AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
1	TC 2	COVER LETTER 3. Application	"Features or design details not listed as required or optional in this document are not considered necessary unless a justification acceptable to the FAA is provided." Comment: There is no mechanism in the -10 draft by which a sponsor can request FAA approval for an option or design detail not listed in the document. The -10C document included a section in Appendix 4 which read - **"C. "The following clarifications are not specifically noted in the AC as purchaser options. For Federally funded procurements, they may only be approved through the issuance of a Modification to Standards by the local FAA Airports District or Regional Office. The Modification to Standards has been issued as noted below.** **_____** **(Name and Title of FAA Approving Official)** **(Sponsor to attach list of modifications to be requested through a Modification to Standards process.)** We believe that it is unrealistic to assume that there will be no sponsor requested options in the future, and suggest that Section C. in Appendix 4 of the -10C AC be added to the -10D document. As was suggested in the industry meetings, a copy of the FAA approval for each option requested should be included with the sponsor's bid documents.	By including an approval mechanism, options which may be required at an airport because of operational requirements can be provided. If a mechanism such as this is not used, when we receive a bid document including a specification item which is not "approved", we will notify the ADO and request that he advise the sponsor that the item must be deleted prior to the bid opening. Reject: The mod TO standard is the ADO's responsibility and this document identifies items that require a mod.	
2	JAW 2	Chapter 1 Addition: 1.1	AMENDMENT 1.1 Trucks that are remanufactured must meet the performance requirements of the Advisory Circular under which it was originally constructed. They will be upgraded with stability enhanced struts and active suspension systems to improve safety. They need to meet the following dynamic stability test requirements: The Evasive Maneuver Test, The NATO Document *AVTP 03-16W* Dynamic Balance (35 mph) minimum speed on a (100 ft) radius circle, "J" turn test at 150 ft radius (35 mph), and the tilt table with the active suspension system engaged as stated in table 4.1.1.	It is unrealistic to think that older truck designs are going to meet all the performance requirements of this latest advisory circular. This would require the retrofitting of new	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Trucks that are remanufactured must meet the acceleration and braking performance requirements of the Advisory Circular under which it was originally constructed.	engines and transmission and braking systems. Reject: Added this statement to the Advisory	
3	JAW 3	Chapter 1 Addition: 1.1	AMENDMENT: 1.1 Trucks that are put through remanufacture facilities will be upgraded with active suspension systems to meet the current dynamic performance requirements of the Advisory Circular. The remanufacturing facility will perform all the dynamic stability tests related to the Advisory Circular contained in 4.1.1 of the *NFPA 414 Standard*.	The cost of rebuilding a vehicle may be justified if the cost is up to 80% of the cost of a new vehicle which includes the cost of the active suspension modification. Reject: Same as above	
4	JAW[1] 1	Chapter 1 Addition: 1.1	The FAA has elected to use a legislative mandate requiring that regulatory revisions follow recognized international consensus standards. The NFPA has been selected by the FAA as that consensus standard organization. It should be noted that the FAA has two individuals representing its organization on the NFPA Aviation Technical Committee, which developed the *NFPA 414* document. It should follow that all NFPA standards be applied or considered including *NFPA Standard 1912 "Standard for Fire Apparatus Refurbishing (2006)*. This standard in 3.3.18 defines fire apparatus as, "A vehicle designed to be used under emergency conditions to transport personnel and equipment, and to support the suppression of fires and mitigation of other hazardous situation." It further classifies refurbishing into to two levels: Level I for refurbishing using new chassis, frame, axle, steering, etc., and Level II defines *"the upgrade of major components or systems of a fire apparatus with components or systems that comply with applicable standards in effect at the time of the original apparatus was manufactured."* AMENDMENT 1.1: All remanufactured ARFF vehicles must meet the standards of *NFPA 1912-"Standard for Fire Apparatus Refurbishing-2006 Edition"*. Level I vehicle refurbishing must not exceed 75% of the cost of new manufactured vehicle of the	Since the FAA is mandated by the Congress of the United States to use industry consensus standards when available, the *NFPA 1912, Standard for Fire Apparatus Refurbishing-2006 Edition"* should be included in the adoption of this new Advisory Circular for defining the requirements of refurbishing or rebuilding ARFF vehicles. It is unrealistic to think that	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			same class with comparable options. Level II vehicle refurbishing must not exceed 50% of the cost of new manufactured vehicle of the same class with comparable options. Remanufacturing costs that exceed 75% of a new vehicle are not considered best value engineering for federal funding.	a truck built under the FAA's older *10 B Standard* can be simply modified to meet all elements of the proposed *10D* document. Reject: Same as Above	
5	MHa[ii] 1	Chapter 1 Addition: 1.1	ADDITION: 1.1 While remanufacturing of ARFF vehicles is often times very practical. Each remanufacture requires economic and safety valuation prior to rebuild. The 75% threshold for A.I.P. Funding approval was based on what substantiation? These vehicles now have a life exceeding 10 years. Over the past 10 years these apparatus have almost if not doubled in price. This means that the FAA would be willing to invest ,for example, $750,000 in a 10 year old apparatus that originally cost $500,000 while a new one could be attained for $1,000,000. Is this practical? And if the FAA is going to allow the remanufacture of old apparatus then how will the FAA handle technology upgrades to more advanced options and on what basis will A.I.P. funding apply.	THIS A.I.P. FUNDING APPROVAL SHOULD BE ON A CASE BY CASE BASIS FOLLOWING THE SAME CONSIDERATIONS AS A MODIFICATION TO STANDARD. Reject: Original cost of the vehicle is irrelevant to the current cost of vehicles and technologies.	
