

The Metal Cleaner™

SOLVENT-FREE METAL & PARTS WASHING COMPOUND

PRODUCT DESCRIPTION:

The Metal Cleaner is a solvent free, moderately foaming, water dilutable detergent complex formulated to safely remove moderate industrial soils. The Metal Cleaner has a very mild "soapy" fragrance . . . is amber in color . . . water thin.

SAFE ALTERNATIVE FOR CHLORINATED AND NON-CHLORINATED SOLVENTS:

Due to the hazards of chlorinated solvents, solvents in general and high alkaline compounds, IPG/Spartan developed The Metal Cleaner to be a cost effective alternative for Trichlor, Perchlor, Methylene chloride, Carbon tetrachloride and other highly hazardous materials.

Chlorinated and non-chlorinated solvents such as 1,1,1-Trichloroethane, Trichloroethylene, Perchloroethylene, kerosene, have been used in industry for decades when the task involved heavy industrial cleaning due to the fact that these types of products offer outstanding cleaning performance, fast dry time and economical cost. However, due to potential health hazards, negative environmental impact, today's high disposal costs of hazardous materials, as well as regulations like SARA Title III, industry is seeking alternatives that offer a combination of exceptional cleaning performance and rust preventative features as well as being safe for individuals and the environment. In other words, industry has been seeking suitable alternatives for Trichlor, Perchlor, Methylene chloride, etc., but the substitutes offered previously either did not perform, exchanged one hazard for another or were too high in price. For example, some manufacturers replaced the high health hazards of chlorinated solvents with non-chlorinated solvents. However, the problem of flammability, trade waste disposal and vapor remained.

In the formulation of The Metal Cleaner, IPG/Spartan chemists have created revolutionary emulsification technology that to our knowledge has never been previously accomplished. This creative chemistry provides in The Metal Cleaner a product with the features, advantages and benefits of trichlor type products . . . without the negative effects to people and the environment.

The following charts demonstrate The Metal Cleaner's excellent corrosion protection for a variety of metals.

CORROSION TEST RESULTS
(TESTS WERE AT 120°F FOR 120 HOURS)

THE METAL CLEANER (10:1 DILUTION)			
METALS	WEIGHT	MARGIN OF ERROR	RATING
ALUM. 2024-T6	0.05	±0.05	0
ALUM. 6061	0.04	±0.02	0
ALUM. 7075	0.02	±0.01	0
BRASS	0.007	±0.007	0
COPPER	0.05	±0.03	0
STEEL	0.05	±0.03	0
CAST IRON	0.02	±0.02	0
MAGNESIUM	0.02	±0.01	0
LOW-CADMIUM PLATED STEEL	0.04	±0.002	0

THE METAL CLEANER (20:1 DILUTION)			
METALS	WEIGHT	MARGIN OF ERROR	RATING
ALUM. 2024-T6	0	±0.05	0
ALUM. 6061-T6	0.05	±0.02	0
ALUM. 7075-T6	0	±0.01	0
BRASS	0	±0.02	0
COPPER	0	±0.05	0
STEEL	0	±0.03	0
CAST IRON	0.02	±0.02	0

THE METAL CLEANER (30:1 DILUTION)			
METALS	WEIGHT	MARGIN OF ERROR	RATING
ALUM. 2024-T6	0.01	±0.01	0
ALUM. 6061-T6	0	±0.02	0
ALUM. 7075-T6	0	±0.01	0
BRASS	0	±0.02	0
COPPER	0	±0.05	0
STEEL	0	±0.03	0
CAST IRON	0.02	±0.02	0

RATING 0 = NO STAIN 3 = MODERATE <50% AREA
 SCALE: 1 = LIGHT <50% AREA 4 = MODERATE >50% AREA
 2 = LIGHT >50% AREA 5 = EXTREME BLACK
 NOTE: NO "WHITE RUST" OR PITTING WAS OBSERVED ON THE ALUMINUM

