

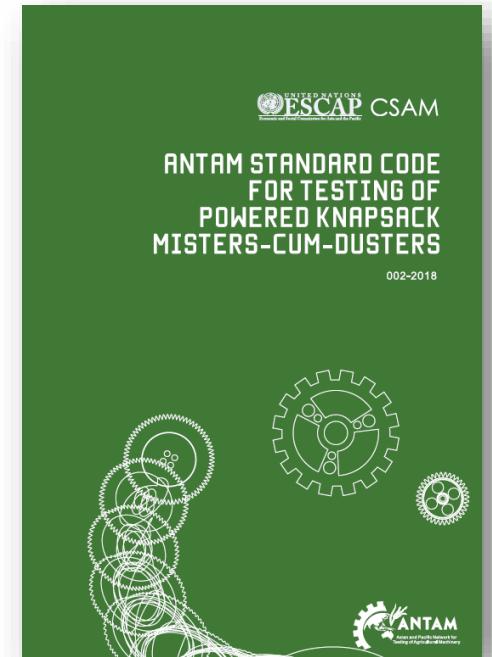
# TWG Report on the revision of Antam test code on Mister cum Duster

Review of the ANTAM Test Code 02.2018

TWG Chair

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## Mister cum duster



A Blower, a Mister & and Duster used in crop protection, fertilizing, seeding, vector control and desinsectization: liquids, (solid) particles and dust

## TWG on Mister cum Duster



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## 5.3 Marking and Packing

**5.3.1 Marking** - Each mister-cum-duster shall be marked with the following particulars:

- a) Manufacturer's name and registered trade-mark
- b) **Maximum** liquid tank capacity
- c) Unloaded mass of machine with empty liquid tank and empty fuel tank
- d) Production Code and serial number
- e) Engine certification label
- f) Type of fuel used
- g) Maximum blower speed (rpm)
- h) Safety labels: The mister-cum-duster shall have safety label which reminds the operator to pay attention to safety while operating. There shall be warning sign near the entrance of fan and high-temperature components of muffler. The pattern and content of the safety label shall comply with the terms of ISO 11684:1995. The safety label shall be pasted firmly.
- i) Control device labels: In the control device or nearby location, there shall have clear labels, its contents should reflect the basic characteristics of the control device.
- j) Any other ANTAM approved Asia Pacific member countries national certification label.

Note: The use of the certification label is governed by the approval of the ANTAM Secretariat.

## ☐ Review of Test code 02 2018 - **5.4.1. Appearance Quality (split one paragraph into three)**

**5.4.1.2** If the surface touches chemicals, i.e.: steel tank, the total thickness shall not be less than 75µm, and the paint coating shall pass the pesticide resistance to corrosion test.

**REQUIREMENT**

**5.4.2 Test procedure is as follows:**

**TEST PROCEDURE**

- Selection and concentration of the chemical is determined by the testing station
- Fill in chemical up to the maximum tank level after conducting tank leakage test
- Securely tighten the lid
- Place the mister/duster securely on a support structure
- Shake the mister/duster vigorously for every 15 minutes and stop for another 15 minutes at a frequency of 0.5 Hz and at an angle of 5 degrees front to back and side to side for duration of 7 days
- Empty the tank
- Inspect the paint finishing
- Continue the test for another 6 cycles each of 7 days
- For each test cycle, renew the chosen chemical as reuse of chemical is not allowed
- Stop the test if there is leakage due to corrosion

**5.4.3 Quality criteria: (good/pass/fail):**

**QUALITY CRITERIA**

- Good: the surface gloss maintained without change or colour. No bubbles, flaking or pits. No powdery appearance, cracks or rust
- Pass: change of colour, loss of gloss, minor bubbles (less than 30 percent of the covering surface) rough paint work surface appear in less than 30 percent of total surface area, minor powdery appearance without cracks, few rust spots (diameter less than 0.5 mm)
- Fail: greater deterioration than previous for criteria

## ❑ Review of Test code 02 2018 - 5.5 Running-in

**5.5.1** The manufacturer/applicant shall run-in all three powered knapsack misters-cum-dusters before the test **under their responsibility and in accordance with the procedure prescribed or agreed with the manufacturer/applicant and in any case in ordinary condition.** The running-in shall be carried out in collaboration with the testing authority. If this procedure is impracticable due to the powered knapsack mister-cum-duster being an imported model, the testing authority may itself run-in the powered knapsack mister-cum-duster in accordance with the procedure prescribed or agreed to with the manufacturer/applicant.

