

# **PART E**

# **SPECIFICATIONS**

## **PART E - SPECIFICATIONS**

### **GENERAL**

#### **E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS**

E1.1 The following Information Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing</u>
SEP-424	Secondary Clarifier Expansion Secondary Clarifier Plan above 233.172
SEP-425	Secondary Clarifier Expansion Secondary Clarifier Sections
SEP-432	Secondary Clarifier Expansion Miscellaneous Details

#### **E2. SITE PREPARATION**

E2.1 The City will isolate, drain, and wash Secondary Clarifier #3 and make it available to the contractor one week after notification of the intent to enter.

#### **E3. MATERIAL**

E3.1 Paint

E3.1.1 Acceptable product is ARC – S1 as supplied by Micron Coatings Inc.

#### **E4. CONSTRUCTION METHODS**

E4.1 General

E4.1.1 The work shall include the abrasive blasting and painting of all steel surfaces of the scum skimming mechanism in clarifier #3. The scum skimmer mechanism includes the following;

- (a) Sludge collector truss arm and towers
- (b) Scum deflector and plow blade
- (c) Scum trough
- (d) Scum baffle and supports
- (e) Sludge rate withdrawal control box
- (f) Inner feed well and deflector gates
- (g) Outer influent well frame
- (h) Torque cage and frame
- (i) Steel spray nozzle piping

E4.2 Blasting

E4.2.1 Prior to sand blasting the metal surfaces shall be degreased and cleaned as required by the coating supplier.

E4.2.2 Abrasive blast clean to SSPC-SP5 white metal, with a 3.0 to 5.0 mil angular profile.

E4.2.3 All sand used for blasting shall be gathered and removed from the site.

E4.2.4 If oxidation occurs between blasting and coating application, the surface shall be re-blasted to the specified visual standard.

E4.3 Painting

E4.3.1 The coating shall be applied by a plural component spray unit and in accordance with the manufacturer's recommendations. Application shall be two coats to all metal surfaces to a total dry film thickness of 20 mil.

E4.4 Approved Applicators

E4.4.1 The coating shall be applied by an applicator that is approved by the coating supplier.

E4.4.2 Approved applicators are;

- (a) Western Industrial Services Ltd
- (b) Carlson Commercial Industrial Services Inc.

**E5. PRODUCT DATA SHEET**

E5.1 A product data sheet for ARC – S1 is attached.



**PRODUCT DATA SHEET**

**Description**

An advanced composite formulated to protect metal surfaces from corrosion and chemical attack. It is normally applied at a thickness of 250 microns (10 mils) per coat. Non-shrinking, 100% solids. Colors are Gray and Blue.

ARC S1 is a low viscosity high performance composite lining that is designed to be spray applied but may also be applied by roller or brush. As a one coat system, it functions as a corrosion resistant primer for many high performance coatings. ARC S1 yields excellent barrier properties for long-term corrosion and chemical resistance in immersion exposures when used in a multicoat application. The cured ARC S1 provides a high gloss surface with unrivaled adhesion and resistance to corrosion.

**COMPOSITION - Polymer/ Surface Modified Mineral Composite**

**Matrix** - A two component, modified epoxy resin structure reacted with a polyamidoamine curing agent.

**Reinforcement** - A proprietary blend of surface modified mineral reinforcements designed to provide resistance to permeation, chemical attack and corrosion.

**Suggested Uses**

- Chemical Storage Tanks
- Structural Steel
- Pipeline Coatings
- Clarifier Tanks
- Petroleum Storage Tanks
- Cooling Water Systems
- Service Water Systems
- Thickener Tanks

**Benefits**

- Dramatically outlasts conventional paints and coatings.
- Long pot life allows for ease of use.
- 100% solids, no shrinkage on cure.
- Outstanding adhesion insures reliable performance against under film corrosion.
- Able to be high voltage spark tested for pinhole free films.

**Packaging**

Material is available in three sizes: 0.75; 4 and 16 liter kits. Each package contains two pre-measured containers (Part A and Part B). A mixing tool, brush and instructions for use are enclosed with the 0.75 and 4 liter kits. The 16 liter kit contains only application instructions.