MULTI METAL CORROSION PROTECTION:

The Metal Cleaner formula includes multiple rust and corrosion inhibitors to inhibit rust and corrosion on aluminum, steel, cast iron, stainless steel, brass, copper, Hastelloy, Inconel, Titanium, Tantalum, Magnesium, at concentrations ranging from 2:1 (43 oz./gal.) through 30:1 (4 oz./gal.). The Metal Cleaner is safe on plastic, glass, ceramic, synthetic rubber, typical o-rings and seals made of Viton, Buna-N, Neoprene, Teflon, polyethylene, polypropylene and most other normally used seals, o-rings and tubing.

ENVIRONMENTALLY SAFE AND USER FRIENDLY:

Safe for the environment, The Metal Cleaner is biodegradable and phosphate free. The Metal Cleaner greatly reduces hazards to employees in the industrial workplace. Non-flammable. Non-corrosive. No VOCs. No solvents, phenols, phosphates, nitrites, nitrates, PCB's, butyl or other substances known to be toxic or highly hazardous to individuals or the environment.

VERSATILE:

Specifically developed for parts washing operations, The Metal Cleaner may also be used in conjunction with pressure washers, steam cleaners, dip tanks (hot or cold). Wipe on, brush on, use in soak tanks, moderate pressure spray booths and ultrasonic cleaners.

EXCELLENT CLEANABILITY:

Removes grease, cosmoline grease, oily carbon, carbon exhaust, coolant residues, baked on hydraulic and lube oils, motor oils, die lubes, inks, road film, solvent based rust preventatives, lapping compound, printers ink and other general dirt and debris.

SAVES MONEY!

The Metal Cleaner reduces costs associated with chlorinated and highly alkaline pH compounds in three ways:

- 1) Biodegradable and sanitary sewer safe in most areas. Once contaminants such as oils, greases, trace metals, etc. are removed, The Metal Cleaner can be disposed of in most sanitary sewer systems in the United States.
- 2) In certain areas, extra surcharges are added to haul away costs of chlorinated solvents. There are no haul away costs with The Metal Cleaner once contaminants are removed. The Metal Cleaner will greatly reduce trade waste disposal costs at any facility.
- 3) Does not contain any compounds reportable by SARA Title III, Section 313. SARA Title III (Superfund Amendments and Reauthorization Act III), part of the Emergency and Community Right-to-Know Act, requires that amounts of chemicals considered toxic or hazardous, or compounds containing materials considered to be hazardous, must be reported to the EPA. This reporting requirement costs industry millions of dollars each year. The Metal Cleaner does not contain any element that must be inventoried and reported.

GREATLY REDUCES HAZARDOUS WASTE:

The Metal Cleaner can be recycled and reused. The Metal Cleaner rejects oils, grease and other non-water soluble soils after it sets undisturbed for 6 to 24 hours. Oils and greases can be skimmed off the top to keep the washing solution clean and contaminant free. The depleted Metal Cleaner solution can be disposed of in most sanitary sewer drains. Check with Federal, State and local authorities prior to disposal.

IDEAL FOR AIRCRAFT:

Field testing of The Metal Cleaner included extensive work with major airlines who determined The Metal Cleaner to be very effective in cleaning all exterior surfaces, engines, landing gears, brakes, cowlings, generators, starters, and other hard to clean surfaces of prop and jet aircraft.

VAPOR DEGREASING:

Vapor degreasing is a traditional method for cleaning metal parts. This is accomplished by heating chlorinated solvents, such as Trichlor, Perchlor, etc., in a large tank, and then condensing the vapors of this boiling solvent on the cooler metal parts. This vapor

condenses on the parts, flushes off the oily type soils. These soils then drip down and become dissolved in the solvent. This cleaning action continues until the part warms up enough to stop the condensation from occurring. The part is then removed.

