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CANADIAN GOVERNMENT SPECIFICATIONS BOARD

Specification

for

METALLIZING GUN SETS; WIRE-GAS

This specification is cancelled since it is no longer of significant interest to federal government agencies.



CANADA

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METALLIZING GUN SETS; WIRE-GAS

23 - GP - 1A

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THIS SPECIFICATION APPLIES TO METALLIZING GUNS AND ACCESSORIES REQUIRED FOR THE PROPER ATOMIZATION OF MOLTEN METAL WIRE USING FUEL GAS AS THE SOURCE OF HEAT, AND SPECIFIES THE MINIMUM REQUIREMENTS FOR THEIR CONSTRUCTION AND OPERATION.

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CANADIAN GOVERNMENT SPECIFICATIONS BOARD

Specification
for

METALLIZING GUN SETS; WIRE-GAS

1. DEFINITION

This specification applies to metallizing guns and accessories required for the proper atomization of molten metal wire using fuel gas as the source of heat, and specifies the minimum requirements for their construction and operation.

2. CLASSIFICATION

Metallizing gun sets to this specification shall be supplied in any of the following classes and types, as specified by the purchaser.

2.1 Class 1 - Capable of spraying metal wire or rod from 0.08 inch (20 B&S gauge) up to 1/8 inch diameter, and in which the wire is fed by an air motor whose speed is controlled by a needle valve restricting the air flow.

2.2 Class 2 - Capable of spraying metal wire or rod from 0.08 inch (20 B&S gauge) up to 1/8 inch diameter, and in which the wire is fed by an air motor whose speed is controlled by a power-governing device.

2.3 Class 3 - Capable of spraying metal wire or rod from 0.08 inch (20 B&S gauge) up to 3/16 inch diameter, and in which the wire is fed by an air motor whose speed is controlled by a power-governing device, and having a supplementary gas-regulating means.

2.4 Class 4 - In two types, capable of spraying metal wire or rod from 0.145 inch (15 B&S gauge) up to 3/16 inch diameter, and in which the wire is fed by an electric motor.

2.4.1 Type A - Power transmission from motor to wire is supplied through gears, a choice of which is available to give different speeds of wire feed.

2.4.2 Type B - Power transmission from motor to wire is supplied through a variable speed drive.

2.5 Class 5 - Capable of spraying metal wire or rod from 0.145 inch (15 B&S gauge) up to 1/8 inch diameter, and in which the wire is fed by an air motor whose speed is controlled by a needle valve restricting the air flow.

2.6 Class 6 - In two types, in which the wire is fed by an air motor whose speed is controlled by a power-governing device and having a supplementary gas-regulating means.

2.6.1 Type A - Capable of spraying metal wire or rod from 0.08 inch (20 B&S gauge) up to 1/8 inch diameter.

2.6.2 Type B - Capable of spraying metal wire in 1/8 inch and 3/16 inch diameter size.

3. MATERIALS

All metallizing gun sets shall consist of the following:

3.1 For all work -

- 3.1.1 (1) Metallizing Gun
(2) Set of Tools
(3) Fuel Gas, Oxygen and Air Hoses with Fittings
(4) Oxygen Regulator
(5) Fuel Gas Regulator and Adaptor
(6) Oil and Moisture Filter, and Pipe Fittings
(7) Air Regulator and Gauge
(8) Wire Reel, Stand and Wire Straightener

3.1.2 Gun sets using up to 1/8 inch diameter shall be supplied with 8 inch wire cutters.

3.1.3 Gun sets using wire from 1/8 inch to 3/16 inch diameter shall be supplied with 14 inch wire cutters.

3.1.4 At the option of the purchaser, metallizing gun sets shall also be supplied with a rotary roughening shaft preparation tool. (See Para. 5.2.5.10).

3.1.5 At the option of the purchaser, metallizing gun sets shall be supplied with FLOW METERS (See Para. 5.2.5.11).

3.2 For internal work - Metallizing gun sets shall at the option of the purchaser, be supplied with the following additional items, according to Class:

	CLASS OF OUTFIT					
	1	2	3	4	5	6
Metallizing Gun Extensions 6" Length	-	-	1	-	-	1
Metallizing Gun Extensions 12" Length	1	1	-	1	-	-
Metallizing Gun Extensions 18" Length	-	-	1	-	-	1
Metallizing Gun Extensions 24" Length	1	1	-	1	-	-
Metallizing Gun Extensions 36" Length	1	1	1	1	-	1
Extension Angular Air Cap	1	1	1	1	-	1

4. GENERAL REQUIREMENTS

- 4.1 The gun shall be compact in design and all moving parts shall be provided with adequate lubricating facilities.
- 4.2 $1\frac{1}{2}$ ounces of suitable valve lubricant for lubricating the control valve in the head, and a like amount of gear-grease for lubricating the drive feed gear mechanism, shall be supplied with each gun.
- 4.3 Suitable tools shall be furnished as itemized in Para 5.2.5.1.
- 4.4 Each gun shall be furnished with two copies of an adequate Handbook, Operational Manual, and Spare Parts List.

