

Technical Analysis Report: Aluminum 350cfm Carburetor

Comparison: Aluminum 350cfm vs. Unaltered Holley 350cfm

Reference: Stock Gauge Specifications Designed for Holley 350cfm Carburetors

Regulatory Non-Compliance

Per Race of Champions rules, *any new components—including engine, frame, or body parts—must be submitted for official approval prior to use in competition.* This requirement was **not followed**. The aluminum carburetor in question was **never presented for pre-approval** before its use in competition, which constitutes a direct violation of the rules.

Summary of Technical Deviations

1. Non-Stock Material Composition

- The component was constructed using **aluminum and other alloys**, deviating from the materials specified for a stock, unaltered Holley 350cfm carburetor.

2. Altered Booster Location

- The booster location was **modified** and did not conform to the required **stock, unaltered positioning** as defined by the technical specifications.

3. Throttle Plate Modifications

- The **shape and size** of the throttle blades were altered, differing from those of a stock unaltered unit.

4. Weight Discrepancy

- The weight of the stock Holley 350cfm carburetor is approximately **33 grams**.
- The aluminum version weighed only **19 grams**, a substantial reduction that may affect mechanical behavior during operation.

5. Venturi Wall Modifications

- Material scanning and thickness analysis revealed that the **venturi walls** were **altered** in both dimension and construction when compared to the stock specification.
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Thermal and Performance Considerations

• Material Behavior:

Aluminum exhibits **different thermal properties** compared to standard stock materials. It **dissipates heat more rapidly** and **cools more efficiently**, which can directly influence fuel atomization and air/fuel mixture temperature.

• Heat Capacity & Charge Density:

With its **lower heat capacity**, aluminum components tend to remain cooler. In a naturally aspirated engine, this can **increase charge density**, improving combustion efficiency and resulting in **higher power output**, despite potential decreases in fuel efficiency.

• Thermal Expansion:

Aluminum expands more significantly with temperature increase—a factor known as **thermal expansion**. Combined with the reduced wall thickness, this can alter airflow characteristics during operation, potentially giving a **competitive advantage**.

Conclusion & Recommendation

The aluminum 350cfm carburetor used in competition:

- Was **not submitted for mandatory pre-approval**.
- Featured **non-conforming materials, altered geometry**, and **modified internal structures**.
- Would have **not been approved for competition** had it undergone proper inspection prior to use.

Recommendation:

The use of this component clearly violates Race of Champions technical regulations. It is recommended that **penalties be applied** as appropriate per the rulebook.