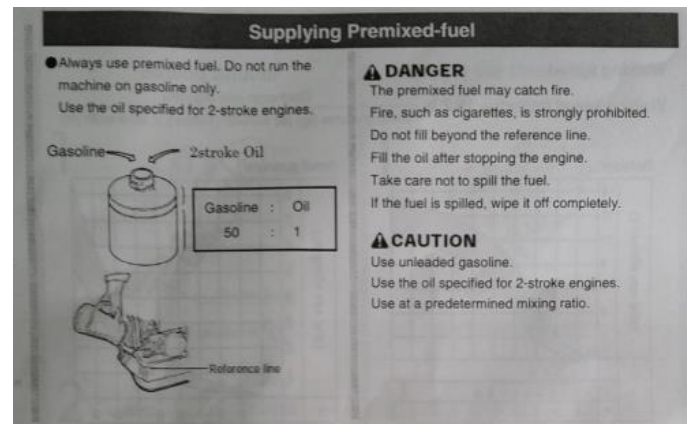


## ❑ Review of Test code 02 2018 - 5.5.2 Servicing and Preliminary Setting after Running-In

**5.5.2.1 Servicing** - After completion of running-in, servicing and preliminary settings should be done **by the manufacturer/applicant** according to the printed literature supplied by the manufacturer/applicant **and in ordinary conditions**. The following may be carried out, wherever applicable:

- a) Change of the engine oil;
- b) Change of oil and fuel filters (if required);
- c) Greasing/oiling of all the lubricating points;
- d)** Checking and adjustment of safety devices, if any;
- e)** Any other checking or adjustment recommended by the manufacturer after the running-in period and included in the printed literature of the powered knapsack mister-cum-duster.

**Note - Manufacturers should be providing the oils needed for the testing (a ,b, c) if needed to be carried out**



Review of Test code 02 2018 - **5.6 Specifications**

**5.6.1 Checking of Specification** The information given by the manufacturer/applicant in the specification sheet as per Annex B-1 shall be verified by the testing authority and any deviation may be reported. Details of the components and assemblies which do not conform **to the standard specification provided by the manufacturer** shall also be reported. The material of construction should be verified.

Review of Test code 02 2018 - **5.6.3 Liquid tank**

**The tank, connected hoses, and air pressure hose will be checked** when the liquid or dusting powder is filled in the tank up to its full capacity. **Any signs of leakage and buckle will be noted in Annex B-1.**

Review of Test code 02 2018 - **5.6.4 Impeller**

**5.6.4 Impeller** - The impeller of the fan shall be dynamically balanced at its rated speed. The impeller shall not touch casing at any point. **The impeller will be check if it is dynamically balanced at its rated speed. During and after the impeller ran at rated speed, it will be checked for scratch or deformation from the parts coming in contact with the impeller.**

Review of Test code 02 2018 - **5.6.13 Nozzles**

**(Specifications)**

**5.6.13 Nozzle/Diffusers** If the machine is equipped with nozzles, all type of nozzle should be listed **as well as other types of diffusers.**



□ Review of Test code 02 2018 - **6.1 Gasoline Engine**

**6.1.4 Fuel Consumption** - The quantity of fuel consumed by engine per unit of time at a stated power and under stated operating conditions expressed in **grams per hour (g/h) or liters per hour (l/h)\***.

**\*Indicate the density of fuel**

**6.1.5 Specific Fuel Consumption** - Fuel consumption per unit of energy produced expressed in grams per kilowatt hour **(g/kWh) or liters per kilowatt hour (l/kWh)\***.

**\*Indicate the density of fuel**

**6.1.6 Full Throttle** - Throttle opening corresponding to **maximum speed**.

**6.1.7 The general tests requirements, rated power, rated speed, specific fuel consumption and lubricating oil consumption shall comply with ISO 8178-4:2017 or IS:7347-1974 (with amendment No. 3 September 2011) or JB/T 5135.1-2013.**

**6.1.8 The manufacturer/applicant has to provide information on the test/homologation of the engine. A list of tests/homologations should be provided in an Annex to the Code.**

❑ Review of Test code 02 2018 - **7.0 Joints, Tank, Straps, Hose and Controls**



**7.2 Hose Accelerated Ageing Test**

**The procedure consist in:** After ageing at  $70 \pm 1$  °C **in the oven** for a period of 72 hours, the rubber used for lining of all types of hoses shall not vary by more than  $\pm 25$  percent for tensile strength and for elongation at breakage point.