5. DETAIL REQUIREMENTS

- 5.1 Weight - The metallizing gun sets completely assembled, including head and drive feed mechanism, but excluding tools, valve lubricant and greases, hoses and other accessories, shall weigh not more than the following, according to Class:

Class 1 - 5 pounds net
Class 2 - 6 pounds net
Class 3 - 11 pounds net
Class 4 - 21 pounds net
Class 5 - 5 pounds net
Class 6 - 5 pounds net

5.2 Mechanical Requirements

5.2.1 Metallizing Gun

- 5.2.1.1 For safety and ease of replacement, metallizing guns shall be made in two assembled parts: the head and the drive feed mechanism.
- 5.2.1.1.1 The head shall be made of pressure-tight metal with all fuel gas, air and control passages incorporated in the head.
- 5.2.1.1.2 The drive feed mechanism shall be housed in a suitable casing.
- 5.2.1.2 All replacement parts for the guns except control valve, shall be readily interchangeable with other similar gun parts made by the same manufacturer to permit quick replacement of parts.
- 5.2.1.3 Tips or wire nozzles shall be made of one-piece construction, so designed as to be airtight, with hardened heat-resisting insert, but without the use of gaskets, washers, or packing.

5.2.2 Feed Mechanism

- 5.2.2.1 The wire feed mechanism and controls shall be located in a convenient and accessible position on the gun.
- 5.2.2.2 Provision shall be made for controlling the pressure on the feed rolls to assure feed of the wire and to accommodate different sizes of wire.
- 5.2.2.3 The wire feed mechanism shall be designed so as to feed the wire continuously and uniformly. The wire speed (rate of feed of wire through the gun) shall be maintained as follows:

- Class 1 - By needle valve restricting air flow
- Class 2 - By power-governing device
- Class 3 - By power-governing device
- Class 4 - Type A - by electric motor drive
Type B - By constant speed electric motor plus a variable speed drive
- Class 5 - By needle valve restricting air flow
- Class 6 - Types A and B - by power-governing device

5.2.3 Speed Reducers

5.2.3.1 In all classes, except Class 4, Type B, all speed reducing devices shall be enclosed inside the case, but shall be readily accessible for inspection and repair. In Class 4, Type B, the driving cone and idler feed roll are outside the case and only partially enclosed.

5.2.3.2 All high speed bearings shall be of the ball or roller type.

5.2.4 Control Valves

5.2.4.1 All guns shall be provided with a single control valve for simultaneously turning air, oxygen, and fuel gas supply on and off with a single movement of the valve lever.

5.2.4.2 The control lever shall be conveniently located on the gun so that it can be readily operated with one hand.

5.2.5 Accessories

5.2.5.1 Tools - A set of tools shall be furnished with each gun and shall include suitable wrenches, screwdrivers spark lighter, and tool post mounting holder or device for lathe mounting. Wire cutters shall also be supplied as specified in Para. 3.1.3.

5.2.5.2 Hoses - The air, fuel gas, and oxygen hoses shall each be at least 15 feet long and shall have female fittings on each end. The air hose shall be 3/8 inch i.d., and the oxygen and fuel gas hoses shall be 3/16 inch i.d.

5.2.5.3 Oxygen Regulator - Shall be a 2-stage, 2-gauge type. The low pressure gauge shall be graduated in increments of not more than 2 pounds each from 0 to 60 psi. The high pressure gauge shall be a standard oxygen 3000-pound gauge.

5.2.5.4 Fuel Gas Regulator - shall be a 1-stage or 2-stage, 2-gauge type. The low pressure gauge shall be graduated in increments of not more than 2 pounds each from 0 to 60 psi. The high pressure gauge shall be at least a 400 pound and not more than a 500 pound gauge. This regulator shall be furnished with an adaptor for use with either internal or external standard cylinder thread fittings.

5.2.5.5 Oil and Moisture-Filter - shall have a capacity of at least 50 cu. ft. of free air per minute at a pressure of 60 to 100 psi. The filter shall be fitted with proper pipe connections, drain petcocks and hose connection outlet.

