	<u>- 0.47</u>	- 0.02	0.00
ALLOY 260	Δ Appearance	No change	Dull finish	Faded Appearance	No change	Dark spots	Faded appearance	Darker outlines	<u>Faded</u> appearance	Dark spots	Dark spots
*BRONZE	%∆ Mass	- 0.01	- 0.01	- 0.04	- 0.01	0.00	- 0.02	- 0.02	<u>- 0.50</u>	- 0.03	0.00
ALLOY 220	Δ Appearance	No change	No change	Faded appearance	No change	Dark spots	Faded appearance	Dark spots	<u>Faded</u> appearance	Dark spots	Dark spots
1008 COLD	%∆ Mass	0.00	0.00	- 0.01	0.00	- 0.04	0.00	0.00	- 0.06	- 0.01	- 0.47
ROLLED STEEL	Δ Appearance	No change	No change	No change	No change	No change	No change	No change	Pinpoints	No change	<u>Rust</u> spots
*COPPER	%∆ Mass	- 0.01	- 0.01	- 0.05	- 0.01	0.00	- 0.02	- 0.02	<u>- 0.51</u>	- 0.01	0.00
ALLOY CA 110	Δ Appearance	No change	No change	Faded appearance	No change	Darker outlines	Faded appearance	Dark spots	<u>Faded</u> appearance	Dark spots	Darker outlines
	%∆ Mass	0.00	0.00	0.00	0.00	0.00	- 0.01	- 0.01	0.00	- 0.01	0.00
MONEL 400	Δ Appearance	No change	No change	No change	No change	No change	No change	No change	No change	No change	No change
304	%∆ Mass	0.00	0.00	0.00	0.00	0.00	- 0.01	0.00	0.00	0.00	0.00
STAINLESS STEEL	Δ Appearance	No change	No change	No change	No change	No change	No change	No change	No change	No change	No change
TITANIUM	$\%\Delta$ Mass	0.00	0.00	0.00	0.00	0.00	0.00	- 0.01	0.00	0.00	0.00
ALLOY, 8% Mn	Δ Appearance	No change	No change	No change	No change	No change	No change	No change	No change	No change	No change





Contact us for product information and samples or a copy of this presentation International Products Corporation

USA Headquarters 201 Connecticut Drive Burlington NJ 08016 USA Tel. 609-386-8770 Fax. 609-386-8438

Kathy Wyrofsky, President 609-386-8770 x213 kwyrofsky@ipcol.com

Tom McGuckin, VP Research and Quality 609-386-8770 x210 tmcguckin@ipcol.com

Michele Christian, Marketing Director 609-386-8770 x222 mchristian@ipcol.com Judy Shapiro, Account Specialist 609-386-8770 x 217 jshapiro@ipcol.com

Website: www.ipcol.com

U.K. Branch

Unit 5 Green Lane Business Park 238 Green Lane - London SE9 3TL U.K. Tel. 0208 857 5678 Fax. 0208 857 1313 saleseurope@ipcol.com

Thank you!