

AIR SPEED

WATERBORNE PAINT SYSTEM

The most recent European regulations, aimed to preserve the safety of the operator and the environment, contemplate the progressive replacement of the paint containing solvents in the water base paint products. These regulations meet or exceed the regulations in the United States

In a typical spray booth, it means:

- Longer wait times between one coat of paint and the next
- Longer bake times
- Difficulty eliminating the volatile organic compounds (VOC'S) in the product before the chemical bonding process

The common problems that generally occur on the finished surface are as follows:

- Loss of brightness in the finish (matting)
- Orange peel
- Solvent popping (the VOC'S did not evaporate)

To eliminate these problems, Blowtherm's engineers have designed the AIR SPEED curing system that is installed in the plenum. The advantage of this system, in comparison with an old technology using ceiling fans or wall and corner blowers, is to avoid blowing any contaminants present onto the freshly finished surfaces.

Operating a booth equipped with the AIR SPEED system in the different finishing cycles, is as follows:

- spraying → In this cycle the entire plenum is open for air flow. This way a uniform air flow is allowed, in compliance with UNI EN 13355 (air flow speed ≥ 60 cfm)
On page 4, picture 1, ventilation scheme, in detail:
 - Picture 1a - full distribution of the air flow
 - Picture 1b - the red colour shows that the entire plenum area allowing air flow into the entire cabin
- pre-drying → This cycle, which is between one coat of paint and the next,
- pre-flashing → makes the product extension easier and faster for the chemical

bonding process to begin. This condition is essential to prepare the finished surface to receive the next coat of product. The cycle, from the painting to the pre-drying or pre-flashing, is the start of the AIR SPEED system. The air flow is concentrated on a restricted area of the plenum and concentrates the air flow on the vehicle. This AIR SPEED system increases the velocity of the air over the vehicle quadrupling the air speed from $V = 118$ cfm to $V_i = 472$ cfm. The greatly increased air speeds allows the break down of the superficial tension of the material applied and accelerates the evacuation of the water and any VOC'S contained in the product.

On page 5, picture 2, the ventilation scheme, in detail:

- Picture 2a – shows the air flow is concentrated at high speed over the vehicle
- Picture 2b – shows in red colour the area of the plenum which allows the air flow

➤ Oven → This cycle, which follows the spraying cycle, takes advantage of the AIR SPEED system to accelerate the distension of the material applied and removes the water and VOC'S in the paint quicker.

On page 5, picture 2, the ventilation scheme, in detail:

➤ Cooling → The AIR SPEED system is on in this cycle also reducing the time required to cool the vehicle body.

The tests were carried out under following conditions:

- Extra Spray booth 23' x 13' 2" x 9' H with a plenum height of 30"
- Generating group is an Extra, direct fire burner, with 2 x 15 hp motors
- Vehicle model "Fiat Scudo"
- Measuring instrument "Anemometer with hot cable sensor"
- Measures taken close to the vehicle in four different situations:
 - a) 39" from the booth floor – AIR SPEED OFF
 - b) 39" from the booth floor -- AIR SPEED ON