5.2.5.6 Air Regulator and Pressure Gauge - shall be of a suitable heavy duty type capable of regulating from a maximum line pressure of 125 psi. and a minimum line pressure of *90 psi. to the required or recommended gun operating pressure, within 2 psi. of the set pressure and be capable of passing 35 cu. ft. of free air at the operating pressure. The * Note - Regulator can be used at lower line pressures, however.

regulator shall be equipped with a gauge graduated from 0 to 100 psi. in increments of not more than 2 pounds.

5.2.5.7 Wire Reel and Stand - The wire reel shall consist of a rotating device equipped with friction brake so as to be easily operated and braked to prevent uncoiling of springy wires. The top of the rotating device shall be provided with posts or pins for different radii, in order that the wire may be used from spools or coils of various diameters. Extensions or arms shall be provided to adapt the reel to handle wire coils up to at least 22 inches i.d. Legs or suitable floor stand at least 30 inches high shall be provided to support or hold the rotating device.

5.2.5.8 Wire Straightener - This shall be furnished with means for removing the set curvature of coils of 1/8 inch to 3/16 inch wire to eliminate undue drag on the gun. The straightener shall be adjustable to accommodate coils of wire of different coil diameters, different tempers and different wire diameters.

5.2.5.9 Wire Nozzles and Air Caps - shall be provided for each class of gun as follows:

Class 1.....	0.23 inch (11B&S) and 1/8 inch
Class 2.....	0.23 inch (11B&S) and 1/8 inch
Class 3.....	1/8 inch and 3/16 inch
Class 4.....	1/8 inch and 3/16 inch
Class 5.....	11 B&S and 1/8 inch
Class 6, Type A.....	1/8 inch
Type B.....	1/8 inch and 3/16 inch

5.2.5.10 Shaft Preparation Tool - At the option of the purchaser, the rotating roughening shaft preparation tool shall be supplied. It is recommended that this tool be equipped with ball-bearing shaft, offset shank, and a rotating roughening assembly attached to the shaft. Each complete tool should be furnished with three extra roughening assemblies, each of which should have five circular blades about 2-1/2 inches in diameter and having approximately 140 teeth per blade. It is further recommended that the blades should be assembled in a holder in such a manner that the individual teeth of each blade are staggered in relation to the teeth of the adjacent blade.

5.2.5.11 Flow Meters - At the option of the purchaser, Flow Meters shall be supplied. Flow meters shall have 2 identical calibrated tubes; the recommended calibrated capacity range is as follows:

Oxygen Tube: 13 CFH at 10 psi. minimum to 240 CFH of free gas at 50 psi. maximum with commercial oxygen.
 Fuel Gas Tube: 5 CFH at 10 psi. minimum to 117 CFH at 25 psi. maximum with commercial acetylene.

Tubes shall be protected by open type clear transparent plastic panel. Color discs or suitable marking means shall be provided indicating combustible gas as RED and Oxygen as GREEN; also floats or balls shall be of different colors in each type of tube.

Inlet and outlet hose connections and a set of inlet hose shall be furnished. Basic calibration curve and pressure correction curve shall be furnished and units shall conform to this curve within 5 percent total error. Charts converting acetylene consumption to that of other commonly-used fuel gases, such as propane, shall be supplied. All component parts including tubes,

pipe connections, hose fittings etc. shall be assembled on a wall mounting frame. Complete unit shall be tested for safe operation at 100 psi.

5.3 Performance Requirements

5.3.1 Applicable to All Classes of Metallizing Guns

5.3.1.1 Guns shall operate satisfactorily with a maximum controlled air pressure of 10 pounds more than the manufacturer's recommendations, but shall not be required to operate at an air pressure exceeding 90 psi.

5.3.1.2 Guns shall operate satisfactorily with acetylene at a maximum pressure of 15 psi.

5.3.1.3 Except where otherwise specified, all guns shall be capable of spraying any metal that can be rendered molten by a neutral flame produced with acetylene, hydrogen, manufactured or natural gas, or propane mixed with oxygen. Where fuel gases other than acetylene are to be used, fittings such as nozzles and adaptors shall be supplied to facilitate neutral flame adjustment.

5.3.1.4 The guns shall have facilities for cleaning the upper and lower feed rolls.

5.3.1.5 All guns shall be capable of maintaining continuous operation without adjustments, blowout, backfire, or producing a spattered lumpy coating when the oxygen pressure is varied 1-1/2 pounds from its originally-adjusted neutral flame setting.

5.3.1.6 Guns shall be capable of meeting the minimum test requirements for speed, load, density and salt spray resistance of Para. 6 of this specification.

Note: - Gearing specified in this specification is necessary to give optimum operating efficiency for the spraying of the high, medium and low melting point metals. Except for spraying the low melting point metals at extremely high production spraying speeds, the three classifications of melting point metals (high, medium and low) can be sprayed with other gearing but at reduced efficiency).

