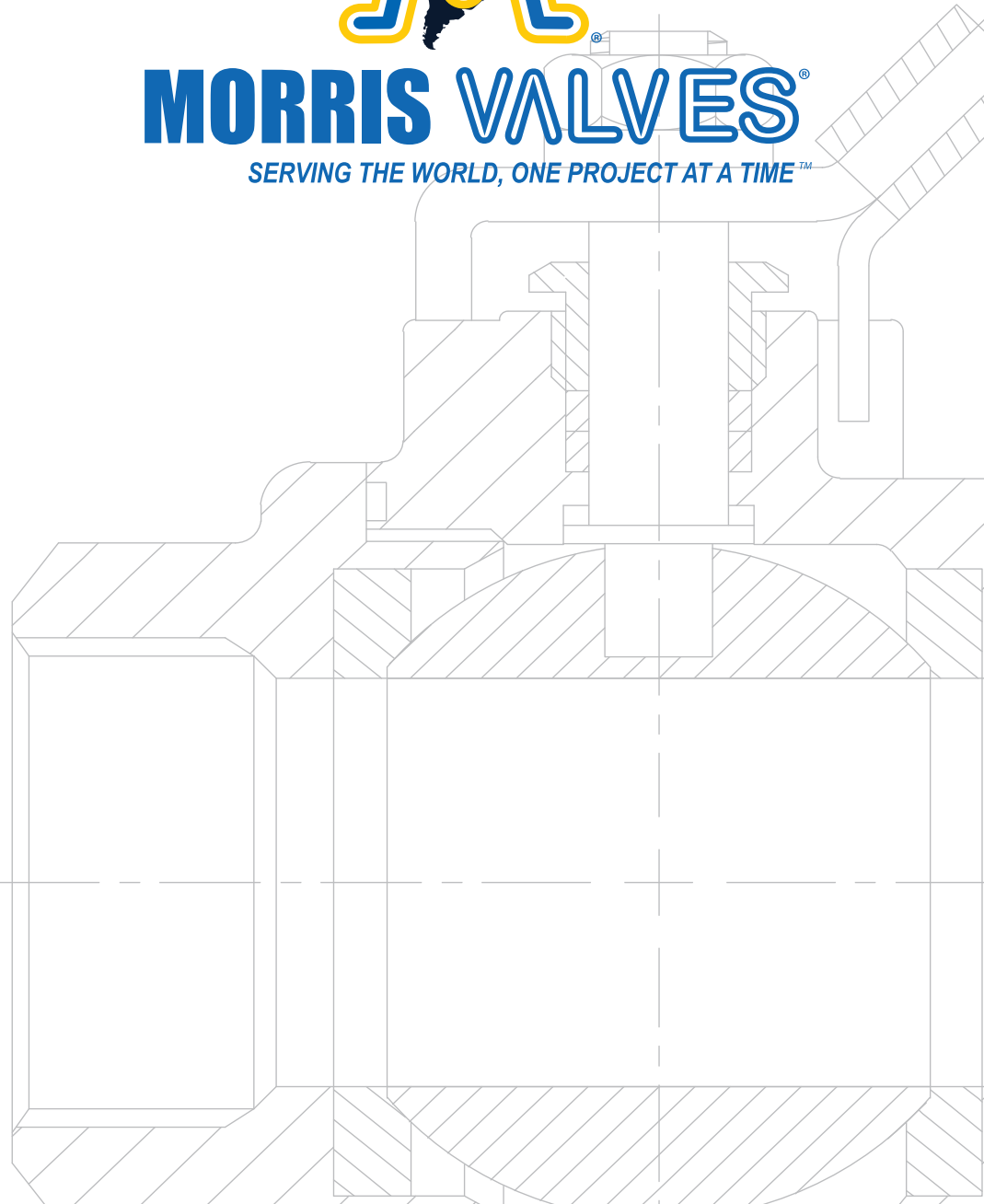




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SERVING THE WORLD, ONE PROJECT AT A TIME™



**API 5L LSAW, DSAW PIPE**

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## Vision

Our vision is to be amongst the leading corporations in the supply of goods and services related to valves, their components and industrial equipment in general. We want to conquer new markets in conformity with international standards and remain committed to customer satisfaction, the welfare of our company and the sustainability our planet.

