

SPEC. : The high pressure gas safety law

1. Principal elements

|                         |  |
|-------------------------|--|
| Type of gas             | Compressed gas or Liquefied gas        |
| Water capacity          | 0.35 L +10,-0%                         |
| Tare weight             | 1.4 kg ±12.5%(without valve)           |
| Hydraulic test pressure | 24.5 MPa                               |
| Filling pressure        | Max. 14.7 MPa at 35°C (Compressed gas) |

2. Material of construction

A. Cylinder : Carbon steel(STS370)

(a) Chemical composition %

|    |              |
|----|--------------|
| C  | : Max. 0.25  |
| Si | : 0.10~0.35  |
| Mn | : 0.30~1.10  |
| P  | : Max. 0.035 |
| S  | : Max. 0.035 |

(b) Heat treatment : Normalizing

(c) Mechanical properties at room temperature

|                  |                              |
|------------------|------------------------------|
| Tensile strength | : Min. 370 N/mm <sup>2</sup> |
| Yield stress     | : Min. --- N/mm <sup>2</sup> |

\*1 Elongation : Min. 30 %

(d) Bursting pressure : 58.8~117.6 MPa

3. Construction

By mannesmann method

4. Designed minimum wall thickness

$$t = \frac{D}{2} \left( 1 - \sqrt{\frac{S - 1.3P}{S + 0.4P}} \right)$$

where

|   |                                   |                       |
|---|-----------------------------------|-----------------------|
| t | : Designed minimum wall thickness | mm                    |
| S | : Allowable wall stress           | 154 N/mm <sup>2</sup> |
| P | : Hydrostatic test pressure       | 24.5 MPa              |
| D | : Outside diameter                | 50.8 mm               |

$$t = \frac{50.8}{2} \left( 1 - \sqrt{\frac{154 - 1.3 \times 24.5}{154 + 0.4 \times 24.5}} \right) = 3.47 \text{ mm}$$

5. Safety factor

$$S = \frac{2ft}{P(D-t)}$$

where

|   |                                      |                       |
|---|--------------------------------------|-----------------------|
| S | : Safety factor                      |                       |
| f | : Tensile strength of material       | 370 N/mm <sup>2</sup> |
| t | : Min. manufacturer's wall thickness | 3.6 mm                |
| P | : Filling pressure                   | 14.7 MPa              |
| D | : Outside diameter                   | 50.8 mm               |

$$S = \frac{2 \times 370 \times 3.6}{14.7(50.8 - 3.6)} = 3.83$$

6. Finish

- (1) Interior finish  
Shot blasting
- (2) Exterior finish  
Shot blasting and painting

Note

- \*1 : Min. elongation shall be computed by subtracting 1 from the value of elongation in 2.(C) for every decrease of 1 mm or fraction thereof in measured wall thickness from 8 mm.
- \*2 : Stamped by The High Pressure Gas Safety Institute of Japan.

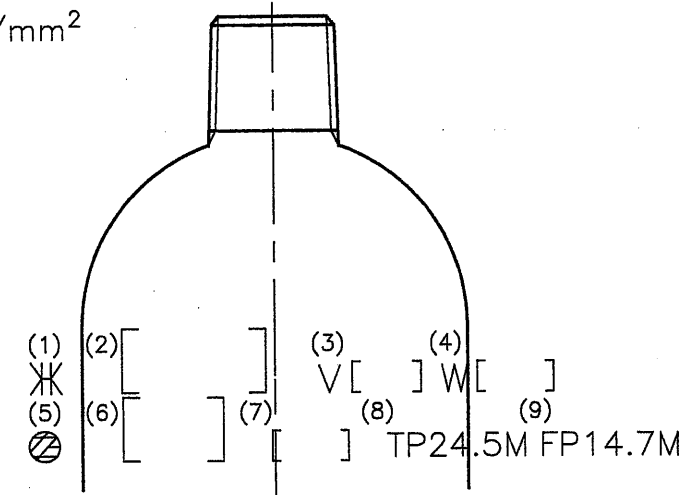
Marking

- \*2 (1) Inspector's mark
- (2) Serial number
- (3) Min. water capacity
- (4) Actual tare weight
- (5) Maker's symbol
- (6) Name of gas
- (7) Test date (month-year)
- (8) Test pressure
- (9) Filling pressure