5.3.2 Applicable to Class 1 Guns

5.3.2.1 Class 1 metallizing guns shall be capable of spraying all metals in wire or rod form as follows:

5.3.2.1.1 From 0.08 inch (20 B&S gauge) to 1/8 inch diameter having melting points less than 3000°F (1650°C).

5.3.2.1.2 0.23 inch (11 B&S gauge) or lighter, having melting points greater than 3000°F (1650°C) using acetylene gas.

5.3.2.2 Class 1 guns shall be furnished with at least one of three sets of gear changes necessary to attain spraying speeds as published and recommended by the manufacturer for the spraying of high, medium and low melting point metals.

5.3.2.2.1 A set of Type 1 gearing shall be installed in the gun having a spraying speed range capable of being varied from 2.0 feet per minute to 5.5 feet per minute by manual adjustment of a needle valve for spraying 1/8 inch diameter medium and high melting point metal wires having melting points above 1550°F. (845°C) (See Para. 5.3.9, 6.3.1).

5.3.2.2.2 A set of Type 2 gearing shall be available at the option of the purchaser, having a spraying speed range capable of being varied from 4.0 feet per minute to 11.0 feet per minute by manual adjustment of a needle valve for spraying 1/8 inch diameter medium melting point metal wires having melting points above 780°F. (415°C) (See Para. 5.3.9, 6.3.1).

5.3.2.2.3 A set of Type 3 gearing shall be available at the option of the purchaser, having a spraying speed range capable of being varied from 8.0 feet per minute to 24.0 feet per minute by manual adjustment of a needle valve for extremely high production spraying speeds of 1/8 inch diameter low melting point wires having melting points below 800°F. (425°C) (See Para. 5.3.9, 6.3.1).

5.3.3 Applicable to Class 2 Guns

5.3.3.1 Class 2 metallizing guns shall be furnished with one set of gearing necessary to attain the spraying speeds as published and recommended by the manufacturer for the spraying of medium and high melting point metals as follows:

5.3.3.1.1 From 0.08 inch (20 B&S gauge) to 1/8 inch diameter having melting points less than 3000°F. (1650°C).

5.3.3.1.2 0.23 inch (11 B&S gauge) or lighter having melting points greater than 3000°F. (1650°C) using acetylene gas.

5.3.3.2 Class 2 metallizing guns shall be furnished with gearing having a spraying speed range capable of being varied from 2.0 feet per minute to 12.5 feet per minute by means of the manual adjustment on the governor without the necessity of changing gears for spraying 1/8 inch diameter medium and high melting point metal wires having melting points above 780°F. (415°C). (See Para. 5.3.9, 6.3.1)

5.3.3.3 A set of high speed gearing shall be available at the option of the purchaser, having a spraying speed capable of being varied from 5.0 feet per minute to 30.0 feet per minute by means of the manual adjustment on the governor without the necessity of changing gears for the extremely high production spraying speeds of 1/8 inch diameter low melting point metal wires having melting points below 800°F. (425°C).

5.3.4 Applicable to Class 3 Guns

5.3.4.1 Class 3 metallizing guns shall be furnished with one set of gearing necessary to attain the spraying speeds as published and recommended by the manufacturer for the spraying of medium and high melting point metal wires as follows:

5.3.4.1.1 From 0.08 inch (20 B&S gauge) to 3/16 inch diameter having melting points less than 3000°F. (1650°C).

5.3.4.1.2 1/8 inch diameter or lighter having melting points greater than 3000°F. (1650°C) using acetylene gas.

5.3.4.2 Class 3 metallizing guns shall be furnished with gearing having a spraying speed range capable of being varied from 2.0 feet per minute to 9.5 feet per minute by means of the manual adjustment on the governor, without the necessity of changing gears, for spraying 3/16 inch diameter high and medium melting point metal wires having melting points above 780°F. (415°C) (See Para. 5.3.9, 6.3.1).

5.3.4.3 A set of high speed gearing shall be available at the option of the purchaser, having a spraying speed range capable of being varied from 4.5 feet per minute to 19.5 feet per minute by means of the manual adjustment on the governor, without the necessity of changing gears, for the extremely high production spraying speeds of 3/16 inch diameter low melting point metal wires.

5.3.5 Applicable to Class 4 Guns

5.3.5.1 Class 4 metallizing guns, Type A and Type B shall be furnished with a constant speed 25, 50 and 60 cycle, 110 volt or 220 volt, single phase, 1/20 H.P., induction, totally-enclosed electric motor.