## Mission

Our mission is to use our highly trained, highly focused, and extremely motivated staff to work with manufacturers who value quality and have the vision for new development and product applications to ensure the timely provision of goods and services related to valves, their components and industrial equipment in general. We maintain a rigorous standard of customer satisfaction, which will provide for the welfare of the company, the welfare of the countries we serve, and most importantly the sustainability of the planet.

*"Serving the world, one project at a time"*

# United States of America

United States Patent and Trademark Office



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**TRADEMARK**

**PRINCIPAL REGISTER**

MORRIS VALVES, INC. (FLORIDA CORPORATION)  
5590 N.W. 84TH AVE.  
MIAMI, FL 33166

FOR: METAL PIPES AND METAL FITTINGS THEREFOR; METAL TUBES AND METAL FITTINGS THEREFOR, IN CLASS 6 (U.S. CLS. 2, 12, 13, 14, 23, 25 AND 50).

FIRST USE 2-11-2015; IN COMMERCE 2-11-2015.

OWNER OF U.S. REG. NO. 4,241,186.

THE COLOR(S) YELLOW, WHITE, AND BLUE IS/ARE CLAIMED AS A FEATURE OF THE MARK.

THE MARK CONSISTS OF A STYLIZED WHITE LETTER "V" WITH A BLUE OUTLINE INSIDE OF A STYLIZED LETTER "M" IN BLUE OUTLINED WITH YELLOW. THE BACKGROUND OF THE MARK IS WHITE.

SER. NO. 86-543,795, FILED 2-24-2015.

MARCIE MILONE, EXAMINING ATTORNEY



*Michelle K. Lee*

Director of the United States  
Patent and Trademark Office

## LSAW PIPES

Longitudinally Submerged Arc Welded Steel pipes. - Longitudinal edges of steel plates as raw material, are first beveled using carbide milling equipment; Beveled plates are then formed into a U shape using a U-press and subsequently into an O shape using an O-press. UOE is the name of the method used for production of longitudinally welded large diameter pipes.

Longitudinal edges of the plates are then tack welded followed by internal and external welds, using double-sided submerged arc welding and flaring from production.

The coherence of cutter head and plate clamping system guarantees the invariable parameters during the entire milling process; accordingly, it ensures the milling quality and lays a good foundation for the success of subsequent welding.

Pipes manufactured by this process are subjected to expanding operation to relieve internal stresses and obtain a perfect dimensional tolerance.

After the pipes are conveyed to cold expansion, hydrostatic testing and NDT inspection, the pipes will be subject to final inspection for the compliance to customer requirements.

### Standard Manufacturing:

- \* ASTM 53
- \* API Spec 5L
- \* ASTM A252-89, EN10217, EN10219

### Steel grades:

- \* API 5L: GR A, GR B, X42, X46, X56, X60, X65, X70
- \* ASTM A252 GR 1, GR 2, GR 3
- \* ASTM A53: GR A, GR B, GR C, GR D
- \* BS 4360: Grade 43, Grade 50
- \* EN: S275, S275JR, S355JR, S355J2H

### Size range by usage

| Usage                        | O.D.(mm)                 | W.T.(mm)             | Length(m) |
|------------------------------|--------------------------|----------------------|-----------|
| Oil & gas pipeline           | 406-1524(16" – 60")      | 6-40 (1/4" – 1.57")  | 8-12.1    |
| for Construction(Pipe Piles) | 350-1600(14" – 63")      | 6-60 (1/4" – 2.36")  | 6-12      |
| Roller pipe                  | 1200-3800(47.24" – 150") | 12-120 (1/2" - 4.7") | <=3.2     |

Addition to above specification, the pipes can be produced according to customer's requirements.



## DOUBLE SUBMERGED ARC WELD PIPE (DSAW)

Derives its name from the welding process wherein the welding arc is submerged in flux while the welding takes place. Both inside and outside welds are required and are usually accomplished in separate processes, hence the word "double." These separate welds consume a portion of the other resulting in a single high quality weld nugget.