Note: Clause 6 of IS: 443-1975 and IS: 3400 (Part 4)-2012 are referred.

❑ Review of Test code 02 2018 - **7.3.2 Residues**

**7.3.2.1 Chemical Tank** - The amount of chemical residue (liquid or dust) remain in the tank shall not exceed 0.1 kg for dust or 0.1 liter for liquid.

Equipment	
Stove	Traction for test bench and sensor
	



## ☐ Review of Test code 02 2018 - 7.4 Straps

### 7.4.1.1 Checking the Straps for Damage

Make sure that there is no damage in straps before test. The straps and their assembly shall withstand the test as follows:

- The **chemical** tank shall be filled with clean water to its full capacity.
- The mister-cum-duster (without discharge line) shall be hung from a solid support by its strap(s) simulating its carriage or to the shoulder of an operator.
- Raise the chemical tank vertically to a height of 300 mm and allow to drop freely while hang by the strap(s). Repeat the operation 24 times.
- The assembly shall be deemed to have passed this test if none of its parts (straps, brackets, etc.) break.



□ Review of Test code 02 2018 - **7.4 Straps**

**7.4.2 Straps Water Absorption Test** - Remove the carrying straps, any padding and any metal or plastic parts attached to them before immersion (to minimize, as far as possible, the dry mass of the straps) and weigh them dry using a weighing device. Completely immerse the straps in water for 2 min. Remove the straps from the water and hang freely to drain for 10 min before re-weighing.

Calculate the mass increase change in m in percentage using the following equation:

$$\Delta m = \frac{m_a - m_b}{m_b} \times 100$$

Where

$m_b$  is the mass before the test

$m_a$  is the mass after the test



**The increase in mass of straps after defined immersion in water shall not exceed 30 % of the dry mass.**

**Note: ISO 19932-2: 2013 is referred.**

□ Review of Test code 02 2018 - **8.0 Blower test**

**8.1 Air Velocity and Air Volume (Optional)** Place the mister-cum-duster in an operating position. Lock the machine as per Figure 3. Position air duct pipe in a horizontal position such as the height of the mister-cum-duster outlet center is  $1000 \pm 20$  mm from the ground.

Set the engine speed according to the rated engine speed defined by the manufacturer. Place an anemometer at the center of the air duct pipe outlet. Measure the air velocity at the centre of the air duct.

Measure the air velocity at distances of  $3000 \pm 20$  mm and  $6000 \pm 20$  mm (Figure 4) from the air duct pipe outlet based on sampling grid of  $100 \times 100$  mm  $\pm 5$  mm and along the four sampling lines AA, BB, CC and DD as per Figure 5. Calculate the average velocity for 15s at each sampling point.

Stop measuring when an air velocity lower than 2 m/s is detected.



## ☐ Review of Test code 02 2018 - 9.0 Discharge Rate Test

**9.1-9.1.1 Misting Discharge Rate (For Full Chemical Tank)** Fill the **chemical** tank of the mister with pre-determined quantity of clean water up to its full marked capacity. Firmly place the knapsack mister on a weighing scale, set the flow regulator at full throttle setting and, divide the starting and stopping of misting into 7 segments of full marked capacity (stopping is defined as irregular continuous misting). Measure the time and weight for each segment and calculate misting discharge rate. Conduct the horizontal and vertical misting.

Repeat these tests three times and record data into Table 2 (Source: Chinese JB/T 7723- 2014 Clause 5.5.5). Use the following equations to find the average misting discharge rate. (...)

**9.1.2 Misting Discharge Variation (For Each Segments)** Obtain the tank filling variation discharge with data from section 9.1.1. The variation in discharge due to tank filling at the various segments shall not exceed 15 percent of the discharge at full capacity of the tank.

**9.2.2 Residue - Weigh or measure the residual dust remained in the chemical tank and hose after the test and record it in Table 3.**  
**(DUSTING)**

□ Review of Test code 02 2018 – **10.1 Misting/Dusting Range and Width**

**10.1.1** Conduct this test in an enclosed space without interferences due to wind (**maximum of 0.5 m/s**). The humidity and temperature will be noted during the test. Place the mister-cum-duster in an upright position and lock the machine as per Figure 7 position. Position air duct pipe of the mister-cum-duster in horizontal direction in such a way that the outlet center is 1000±20 mm from the ground to ensure mist flow in horizontal direction. Because of health and safety issues **using powder or similar** dusting material, test may preferably **be operated** in outdoor conditions. In this case, the natural wind speed shall be lower than 0.5 m/s otherwise a wind breaker is to be used. **Wind speed shall be recorded.**

**10.1.2** Initial Trial - Fill the **chemical** tank with clean water and set the engine at rated speed. Operate the misting at full throttle for 3 min.