5.3.5.2 Class 4 metallizing guns, Type A and Type B shall carry the approval of the Canadian Standards Association (for electric motors).

5.3.5.3 Class 4 metallizing guns shall be furnished with or have available, at the option of the purchaser, the necessary worms and spur gears to obtain spraying speeds as published and recommended by the manufacturer for the spraying of high, medium and low melting point metal wires as follows:

5.3.5.3.1 From 0.145 inch (15 B&S gauge) to 3/16 inch diameter wires having melting points less than 3000°F. (1650°C).

5.3.5.3.2 1/8 inch diameter or lighter having melting points greater than 3000°F (1650°C), using acetylene gas.

5.3.5.4 For Class 4, Type A metallizing guns the manufacturer shall have available.

- (a) 2 sets of worms and worm gears
- (b) 6 sets of spur gears

These will offer 12 combinations to provide the following wire speeds: 2.7, 3.2, 3.8, 4.4, 5.2, 5.4, 6.0, 6.4, 7.6, 8.8, 10.4, and 12.0 feet per minute. (See Para. 5.3.9 and 6.3.1)

5.3.5.5 Class 4, Type B metallizing guns shall be furnished with one set of gearing and a variable speed drive that can be adjusted manually to give a spraying speed range from 1.8 to 6.0 feet per minute, for spraying 1/8 inch and 3/16 inch wires of high melting point metals (over 1550°F. or 845°C). A set of high speed gearing shall be available at the option of the purchaser, to be used in conjunction with the same variable speed drive, to give a speed range from 5.3 to 22 feet per minute, for spraying 1/8 inch and 3/16 inch wires of low and medium melting point metals (See Para. 5.3.9, 6.3.1).

5.3.6 Applicable to Class 5 Guns

5.3.6.1 Class 5 metallizing guns shall be capable of spraying metals in wire or rod form as follows:

5.3.6.1.1 From 0.145 inch (15 B&S gauge) to 1/8 inch diameter having melting points less than 3000°F. (1650°C) using acetylene gas only.

5.3.6.1.2 Only one set of gearing shall be furnished having a speed range of from 2.5 feet per minute to 7.0 feet per minute (See Para. 5.3.9, 6.3.1).

5.3.7 Applicable to Class 6, Type A Guns

5.3.7.1 Class 6, Type A metallizing guns shall be furnished with one set of gearing necessary to attain the spraying speeds as published and recommended by the manufacturer for the spraying of low, medium and high melting point metal wires as follows:

5.3.7.1.1 From 0.08 inch (20 B&S gauge) to 1/8 inch diameter wire having melting points less than 4750°F. (2125°C).

5.3.7.2 Class 6, Type A metallizing guns, shall be furnished with gearing having a spraying speed capable of being varied from 1.5 feet per minute to 12.0 feet per minute by means of the manual adjustment on the governor, without the necessity of changing gears, for spraying 1/8 inch diameter medium and high melting point wires having melting points above 780°F. (415°C) to 4750°F. (2125°C) (See Para. 5.3.9 and 6.3.1).

5.3.7.3 A set of high speed gearing shall be available at the option of the purchaser, having a spraying speed capable of being varied from 7.5 feet per minute to 30.0 feet per minute by means of the manual adjustment on the governor, without the necessity of changing gears for special or production spraying speeds of 0.145 inch diameter (15 B&S gauge) and smaller size wires, and also for high spraying speeds of 1/8 inch diameter low melting point wires having melting points below 1250°F. (675°C).

5.3.8 Applicable to Class 6, Type B Guns

5.3.8.1 Class 6, Type B metallizing guns shall be furnished with only one set of gearing necessary to attain the spraying speeds as published and recommended by the manufacturer for the spraying of 1/8 inch diameter and 3/16 inch diameter wire only, having melting points equal to or lower than that of aluminum.

5.3.8.2 Class 6, Type B metallizing guns shall be furnished with only one set of gearing having a spraying speed capable of being varied from 2.5 feet per minute to 20.0 feet per minute by means of the manual adjustment on the governor, without the necessity of changing gearing for spraying all metal wires having melting points equal to, or lower than aluminum, in both 1/8 inch diameter and 3/16 inch diameter size (See Para. 5.3.9 and 6.3.1).

5.3.9 Spraying Speeds - Guns shall produce a finely-atomized coating, free from lumps, at not less than 90 percent of the manufacturer's published spraying speeds, which should be obtained when the gun operates at maximum efficiency.

When tested according to Para. 6.3.1, the guns shall show spraying speeds not less than the applicable speeds listed in Table 1.

