Section 1 – PRODUCT AND COMPANY IDENTIFICATION

Issue Date: September 23, 2015

Material Name: Stainless Steel Weld Studs
Type: Drawn Arc/Non-Coated

Includes Concrete Anchors, Shear Connectors, Punch Shear Resistors, Fully and Partially Threaded, Non-Threaded, Collar Studs, Knock-off Studs, Stud-Weldable Deformed Bar and other specialty stainless steel Weld Stud configurations.

Weld studs covered under this SDS are made from stainless steel of SAE 300 and 400 varieties.

Product Use:

Specialty stud-weldable fasteners using drawn arc process.

Manufacturer Information:

Tru-Weld Division, TFP Corporation
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Medina, Ohio 44256 U.S.A.
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Section 2 – HAZARDS IDENTIFICATION

Emergency Overview

Appearance/Odor: Gray or dull silver, odorless metal shapes. Typically have a protruding aluminum point on one end.

Weld studs do not pose health, fire, or environmental hazards in their final manufactured form.

Operations such as welding, burning, flame or laser cutting, brazing, grinding, sanding, and sawing may release fume and other particulate (metal dust) which may present health, fire, explosion, or environmental hazards.

Fume or particulate may aggravate existing asthma and pulmonary disease.

Product may contain small amounts of nickel and chromium and trace amounts of lead which may be released during processing in forms that are listed as carcinogens or potential carcinogens by OSHA, IARC or NPT.

Molten metal or finely divided particulate, which has been ignited, may pose an explosion hazard in contact with water or other liquids. If the fine particulate has ignited, use Class D Extinguishing agent.

Section 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	% by Weight
Carbon	1333-86-4	<0.25%
Chromium	7440-47-3	12.0% - 20.0%
Manganese	7439-96-5	<1.00%
Molybdenum	7439-98-7	<0.70%
Nickel	7440-02-0	<1.00% - 20.0%
Silicon	7440-21-3	<0.30%
Iron	7439-89-6	Balance

Major components above vary by SAE grade. Exact composition on specific product can be found on heat/lot certification which accompanies each shipment.

Other trace materials (<1% by weight) may include aluminum, boron, calcium, cobalt, copper, lead, phosphorous, sulfur, tin, titanium, vanadium, and zirconium.

Section 4 – FIRST AID MEASURES

Stainless Steel Weld Studs in their final manufactured state do not represent inhalation, ingestion, or contact hazards. However, the following recommendations are for overexposure to welding fume and other particulate released during processing operations.

Eye Contact: Immediately flush with water for at least 15 minutes; keep eyelids open; get medical attention.
Skin Contact: Wash with soap and water to remove particles.
Inhalation: Remove from excessive exposure to fresh air immediately.

Section 5 – FIRE FIGHTING MEASURES

In manufactured state, weld studs are considered noncombustible. If particulate has ignited, wear NIOSH approved SCBA and full protective gear.

Suitable Extinguishing Media: Use Class D agent to extinguish a particulate fire.

Unsuitable Extinguishing Media: Water in contact with ignited particulate or molten metal may result in an explosion.

Section 6 – ACCIDENTAL RELEASE MEASURES

Stainless Steel Weld studs in manufactured state are not expected to pose a release hazard.

Section 7 – HANDLING AND STORAGE

Store away from acids and sodium hypochlorite. Store indoors out of weather to reduce rust formation.

Section 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Component	CAS#	Exposure Limits (mg/m3)		Carcinogen
		OSAH PEL	ACHIH TLV	
Carbon	1333-86-4	3.5	3.5	No
Chromium	7440-47-3	1	0.5	No
Manganese	7439-96-5	C 5	0.5	No
Molybdenum	7439-98-7	15[1]	10[2], 3[3]	No
Nickel	7440-02-0	1	1.5	No[4]
Silicon	7440-21-3	15[5], 5[6]	1.0	No
Iron	7439-89-6	10	5	No

Other trace materials (<1% by weight) may include but are not limited to aluminum, boron, calcium, cobalt, copper, lead, phosphorous, sulfur, titanium, tin, vanadium, and zirconium.

Engineering Controls:

Weld studs in their final manufactured state do not present inhalation, ingestion, or contact hazards. However, operations such as welding, burning, flame or laser cutting, brazing, grinding, sanding, or sawing may release fume and other particulate, which should be captured with adequate

[1] Total Particulate (OSHA definition)
[2] Inhalable Particulate (ACGIH definition)
[3] Respirable Particulate (ACGIH definition)
[4] Some Nickel compounds are carcinogens, excluding metallic nickel
[5] Total Particulate (OSHA definition)
[6] Respirable Particulate (OSHA definition)

local exhaust ventilation such as a fume extractor or vented down draft table. Mechanical exhaust ventilation is mandatory for welding and thermal cutting of stainless steel weld studs in confined spaces. Mechanical exhaust ventilation is also strongly recommended if the weld studs are galvanized or coated since there may be toxic fumes from the heat breakdown of the coatings. OSHA ventilation and work practice requirements for welding are in 29 CFR 1910.252.

Eye/face Protection

Goggles or safety glasses with side shields and face shields should be used for protection against flying particulate and fume during application of weld studs. Provide appropriate eye protection during welding.

Skin Protection

Protective clothing including long sleeves and long pants is recommended for protection during application of weld studs. Welding gloves, aprons or jackets are also recommended where appropriate.

Respiratory Protection

Respiratory protection is not needed in well ventilated areas. Where exposures cannot be adequately controlled through exhaust ventilation, provide respiratory protection in accordance with OSHA and NIOSH recommendations. Minimum respiratory protection would include half-face air purifying or PAPR with N, P, R-95 filter or supplied air in continuous mode.