Visually observe the coverage of misting that will define the sampling zone and the misting range (along the deposition main axis) and misting width (perpendicular to the deposition main axis).

**10.3 Measurement of Dusting and Misting Width** Record the maximum width of the misting/dusting as measured in **10.1.3, 10.1.4 and 10.1.6**

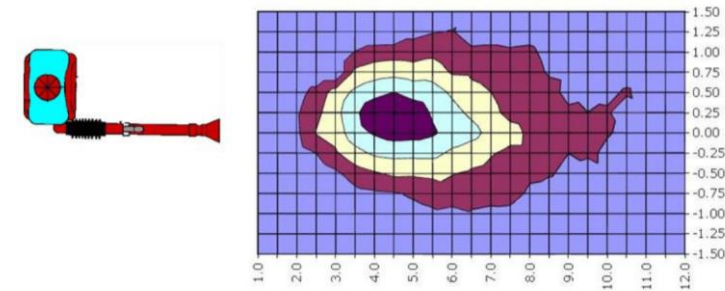


Figure 17a. Misting/Dusting range and width (source JKI)

❑ Review of Test code 02 2018 – **10.2 Measurement of Vertical Deposition (Mister Only)**

**10.2 Measurement of Vertical Deposition (Mister Only) - Optional**



How to evaluate sprayer's vertical deposition



Dec 2022

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Figure 18a. Set up for vertical deposition test



## ❑ Review of Test code 02 2018 – 12.0 Noise Test

### 12.1.3 Operator Ear Level Noise Measurement

During measurement, the microphone is placed as explained in Figure 9. Measure the noise level. Repeat 3 times at each point. Compute the average, record readings in Table 4.

Variations between two successive measurements shall not exceed 3 dB(A). **In case the variation is higher, repeat the measurement.** Record the maximum value.

The noise level of the machine should be the lowest possible to safeguard the operators and because it is a limitation for export to some countries. Manufacturer should supply appropriate ear protectors along with the mister-cum-duster in respect to the country's limitations according to noise exposure level.

**Note - National limits will be used as reference**

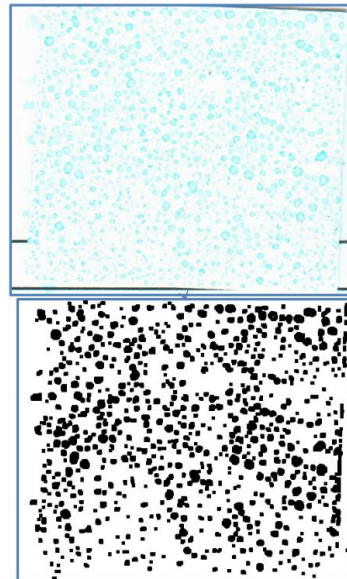
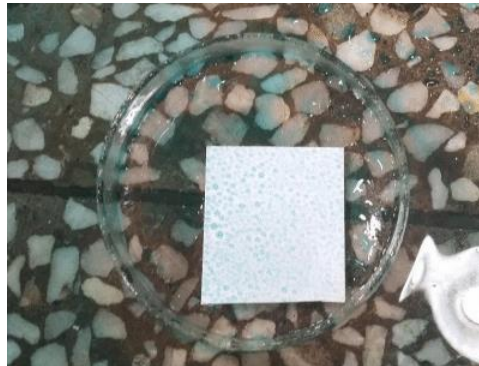
## ❑ Review of Test code 02 2018 – 13.0 Vibration Test

Compute the average record results in the table 9a. Average vibration acceleration at the back rest shall not exceed 15 **m/s<sup>2</sup>**.



# Miscellaneous

- Droplet size measurements for the characterization of nozzles/diffusers
- Ground deposition with a dye tracer (also applicable to crop deposition)



Use of a dye tracer to quantify the spray deposition.



- ❑ TWG members on Muster cum Duster are deeply acknowledged for the work done and the quality of discussion
- ❑ Dr Sandro Liberatori, as representative of the TRU, for the help provided
- ❑ David Bondoc and Marco Silvestri. CSAM. for the administration and technical workflow