5.3.10 Density Test - A brass cylinder prepared and tested as described in Para 6.3.2 shall withstand a hydrostatic pressure of 150 psi. for 15 minutes without leaking or weeping.

5.3.11 Salt Spray Test - After 100 hours of exposure in the salt spray test specified in Para 6.3.3 the test specimen shall be free from rust spots.

Table I
SPRAYING SPEEDS

	Wire Material	Wire Diam.	*Seconds to Spray 5'0"	Equivalent lb. per hr.
Class 1	Steel.10C	1/8"	100	7.5
" 1	Brass	1/8"	51	16.2
" 1	Zinc	1/8"	25	27.0
Class 2	Steel.10C	1/8"	94	8.0
" 2	Brass	1/8"	47	17.4
" 2	Zinc	1/8"	27	25.4
Class 3	Steel.10C	3/16"	99	17.1
" 3	Brass	3/16"	57	32.4
" 3	Zinc	3/16"	38	39.6
Class 4 Type A&B	Steel.10C	3/16"	100	16.0
" 4 " "	Brass	3/16"	56	32.4
" 4 " "	Zinc	3/16"	34	44.0
Class 5	Steel.10C	0.23" (11Ga.)	87	4.6
Class 5	Brass	0.23" (11Ga.)	50	8.6
Class 5	Zinc	1/8"	48	14.2
Class 6 Type A	Steel.10C	1/8"	70	10.7
" 6 " "	Brass	1/8"	39	20.9
" 6 " "	Zinc 99.9%	1/8"	28	24.3
Class 6 Type B	Aluminum			
" 6 " "	99.0%	3/16"	36	15.8
" 6 " "	Zinc 99.9%	3/16"	28	54.9

* Time required to spray 5 feet of wire is given to the nearest whole second.

Note: Brass (Naval) to be of the following composition: Approximately 50% copper, 0.1% iron, 0.2% lead, 0.75% tin, balance zinc.

5.3.12 Load and Power Spray Test - When tested as described in Para. 6.3.4 the sample guns shall raise the specified weight a height of five feet in a time not exceeding those given in the following table, according to class.

Class	Percent Time Above That Required to Spray Straight Wire Without Load
1	65
2	10
3	10
4	5
5	65
6	10

6. SAMPLING AND TEST METHODS

6.1 Sampling -- Out of each lot of 10 guns or less, one metallizing gun and its complete accessory equipment (exclusive of wire) shall be selected for tests to determine compliance of performance according to class, as defined by this specification.

6.2 Kind and Size of Wire

6.2.1 Each class of metallizing gun except Class 6 Type B shall be tested using carbon steel, brass and zinc wires. Class 6 Type B shall be tested using zinc and aluminum wires only.

6.2.2 Wire of the largest diameter recommended by the manufacturer for the given gun class shall be used for these tests.

6.2.3 The manufacturer shall furnish data giving the weights of these wires per foot of length.

6.3 Testing

6.3.1 Spraying Speed Test

Straight lengths of wire, 8'0" long are cut from a coil or reel, and each piece of wire is marked 1'0" and 6'0" from the free end (or end away from the gun).

The metallizing gun is adjusted to neutral flame setting. A straight piece of wire marked as above is inserted into the gun and sprayed. Time record for the 5'0" marked-off distance is made. The spraying speed in pounds per hours is calculated by Formula A and in seconds required to spray 1 foot of wire is calculated by Formula B.

$$A. \quad M = \frac{3600 W}{X}$$

$$B. \quad X = \frac{3600 W}{M}$$

Where M = Pounds of metal sprayed per hour

W = Weight of 1 foot of wire

X = Seconds required to spray 1 foot of wire

The spraying speeds in pounds per hour (M) shall not be less than those listed in the fifth column of Table I. The spraying speeds in seconds required to spray 5 feet of wire (5X) shall not be more than those given in the fourth column of Table I.

Data on Metallizing Wires

	0.23 inch (11 Gauge)		1/8 inch		3/16 inch	
	Wt.-lb. per ft.	Ft. per lb.	Wt.-lb. per ft.	Ft. per lb.	Wt.-lb. per ft.	Ft. per lb.
Steel .10C	.0222	45.05	.0417	23.98	.0938	10.66
Brass	.0241	41.49	.0455	21.98	.1024	9.77
Zinc	-	-	.0376	26.60	.0846	11.82
Aluminum (99.0%)	.0075	133.33	.0141	70.92	.03173	31.53

6.3.2 Density Test

A brass cylinder (Figure 1) approximately 4 inches long with a wall thickness of approximately 1/4 inch is prepared by spraying brass (approx. 60% copper, 0.1% iron, 0.2% lead, 0.75% tin, balance zinc) on a stick of hard wood turned to a diameter of approximately 1 inch. During the coating the hardwood stick is revolved in a lathe, and the gun is operated at a spraying speed specified in Para. 5.3.9.