General Hygiene Considerations

Hands and face should be washed before eating or smoking. Fume and other particulate should be removed form clothing by HEPA vacuuming. Compressed air MUST NOT be used for particulate removal. Contaminated clothing should not be worn off the job site.

Section 9 – PHYSICAL AND CHEMICAL PROERTIES

Color:	Gray or Silver-Gray
Odor:	Odorless
Physical State:	Solid Metal
pH:	Not Applicable
Melting Point:	>2500^{o}F
Boiling Point:	>5400^{o}F
Flash Point:	Non-Flammable
Evaporation Rate:	Not Applicable

Flammability (solid gas):	Not Applicable
Upper Flammability Limit:	Not Applicable
Lower Flammability Limit:	Not Applicable
Vapor Pressure:	1@ 3254°F
Vapor Density:	Not Applicable
Specific Gravity:	7.84 @ 60°F
Solubility (water):	Not Applicable
Partition Coefficient (n-octane/water)	Not Applicable
Auto Ignition Temperature:	Not Applicable
Percent Volatile (wt%):	Not Applicable
Volatile Organic Compound Content (wt%):	Not Applicable

Section 10 – STABILITY AND REACTIVITY

Stability:	Stable
Incompatible Materials:	Liberates Hydrogen on contact with acids.
Hazardous Decomposition Products:	Hazardous metallic dust (particulate) and fume may be Generated from welding, brazing, cutting, burning, grinding, sanding, sawing, and during some machine activities.

Section 11 – TOXICOLOGICAL INFORMATION

Note: Stainless steel weld studs in their final manufactured state do not present inhalation, ingestion or contact hazards. However, operations such as welding, burning, flame or laser cutting, brazing, grinding, sanding, and sawing may release fume and other particulate (metal dust) which may present health hazards if concentrations exceed individual compound PELs or TLVs.

Routes of Entry:	Inhalation -	may occur during welding, cutting, or grinding.
	Ingestion -	not a significant route of entry but during welding, cutting, or grinding may enter eye and impact skin.
Target Organs:	Iron oxide -	lungs
	Carbon -	lungs
	Chromium -	skin, nose, throat, eyes
	Lead -	CNS (central nervous system), blood forming organs
	Manganese -	CNS, lungs, reproductive (males)
	Molybdenum -	lungs, CNS
	Nickel -	skin, lungs
	Silicon -	eyes, skin, respiratory system

Acute exposure:

Exposure to fume and particulate may produce irritation of the eyes and respiration system (nose, throat, bronchi). Inhalation of high concentration of freshly formed oxides of the metals iron, manganese, or copper may cause metal fume fever characterized by metallic taste in the mouth, dryness and irritation of the throat and delayed influenza-like symptoms.

Chronic exposure:

Long term exposure to high concentrations of the heavy metals from burning or mechanical action on this product may cause the following chronic effects: iron oxide fume may cause benign siderosis pneumoconiosis); iron oxide may increase the risk of lung cancer development when also exposed to pulmonary carcinogens. Manganese may affect the central nervous system, causing sleepiness, languor, weakness in the legs, psychological or neurological and psychomotor effects; manganese may also cause reduced fertility in males. Silicon is an upper respiratory tract and skin irritant. Carbon is a skin, eye and respiratory tract irritant. Nickel is an irritant and sensitizer of the skin and respiratory system and may also damage the liver and kidneys.

Symptoms:

Symptoms of exposure to fume and other particulate from welding, burning or mechanical action on stainless steel weld studs include irritation of skin, eyes and throat; central nervous system effects such as sleepiness, languor, psychological and psychomotor effects; metal fume fever, cough, tightness in chest, weakness, fatigue, insomnia, GI distress, kidney, liver, or cardiovascular system disease.

Section 12 – ECOLOGICAL INFORMATION

Stainless Steel Weld Studs, in their solid manufactured form, do not present an ecological hazard.

Section 13 – DISPOSAL CONSIDERATIONS

Disposal: Not a RCRA (Resource Conservation and Recovery Act) hazardous waste. Dispose of per local, state, and federal requirements.

Section 14 – TRANSPORT INFORMATION

Stainless steel weld studs in their final manufactured form are not a US Department of Transportation (US DOT) regulated hazardous material requiring labeling or a placard.

Section 15 – REGULATORY INFORMATION

ACGIH Threshold Limit Values for Chemical Substance and Physical Agents, 2003

NIOSH Pocket Guide to Chemical Hazards, 2001

US DOT Emergency Response Guide to Chemical Hazards, 2001

29 CFR 1910 OSHA Standards for General Industry including Table Z-1 and Subpart 1000 (air contaminants); Subpart Q Welding, Cutting, and Brazing
Section .132 Personal Protection Equipment
Section .133 Eye and Face Protection
Section .134 Respiratory Protection
Section .151 Medical Services and First Aid
Section .1025 Lead
Section .1200 Hazard Communication

29 CFR 1915 OSHA Shipyard Standards

29 CFR 1926 OSHA Standards for the Construction Industry

49 CFR Parts 100-185 US Department of Transportation Hazard Materials Regulations

40 CFR 370 SARA Title III Section 302 Reportable Quantity, Section 311 Hazard Chemical Reporting, Subpart B Reporting Requirements, Section 312, Hazardous Chemical Reporting, Subpart D Inventory Forms, Section 313 Emissions Reporting Form R

Section 16 – OTHER INFORMATION

Not Applicable.