### Two different processes are used to manufacture DSAW pipe;

1. The pyramid rolls method, and the
2. U-O-E method.

The difference in the processes is found only in the method of forming the cylinder.

- a. In the pyramid rolls process the cylinder is formed between 3 rolls arranged in a pyramidal fashion.
- b. As the name implies; the U-O-E method uses a "U" press, and "O" press for forming. Other parts of the process such as finishing and inspection are similar.

Both processes use flat steel plate as the raw material.

DSAW pipe may or may not be cold expanded. Cold expansion is a process where the pipe is expanded (up to 1.5%) to obtain its final OD dimension. In the process, a gain of yield strength results.

Expansion is most often utilized in a U-O-E mill due to the need to recover the yield strength lost during forming in the "O" press.

## DSAW Pipe is available in the following specifications:

- \* ASTM A134,
- \* A139, A252,
- \* A671, A672, A690, A691,
- \* A500, A515.
- \* CSA (Canadian) –Z245.1 and custom specifications.
- \* API 2B, 5LB, 5LX-42 thru 5LX-80

**SPIRAL WELDED.** -Is a steel pipe having a DSAW seam the entire length of the pipe in a spiral form. The outside diameter is determined by the angle of the de-coiled steel against the forming head. The more acute the angle, the greater the diameter.

The production of large, hot rolled coils of sufficient width and the development of dependable non-destructive testing methods has enabled this product to be placed in more demanding service.

Spiral weld pipe can be rolled in exact lengths up to 115 feet in either ID or OD dimensions up to 144 inches. **There is a minimum tonnage required for rolling.** Because the manufacturing process is slow, it gives the contractor an advantage of short term changes to the order. This same slow production can also be a disadvantage when large tonnages are needed with a short lead time.

Spiral weld pipe is produced to limited specifications. Now, if this is confusing to you, don't get discouraged. Steel pipe is a complex world to understand. A few charts might help.



#### SPECIFICATION FOR ASTM A-134 Chemical and Mechanical Properties

| Chemical Requirements (Composition %) |          |           |          |          |           |           |           |           |           |          | Tensile Requirements            |                                   |                       |
|---------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------|---------------------------------|-----------------------------------|-----------------------|
| Grade                                 | C<br>Max | Mn<br>Max | P<br>Max | S<br>Max | Si<br>Max | Cr<br>Max | Ni<br>Max | Co<br>Max | Mo<br>Max | V<br>Max | Yield strength<br>Min (MPa)/Ksi | Tensile strength<br>Min (MPa)/Ksi | Elongation<br>Min (%) |
| A283 Gr.A                             | 0.14     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 165 / 24                        | 310/ 45-60                        | 30                    |
| A283 Gr.B                             | 0.19     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 215 / 27                        | 345/ 50-65                        | 28                    |
| A283 Gr.C                             | 0.24     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 205 / 30                        | 380/ 55-75                        | 25                    |
| A283 Gr.D                             | 0.27     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 230 / 33                        | 415/ 60-80                        | 23                    |
| A285 Gr.A                             | 0.17     | 0.9       | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 165 / 24                        | 310/ 45-65                        | 30                    |
| A285 Gr.B                             | 0.22     | 0.9       | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 215 / 27                        | 345/ 50-70                        | 28                    |
| A285 Gr.C                             | 0.28     | 0.9       | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 205 / 30                        | 380/ 55-75                        | 27                    |
| A570 Gr.30                            | 0.25     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 205 / 30                        | 340/ 49                           | 25                    |
| A570 Gr.33                            | 0.25     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 230 / 33                        | 360/ 52                           | 23                    |
| A570 Gr.36                            | 0.25     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 250 / 36                        | 365/ 53                           | 22                    |
| A570 Gr.40                            | 0.25     | 0.9       | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 275 / 40                        | 380/ 55                           | 21                    |
| A570 Gr.45                            | 0.25     | 1.35      | 0.035    | 0.04     | 0.4       |           |           |           |           |          | 310 / 45                        | 415/ 60                           | 19                    |
| A-570 Gr 50                           |          |           |          |          |           |           |           |           |           |          | 345 / 50                        | 450 / 65                          | 17                    |
| A-570 Gr 50                           |          |           |          |          |           |           |           |           |           |          | 380 / 55                        | 480 / 70                          | 15                    |
| A36/A36M                              | 0.26     | 0.9       | 0.04     | 0.05     | 0.4       |           |           |           |           |          | 250 / 36                        | 400/ 58-80                        | 20                    |