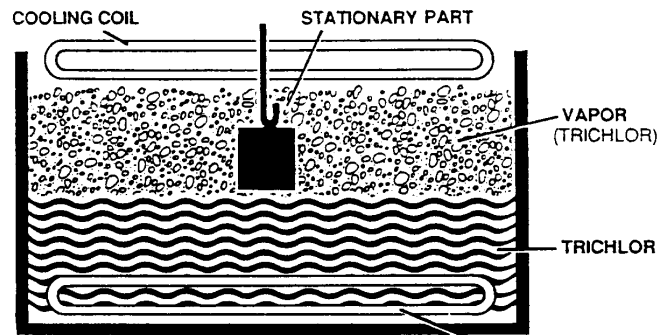
Vapor degreasing is especially effective for removing organic soils, such as oil-based cutting oils, grease, petroleum, and hot melt waxes. It is less effective for fingerprints, water salt, road films, or other water soluble soils. A lot of companies would very much like to get rid of their vapor degreasing equipment, and the Trichlor, Perchlor, etc., that is used in it. However, buying new dip tanks to replace the very expensive vapor degreasing equipment would be quite a jolt to their budget.

IMPORTANT NOTE!

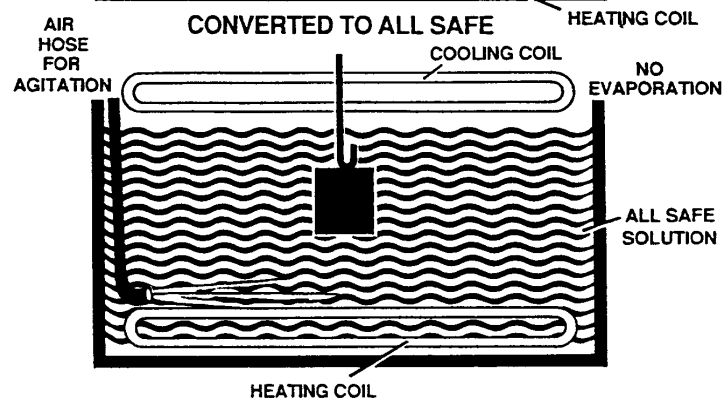
Most vapor degreasers can be modified to handle a solution of The Metal Cleaner. In other words, a company can keep their vapor degreasing equipment and use The Metal Cleaner rather than chlorinated solvents.

This is accomplished by raising the liquid level in the heated tank and extending the part so it hangs into the liquid. Adding an air line down in the liquid provides some agitation in the liquid phase, so that you get better cleaning action. See schematics on next page. Extending the part into the liquid phase, and adding air agitation, provides excellent cleaning action. When the part comes out it can either be air dried, or, if desired, rinsed with plain water and then heat or forced-air dried.