The cylinder is hydrostatically tested as suggested in Fig. 1, at a pressure of 150 psi.

6.3.3 Salt Spray Test

Three samples of 1/16 inch thick black steel, 3 inches x 3 inches are grit blasted and immediately spray coated on both sides and on all edges to a depth of 0.003 inch zinc, at spraying speeds specified in Para. 5.3.9.

The specimens are then exposed to the salt spray test described in Method 63.1 of Schedule 3-GP-0: Methods of Testing Petroleum and Associated Products; except that a soft fibre brush shall be specified for cleaning the specimens. After 100 hours of continuous exposure the three specimens are examined for rust spots.

6.3.4 Load and Power Spray Test

This test is conducted with steel, brass and zinc wire.

With the same spraying speed as determined in Para. 6.3.1 and without any adjustment to the gun or its accessory equipment, the following load or power test is made to determine the performance stability of each class of gun.

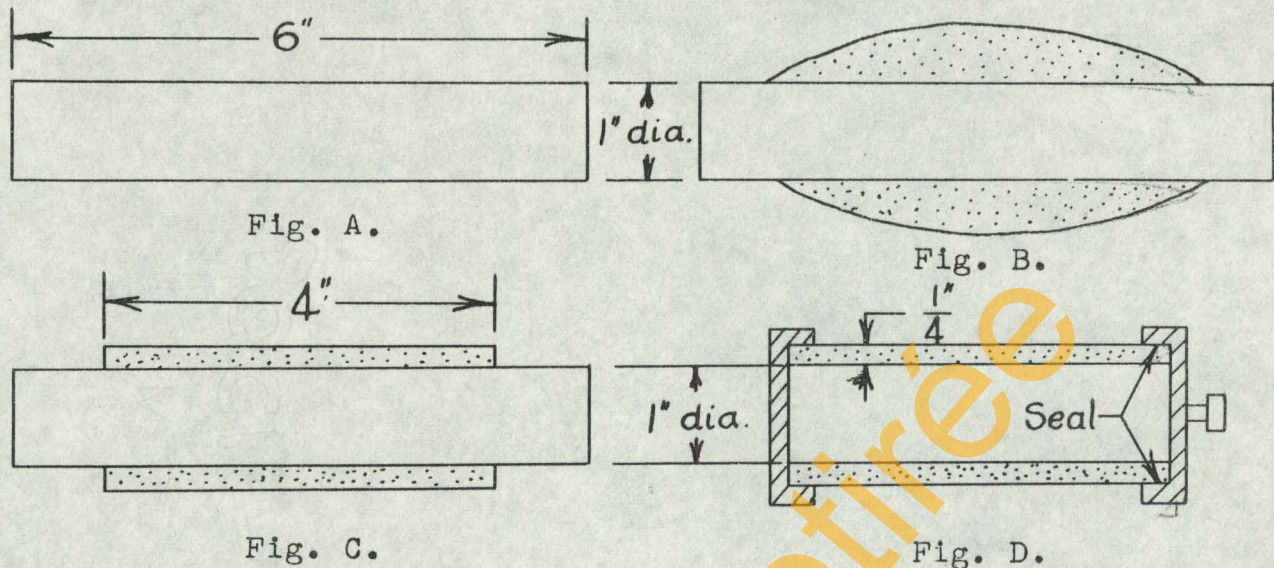
To the free end of a 8'0" length of straight wire is attached a piece of stranded flexible wire (picture wire). The flexible wire is then threaded under Pulley A (Figure 2) which should be approximately on a horizontal plane with the rear wire guide tube of the gun. The wire is further threaded over Pulley B (approx. 8 feet from floor) and a 10-pound weight is attached for Class 1, 2, 3, 4, and 6, Types A and B guns and a 5-pound weight is attached for Class 5 guns, to the wire at the floor line.

The gun is then put into spraying operation, and the required time to raise the weight from 1 foot from the floor to 6 feet from the floor is recorded.

7. NOTES

All pressures referred to in this specification are gauge pressures.

Correspondence regarding this specification should be addressed to the Secretary, Canadian Government Specifications Board, National Research Council, Ottawa, Canada.