a) 39" from the booth floor - AIR SPEED OFF



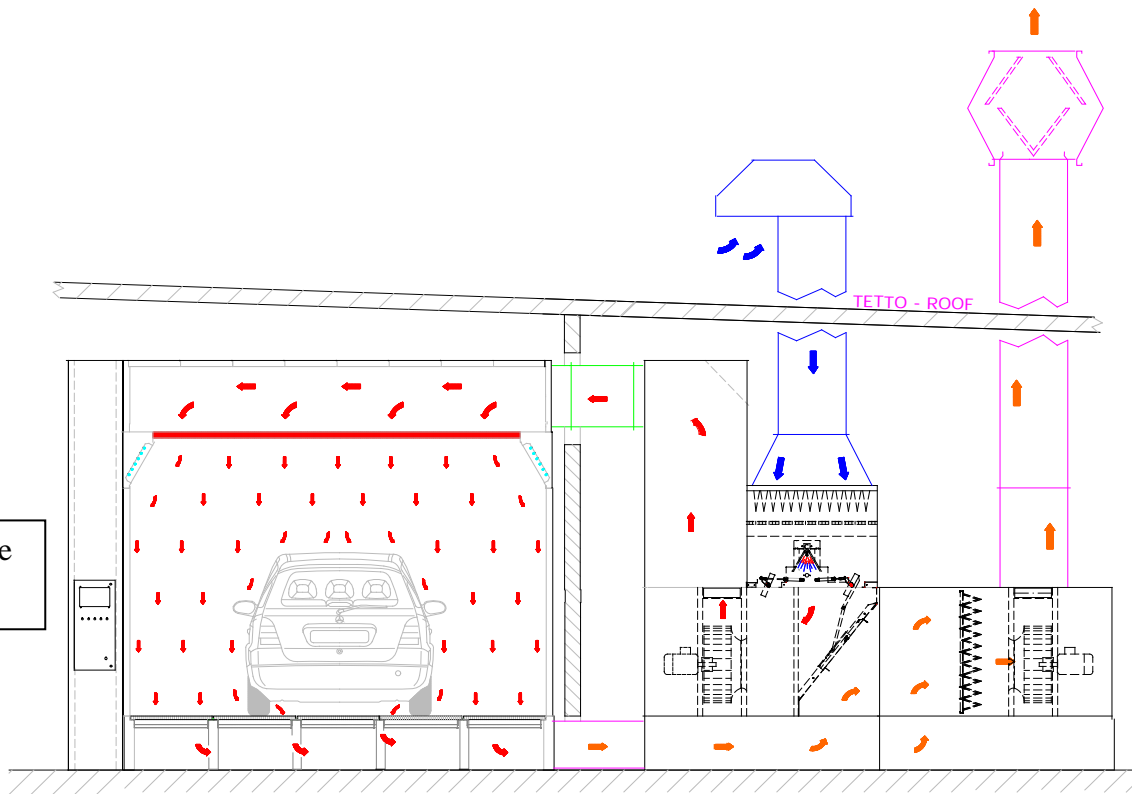
$V = (98 \div 157 \text{ CFM})$

b) 39" from the booth floor - AIR SPEED ON