**Coverage**

Based on a 250 µ (10 mils) thickness:

0.75 liters will cover 3.0 sq. meters (32 sq. ft.)

4 liters will cover 16 sq. meters (170 sq. ft.)

16 liters will cover 64 sq. meters (678 sq. ft.)

To calculate the kilograms required for a given application use the appropriate formula below:

$1.5 \text{ (g/cc)} \times \text{Area (m}^2\text{)} \times \text{Average Thickness (mm)} = \text{kg}$

$3.5 \times \text{Area (ft}^2\text{)} \times \text{Average Thickness (inches)} = \text{kg}$

**Chemical Resistance**

Tested at 21°C (70°F). Samples cured 7 days at 25°C (77°F).

1 = Continuous long term Immersion

2 = Short term/intermittent Immersion

3 = Splash and spills with immediate cleanup, vapors

4 = Not recommended for direct contact

**Acids**

10% Acetic	4
10% Hydrochloric	1
20% Hydrochloric	2
10% Sulfuric	1
20% Sulfuric	3
5% Nitric	3
10% Nitric	4
10% Phosphoric	3
50% Phosphoric	4

**Alkalies & Bleaches**

28% Ammonium Hydroxide	1
10% Potassium Hydroxide	1
50% Potassium Hydroxide	2
10% Sodium Hydroxide	1
50% Sodium Hydroxide	2
6% Sodium Hypochlorite	1

**Other Compounds**

Bunker C	1
Diesel Fuel	1
Isopropyl Alcohol	1
Kerosene	1
Naphtha	1
Salt Water	1
Sewage	1
Toluene	2
Xylene	2

**Technical Data**

Cured Density		1.5 g/cc	94 lb/ cu.ft.
Tensile Adhesion	(ASTM D 4541)	>140 kg/cm <sup>2</sup>	>2000 psi
Tensile Strength	(ASTM D 638)	240 kg/cm <sup>2</sup>	3,400 psi
Tensile Elongation	(ASTM D 638)		3%
Flexural Strength	(ASTM D 790)	420 kg/cm <sup>2</sup>	6000 psi
Flexural Modulus	(ASTM D 790)	2.0 x 10 <sup>4</sup> kg/cm <sup>2</sup>	2.8 x 10 <sup>5</sup> psi
Heat Deflection Temperature	(ASTM D 648)	46°C	115°F
Hardness Shore D	(ASTM D 2240)		85
Vertical Sag Resistance at 21°C (70°F) and 250 µ (10 mils)			No sag
Maximum Temperature (Dependent on service)	Wet Service	52°C	125°F
	Dry Service	80°C	175°F

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**Surface Preparation**

Proper surface preparation is critical to the long-term performance of this product. The exact requirements for surface preparation vary with the severity of the application, expected service life, and the initial substrate conditions. All sharp edges and welds shall be ground smooth or to a 3 mm (0.125") radius before abrasive blasting. Optimum preparation will provide a surface cleaned of all contaminants and roughened to an angular profile between 75-125 microns (3 to 5 mils). This is normally achieved by initial cleaning and degreasing and then abrasive blasting to a cleanliness of White Metal (Sa 3/SSPC-SP5) for immersion service and thermal cycling applications, and Near White Metal (Sa 2 1/2/SSPC-SP10) for atmospheric exposure. Prior to application, all residual blast residue shall be removed from the surface to be coated.

**Mixing**

To facilitate mixing and application, material temperatures should be between 21°C - 32°C (70°F - 90°F). Each kit is packaged to the proper mix ratio. If further proportioning is required, the kit should be divided to the correct mix ratio.

Mix Ratio	By Weight	Volume
A:B	2.8:1	2.0:1

Prior to mixing ARC S1, pre-mix Part B to suspend any settled reinforcements. When applying by hand, add Part B to Part A. Mix by hand for 1 minute. Shift a small portion of this mix back to the Part B container and scrape the walls of this container to remove all traces of residue. Add this portion back to the Part A container. Continue to mix product until product is uniform in color and consistency, no streaks. Power mixing should be accomplished with a variable speed, high torque, low speed mixer with a non-air entraining mix blade such as a "Jiffy" blade. Do not mix more product than can be applied within the stated working time.