#### SPECIFICATION FOR ASTM A-139 Chemical and Mechanical Properties

| Chemical Requirements (Composition %) |          |           |          |          |           |           |           |           |           |          | Tensile Requirements            |                                   |                       |
|---------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------|---------------------------------|-----------------------------------|-----------------------|
| Grade                                 | C<br>Max | Mn<br>Max | P<br>Max | S<br>Max | Si<br>Max | Cr<br>Max | Ni<br>Max | Co<br>Max | Mo<br>Max | V<br>Max | Yield strength<br>Min (MPa)/Ksi | Tensile strength<br>Min (MPa)/Ksi | Elongation<br>Min (%) |
| A-139 Gr. A                           | 0.25     | 1.00      | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 30                              | 48                                |                       |
| A-139 Gr. B                           | 0.26     | 1.00      | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 35                              | 60                                |                       |
| A-139 Gr. C                           | 0.28     | 1.20      | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 40                              | 70                                |                       |
| A-139 Gr. D                           | 0.30     | 1.30      | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 42                              | 60                                |                       |
| A-139 Gr. E                           | 0.30     | 1.40      | 0.035    | 0.035    | 0.4       |           |           |           |           |          | 52                              | 66                                |                       |



**SPECIFICATION FOR ASTM A-252 for welded and seamless steel pipe piles**  
Chemical and Mechanical Properties

| Chemical Requirements (Composition %) |          |           |          |          |           |           |           |           |           |          | Tensile Requirements            |                                   |                       |
|---------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------|---------------------------------|-----------------------------------|-----------------------|
| Grade                                 | C<br>Max | Mn<br>Max | P<br>Max | S<br>Max | Si<br>Max | Cr<br>Max | Ni<br>Max | Co<br>Max | Mo<br>Max | V<br>Max | Yield strength<br>Min (MPa)/Ksi | Tensile strength<br>Min (MPa)/Ksi | Elongation<br>Min (%) |
| A-252 Gr. 1                           | N/A      | N/A       | 0.050    | N/A      | N/A       |           |           |           |           |          | 30                              | 50                                | 18 - 30               |
| A-252 Gr. 2                           | N/A      | N/A       | 0.050    | N/A      | N/A       |           |           |           |           |          | 35                              | 60                                | 14 - 25               |
| A-252 Gr. 3                           | N/A      | N/A       | 0.050    | N/A      | N/A       |           |           |           |           |          | 45                              | 66                                | -- - 20               |

**SPECIFICATION FOR ASTM A- 500. for cold-formed welded and seamless tubing in rounds and shapes for general structural purposes**  
Chemical and Mechanical Properties

| Chemical Requirements (Composition %) |          |           |          |          |           |           |           |           |           | Tensile Requirements |                                 |                                   |                       |
|---------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------------------|---------------------------------|-----------------------------------|-----------------------|
| Grade                                 | C<br>Max | Mn<br>Max | P<br>Max | S<br>Max | Si<br>Max | Cr<br>Max | Ni<br>Max | Co<br>Max | Mo<br>Max | V<br>Max             | Yield strength<br>Min (MPa)/Ksi | Tensile strength<br>Min (MPa)/Ksi | Elongation<br>Min (%) |
| GRADE B                               | 0.26     | 1.35      | 0.035    | 0.035    | N/A       |           |           |           |           |                      | 42                              | 46                                | 23                    |
| GRADE C                               | 0.23     | 1.35      | 0.035    | 0.035    | N/A       |           |           |           |           |                      | 58                              | 62                                | 21                    |