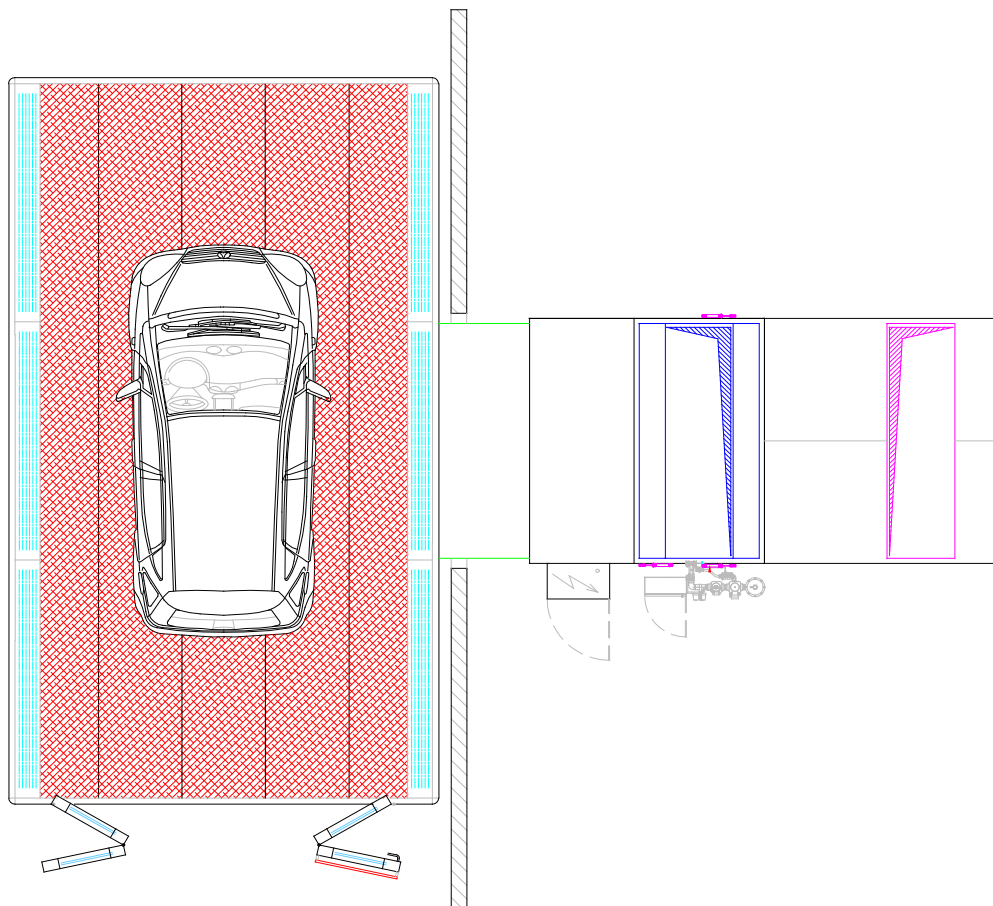


$V_i = (255 \div 472 \text{ CFM})$

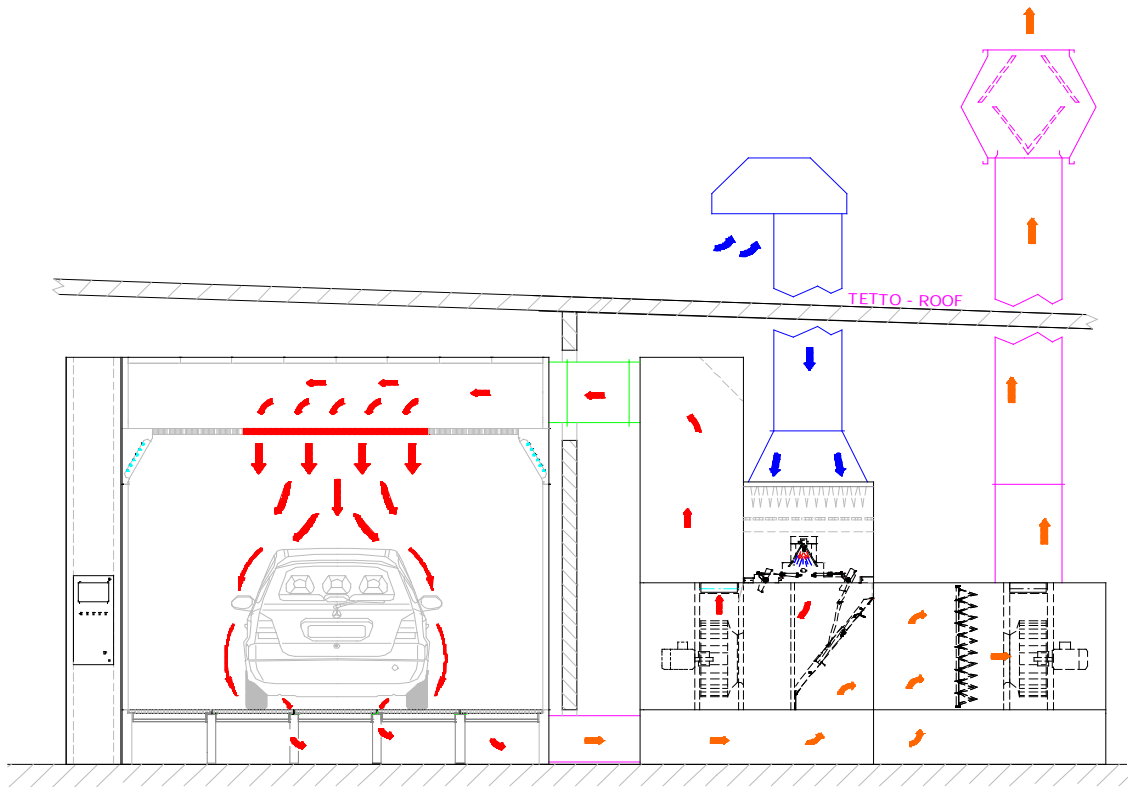
Picture 1a



Picture 1b



Picture 2a



Picture 2b