DETAILS OF DENSITY TEST SPECIMEN

1. 1" Diameter x 6" Hardwood Stick - center ends. See Fig. A.
2. Place in lathe and roughen with coarse emery paper
3. Spray with Brass (Approximately 60.0 Cu. 010 Fe, 0.20 Pb, 0.75 Sn, Bal. Zn) so that coating will be at least 1/4" wall thickness and 4" long. See Fig. B.
4. Machine Coating so that ends will fit into brass cap (one cap to be drilled and tapped for connection to hydraulic pressure supply). See Figs. C and D.
5. Remove hard wood stick.
6. Join or seal Bronze Caps to end of coating - See Fig. D.
7. Apply Hydrostatic Pressure at 150 psi. pressure for 15 minutes without evidence of leaking or weeping.

FIGURE 1 - Density Test

For Classes 1, 2, 3, 4, 6 - Use 10 lb. Weight

For Class 5 - Use 5 lb. Weight

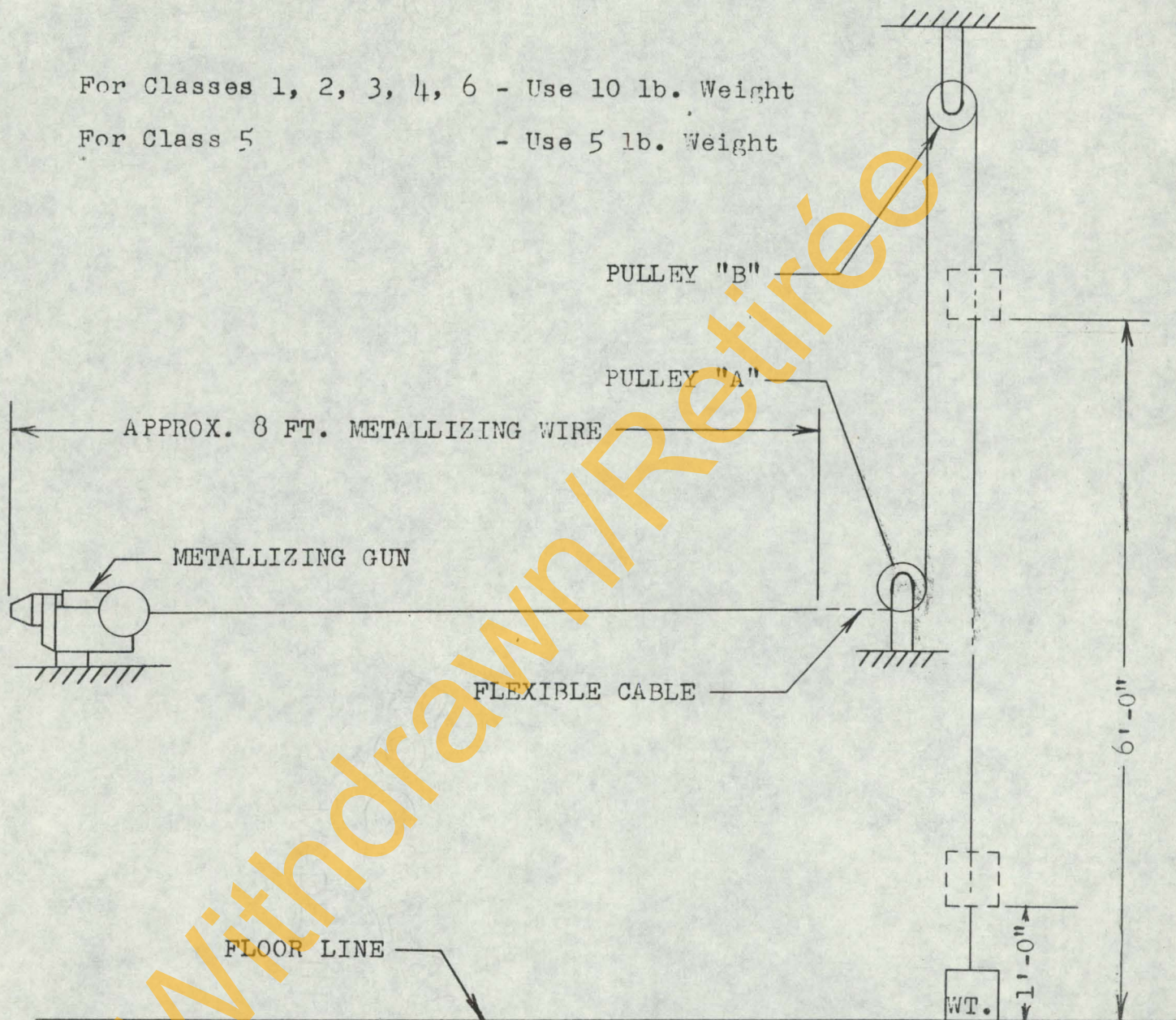


FIGURE 2

LOAD AND POWER SPRAY TEST FOR WIRE GAS METALLIZING GUN.