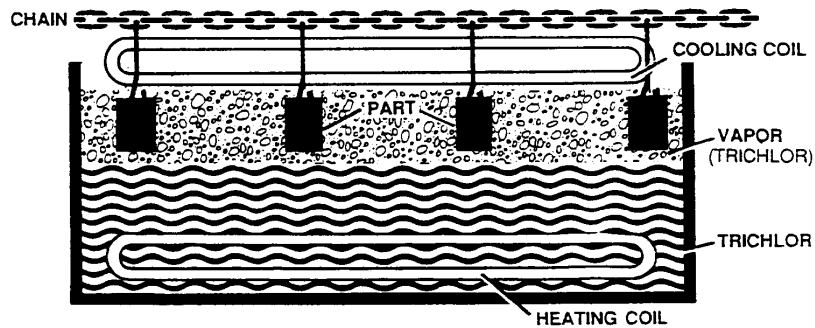
TYPICAL MANUAL LOAD VAPOR DEGREASER



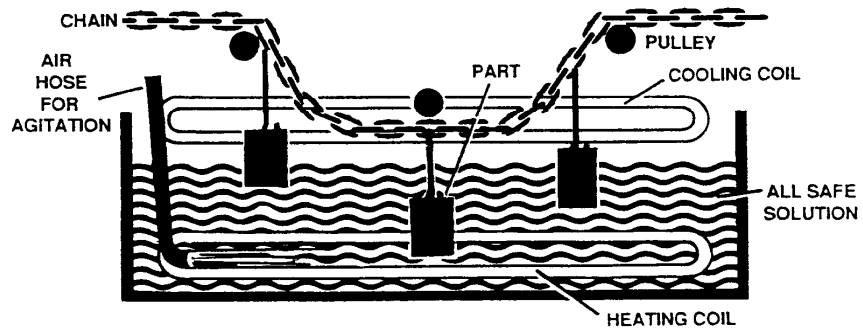
CONVERTED TO ALL SAFE



TYPICAL AUTOMATIC IN LINE VAPOR DEGREASER



CONVERTED TO ALL SAFE



EXCELLENT FILTERABILITY:

A solution of The Metal Cleaner can be easily filtered by settling, cyclonic, or any positive type media filtration equipment. By filtering a solution of The Metal Cleaner, you can remove any solid debris, metal chips and fines, etc., from the solution, extending the life of the The Metal Cleaner tremendously. This greatly reduces the number of times a cleaning solution needs to be changed in a washing operation... greatly reducing any haul away costs incurred by the facility.

TEMPERATURE AND AGITATION GREATLY ENHANCES THE CLEANING ABILITY OF THE METAL CLEANER:

One of the biggest advantages in straight solvents is the tremendous speed in which they will remove petroleum based soils. Straight solvents will instantaneously solubilize most oils, greases, etc. The Metal Cleaner does an excellent job of cleaning these same soils. However, at room temperature, without agitation, it may take a little time to get this job completed.

In physical chemistry, by increasing a temperature by 10°, you double the reaction. The same concept holds true in water-based cleaning compounds. By increasing the temperature of the cleaning solution in a parts dip tank, as an example, you increase the cleaning efficiency of that material tremendously. To match the cleaning ability of a straight solvent, in a lot of cases you may need to increase the temperature of the The Metal Cleaner cleaning solution and/or add some form of agitation. In our field tests of The Metal Cleaner, we have found that the increased temperature and the addition of agitation greatly enhances the performance of The Metal Cleaner in any cleaning operation. By choosing a strong concentration, raising the temperature of the cleaning solution, and with the addition of agitation, The Metal Cleaner will perform any cleaning task done in industry today with chlorinated solvents.

POTENTIAL CUSTOMERS:

Gas stations	Truck lines
Machine shops	Trains
Retail tire outlets	Airplanes
Auto repair shops	Barges
Auto detailers	Shipyards
Body shops	Motorcycle shops
Transmission, rust proofing	Printers
Lawnmower Repair Shops	Heating and air conditioning
Farm implement stores	Manufacturing plants
Bus companies	

DIRECTIONS FOR USE:

1. Dilute with water. See chart for recommended concentration.
2. Apply The Metal Cleaner to soiled metal. Agitation always reduces time and labor costs.
3. If corrosion protection is desirable, do not rinse. Unrinsed metal provides an extremely light rust-preventing layer suitable for indoor storage. If residue-free parts are required, rinse completely with water and dry thoroughly with heat or forced air.

The following recommendations are based on Spartan laboratory studies, independent laboratory studies and major airlines facilities' evaluation.