**SPECIFICATION FOR ASTM A- 671 / 672**  
Chemical and Mechanical Properties

| Chemical Requirements (Composition %) |          |           |          |          |           |           |           |           |           |          | Tensile Requirements            |                                   |                       | Hardness  |
|---------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------|---------------------------------|-----------------------------------|-----------------------|-----------|
| Grade                                 | C<br>Max | Mn<br>Max | P<br>Max | S<br>Max | Si<br>Max | Cr<br>Max | Ni<br>Max | Co<br>Max | Mo<br>Max | V<br>Max | Yield strength<br>Min (MPa)/Ksi | Tensile strength<br>Min (MPa)/Ksi | Elongation<br>Min (%) | HB<br>Max |
| -/A45                                 | -/0.17   | 0.98      | 0.35     | 0.35     | -         |           |           |           |           |          |                                 |                                   |                       |           |
| -/A50                                 | -/0.22   | 0.98      | 0.35     | 0.35     | -         |           |           |           |           |          |                                 |                                   |                       |           |
| CA55/A55. Plain Carbon                | 0.28     | 0.98      | 0.35     | 0.35     | -         |           |           |           |           |          |                                 |                                   |                       |           |
| -/B55                                 | -/0.20   | 0.98      | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |
| CB60/B60.Plain Carbon Killed          | 0.24     | 0.98      | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |
| CB65/B65.Plain Carbon Killed          | 0.28     | 0.98      | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |
| CB70/C70.Plain Carbon Killed          | 0.31     | 1.30      | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |
| -/C55                                 | -/0.18   | 0.55      | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |
| CC60/C60.Plain CK Fine Grain          | 0.21     | -0.98     | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |
| CC65/C65.Plain CK Fine Grain          | 0.24     | 0.79      | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |
| CC70/C70.Plain CK Fine Grain          | 0.27     | 1.30      | 0.35     | 0.35     | 0.13-0.45 |           |           |           |           |          |                                 |                                   |                       |           |

**SPECIFICATION FOR ASTM A- 690**  
Chemical and Mechanical Properties

| Chemical Requirements (Composition %) |          |           |          |          |           |           |           |           |           | Tensile Requirements |                                 |                                   | Hardness              |           |
|---------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------------------|---------------------------------|-----------------------------------|-----------------------|-----------|
| Grade                                 | C<br>Max | Mn<br>Max | P<br>Max | S<br>Max | Si<br>Max | Cr<br>Max | Ni<br>Max | Co<br>Max | Mo<br>Max | V<br>Max             | Yield strength<br>Min (MPa)/Ksi | Tensile strength<br>Min (MPa)/Ksi | Elongation<br>Min (%) | HB<br>Max |
| A -690                                | < 0.22   | 0.6-0.9   | 0.8-0.15 | <0.04    | <0.04     |           |           |           |           |                      | > 345                           | > 485                             | > 21                  |           |

**SPECIFICATION FOR ASTM A/SA 691 CHROME MOLY ALLOY WELDED PIPE**  
Chemical and Mechanical Properties

| Chemical Requirements (Composition %) |          |           |          |          |           |           |           |           |           | Tensile Requirements |                                 |                                   | Hardness              |           |
|---------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------------------|---------------------------------|-----------------------------------|-----------------------|-----------|
| Grade                                 | C<br>Max | Mn<br>Max | P<br>Max | S<br>Max | Si<br>Max | Cr<br>Max | Ni<br>Max | Co<br>Max | Mo<br>Max | V<br>Max             | Yield strength<br>Min (MPa)/Ksi | Tensile strength<br>Min (MPa)/Ksi | Elongation<br>Min (%) | HB<br>Max |
| A 1 ¼ Cr                              | < 0.22   | 0.6–0.9   | 0.8–0.15 | <0.04    | <0.04     |           |           |           |           |                      | > 345                           | > 485                             | > 21                  |           |
| 2 ¼ Cr                                |          |           |          |          |           |           |           |           |           |                      |                                 |                                   |                       |           |
| 5 Cr                                  |          |           |          |          |           |           |           |           |           |                      |                                 |                                   |                       |           |
| 9 Cr                                  |          |           |          |          |           |           |           |           |           |                      |                                 |                                   |                       |           |
| 91                                    |          |           |          |          |           |           |           |           |           |                      |                                 |                                   |                       |           |
| -690                                  |          |           |          |          |           |           |           |           |           |                      |                                 |                                   |                       |           |



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