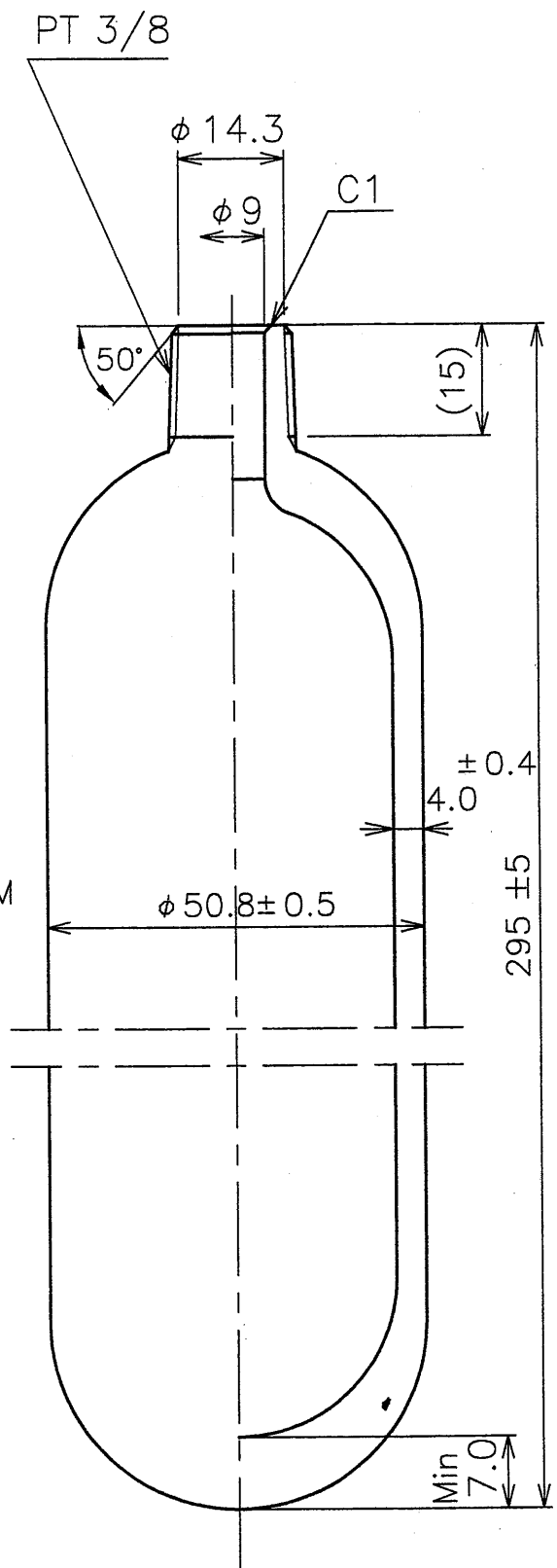
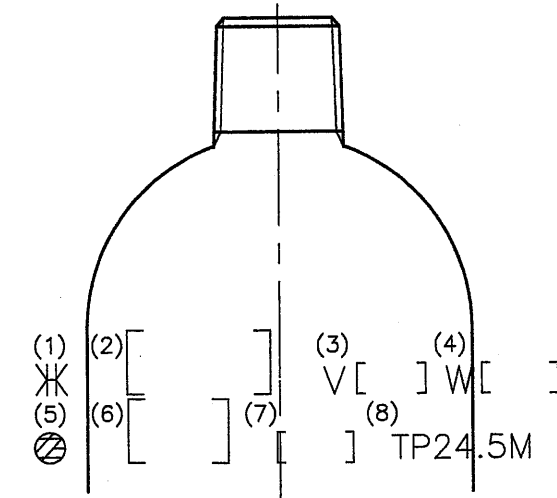
Letter height

- 4 mm
- 7 mm
- 3 mm
- 3 mm
- 3 mm
- 7 mm
- 3 mm
- 3 mm
- 3 mm

Compressed gas



Liquefied gas



Unit : mm

|                            |                    |     |             |        |             |        |
|----------------------------|--------------------|-----|-------------|--------|-------------|--------|
| TITLE                      | 0.35L GAS CYLINDER |     |             |        |             |        |
| APPR'D                     | Y.I                | CHK | T.S         | DESIGN | T.S         | SCALE  |
|                            | Oct. 5 '99         |     | Oct. 05 '99 |        | Oct. 05 '99 | 1:1    |
| ASAHI SEISAKUSHO CO., LTD. |                    |     |             |        | NO          | 11965E |