Type of Cleaning	Type of Metal	Temperature (Fahrenheit)	Soil Condition	Dilution Ratio (Parts water to parts cleaner)	Oz./Gal.
Recirculating & In-Line Parts Washers	Ferrous & Yellow Metals	60°-100°	Medium	5:1	21
		60°-100°	Heavy	3:1	32
		100°-140°	Medium	8:1	14
		100°-140°	Heavy	5:1	21
		140°+	Medium	10:1	12
		140°+	Heavy	8:1	14
	Magnesium, Aluminum & Alloys	60°-100°	Medium & Heavy	5:1	21
		100°-140°	Medium & Heavy	8:1	14
		140°+	Medium	15:1	8
		140°+	Heavy	10:1	12
Ultrasonic Cabinet Spray Booth	All Metals	60°-100°	Medium	5:1	21
		60°-100°	Heavy	3:1	32
		100°-140°	Medium	10:1	12
		100°-140°	Heavy	5:1	21
		140°+	Medium	15:1	8
		140°+	Heavy	10:1	12
Hot Dip	Ferrous & Yellow Metals	100°-140°	Medium	8:1	14
		100°-140°	Heavy	5:1	21
		140°+	Medium	15:1	8
		140°+	Heavy	10:1	12
	Magnesium, Aluminum & Alloys	100°-140°	Medium & Heavy	8:1	14
		140°+	Medium	15:1	8
Cold Dip	Ferrous & Yellow Metals	60°-100°	Medium Heavy	5:1	21
		60°-100°		3:1	32
	Magnesium, Aluminum & Alloys	60°-100°	Medium & Heavy	5:1	21
Pressure Wash Cold	All Metals	60°-100°	Medium & Heavy	5:1	21
Pressure Wash Hot	All Metals	100°-140°	Medium & Heavy	10:1	12
		140°+	Medium & Heavy	15:1	8
Steam Cleaning	All Metals		Medium & Heavy	15:1	8
Foam Gun Hot and Cold	All Metals	60°-100°	Medium	5:1	21
		60°-100°	Very Heavy	3:1	32
		100°-140°	Medium	8:1	14
		100°-140°	Very Heavy	3:1	32
		140°+	Medium	10:1	12
		140°+	Very Heavy	3:1	32
Hand Wipe	All Metals		Medium	10:1	12
			Heavy	5:1	21
			Very Heavy	3:1	32
Trigger & Pump-Up Sprayer	All Metals		Medium	5:1	21
			Heavy	3:1	32

**EASY CONCENTRATION CONTROL USING THE
AO MODEL 10440 REFRACTOMETER**

Check the concentration of The Metal Cleaner in water by using the following refractive index vs. concentration chart.

<u>Refractive Index</u>	<u>Dilution Ratio</u>
8.4	2:1
4.2	5:1
2.2	10:1
1.6	15:1
1.2	20:1
0.9	25:1
0.7	30:1

TECHNICAL DATA:

Total Active Ingredients -- 25.0

Specific Gravity -- 1.0466 @ 24°C/75°F

Density -- 8.71 lbs./gal. @ 24°C/75°F

Viscosity -- Water thin pH (Concentrate) -- 9.0

Flash Point -- None

Solvents (Aromatic and Aliphatic) -- None

Stability --

- Shelf @ 24°C/75°F -- One year minimum
- Accelerated @ 49°C/120°F -- 60 days minimum
- Freeze/Thaw Cycle -- Will withstand a minimum of three freeze/thaw cycles.

Miscibility -- Mixes well with hot or cold water.

Rinsability -- Rinses freely with hot or cold water.

Biodegradable

Phosphate free

PACKAGING:

The Metal Cleaner is available in 330-gallon disposable totes; 275-gallon totes; recyclable HDPE (High Density Polyethylene) 55, 30 and 15-gallon drums; 5-gallon pails and gallons, four per case. Label copy is provided in English and Spanish. Secondary labels are also available.

Be sure to read all Directions, Precautionary and First Aid Statements on product labels before use of this or any IPG/Spartan product. Material Safety Data Sheets for all IPG/Spartan products are available from your authorized IPG/Spartan distributor.

GUARANTEE:

Spartan's modern manufacturing and laboratory control insure uniform quality. If dissatisfied with performance of product, any unused portion may be returned for credit within one year of the date of manufacture.

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