**Working Time - Minutes**

	10°C 50°F	16°C 60°F	25°C 77°F	32°C 90°F
0.75 liter	90	75	60	45
4 liter	75	60	45	30
16 liter	50	40	25	20

The chart above defines the practical working time of ARC S1, starting from when mixing begins.

**Application**

ARC S1 may be applied by spray system, brush, or roller using a lint free nap roller such as mohair. When applying ARC S1 the following conditions should be observed:

Film thickness range per coat 200 µ (8 mils) - 375 µ (15 mils)  
 Application temperature range 10°C (50°F) - 35°C (100°F) (substrate)

ARC S1 may be spray applied by plural component airless spray equipment without solvent dilution. Recommended equipment and procedures are below:

**Plural Component**

- Fixed ratio: 2 : 1
- Air Motor: Graco Bulldog 30-1 or equal
- Part A Fluid Line: 12 mm (1/2")
- Part B Fluid Line: 9,5 mm (3/8")
- In-line 220 volt heaters

- Reservoir heaters and insulated hoses able to maintain materials at 50°C (120°F)
  - Gun: Graco Model 220-956, Series A
  - Tip: 513 -523
  - Pressure: 204 - 225 bar (2,900 -3,200 psi)
- Apply initial pass at 75 -125 microns (3-5 mils). Build successive passes to achieve final first coat desired thickness. Vertical or overhead applications will result in reduced film thickness. To compensate additional coats are recommended. Use the chart below to determine the desired final film thickness recommended for the application.

Service Conditions	Minimum # of Coats	Film Thickness per Coat	Total Film Thickness
Atmospheric (Structural Steel)	1	200 - 300 µ (8 - 12 mils)	200 - 300 µ (8 - 12 mils)
Static Immersion (Tanks)	2	250 - 400 µ (10 - 15 mils)	500 - 750 µ (20 - 30 mils)
Fluid Flow (Pipes)	2	250 - 400 µ (10 - 15 mils)	500 - 750 µ (20 - 30 mils)

Multiple coat applications of ARC S1 may be accomplished, without additional surface preparation, as long as the film is free of contamination and has not cured beyond the stage stated as Overcoat End in the Curing Schedule chart below. If this period is exceeded, light abrasive blasting or sanding is required to be followed by a solvent wash to remove any abrasive residues.

**Curing Schedule**

	10°C 50°F	16°C 60°F	25°C 77°F	32°C 90°F
Tack Free	8 hrs	7 hrs	6 hrs	4 hrs
Light Load	36 hrs	24 hrs	18 hrs	12 hrs
Overcoat End	44 hrs	36 hrs	30 hrs	24 hrs
Full Load	72 hrs	48 hrs	36 hrs	24 hrs
Full Chemical	240 hrs	210 hrs	188 hrs	120 hrs

Force curing at 65°C (150°F) after material has reached Tack Free will accelerate cure time to 4 hours plus Tack Free time.

**Clean Up**

ARC S1 cures to a solid mass in a very short period of time. All clean up activities must be carried out as soon as possible to prevent material hardening onto the tools. Use commercial solvents (Acetone, Xylene, Alcohol, Methyl Ethyl Ketone) to clean tools immediately after use. Once cured the material would have to be abraded off.

**Storage**

Store between 10°C (50°F) and 32°C (90°F). Excursions beyond this range which may occur during shipping are acceptable. The shelf life is two years in unopened containers. Settling and reinforcement separation may occur over time or at elevated storage temperatures. Reconstitute prior to use by mixing individual components before mixing Part A with Part B.

**Safety**

Before using any product, review the appropriate Material Safety Data Sheet (MSDS) or Safety Sheet for your area. Follow standard confined space and entry work procedures, if appropriate.

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