6	PDT 11	Chapter 1 Addition: 1.1	As NFPA is the guiding document for this A/C all NFPA standards should be applied including NFPA Standard 1912 "Standard for Fire Apparatus Refurbishing (2006). This standard in its definitions (3.3.18) defines fire apparatus as "A vehicle designed to be used under emergency conditions to transport personnel and equipment, and to support the suppression of fires and mitigation of other hazardous situation". It further classifies refurbishing into to two levels; Level 1 for refurbishing using new chassis, frame, axle, steering, etc. and Level 2, defined as "the upgrade of	Reject: Same as Above	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			major components or systems of a fire apparatus with components or systems that comply with applicable standards in effect at the time of the original apparatus was manufactured. "		
7	PDT 12	Chapter 1 Addition: 1.1	**Amendment:** Addition 1.1 All remanufactured ARFF vehicles must meet the performance standard in effect at the time of original manufacture. NFPA 1912 Level 1 refurbishing shall be utilized as a general guideline except for discrepancies in language where NFPA 414 shall prevail. In addition, if not originally equipped, the remanufactured ARFF vehicle must incorporate an anti-roll strut system or other approved roll stability system. NFPA 414, Section 4.11.5 shall be incorporated into all remanufactured ARFF vehicles. Remanufactured ARFF vehicles must not exceed 75% of the cost of new manufactured vehicles of the same class with comparable options. Remanufacturing costs that exceed 75% of a new vehicle are not considered best value engineering for federal funding.	The statement that all remanufactured ARFF vehicles must meet the standards of this AC is not practical from either a design/engineering or cost perspective. Vehicles designed to previous AC 150/5220 standards were manufactured with frames, suspensions, axles, steering, engines, transmissions, cabs and other basic components designed to meet requirements of the standard then in effect. As each subsequent standard went into effect, many of these components were completely redesigned making the previous components obsolete. Even current 2007 EPA engine requirements make all previous engines	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				obsolete requiring different cooling systems, exhaust systems and transmissions. Over the years, these basic chassis components have proven reliable, easy to maintain and prime candidates for remanufacturer. Both NFPA 1912 Standard for Fire Apparatus Refurbishing (Level 1) and NFPA 1901 (appendix D) recognize that basic chassis components cannot be upgraded to current levels. Instead, these documents focus on the safety and upgrading functional capabilities including new technology. Reject: Same as Above	
8	TC 3	Chapter 1 Addition: 1.1	"All remanufactured ARFF vehicles must meet the standards of this AC." Comment: We believe that including a section on remanufacturing in the -10D AC overly simplifies the process of remanufacturing. It is unclear as to how a remanufactured vehicle can be modified to meet all of the requirements of Table 4.1.1 (b) of NFPA 414, specifically the side slope stability requirement of 30º and the acceleration requirements for both major vehicle classes. We do not believe that	Unless a specific remanufacturing AC is created, describing the remanufacturing process in detail, companies considering remanufacturing will	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			remanufacturing belongs in this AC and that it requires a separate document specifically defining the basic criteria which must be met for a vehicle to be considered remanufactured.	have different expectations as to what an acceptable 'remanufacturing' process will be, which will not allow a fair comparison of bids to be made. Reject: Advisory currently provides performance requirements for remanufacturing as opposed to the design specifications requested.	
9	TC 4	Chapter 1 Addition: 1.1	"Remanufactured ARFF vehicles must not exceed 75% of the cost of new manufactured vehicles of the same class with comparable options. Remanufacturing costs that exceed 75% of a new vehicle are not considered best value engineering for federal funding." Comment: We do not understand how the process will work in making the determination that "a vehicle does not exceed 75% of the cost of a new manufactured vehicle of the same class with comparable options". A request for remanufacturing an existing vehicle should be entirely separate from a request for procuring a new vehicle and should include specific criteria describing the remanufacturing process that must be followed.	The sentences as written do not adequately describe what is expected in the 'remanufacturing' process. In the 1990's the FAA drafted a "Guide Specification for the Remanufacture of Aircraft Rescue and Firefighting Vehicles" and requested comments from industry on the document. The draft was very detailed and provided excellent direction to	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				manufacturers about the FAA's requirements which had to be met if a vehicle was to be considered properly 'remanufactured'. We suggest that a similar document is necessary today and can provide the draft document for review and consideration upon request. Reject: Advisory currently provides performance requirements for remanufacturing as opposed to the design specifications requested.	
10	KG[iii] 1	Chapter 1 Addition: 1.1:	I believe the 75% to be too high to be cost effective.	I base this on a study by the City of Chicago Fire Department that provided data over a period of twenty years of remanufacturing old fire apparatus. Their conclusion was to cease their remanufacturing program due to a lack of cost effectiveness.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Accept: However, the AIP office has determined the 75% number is acceptable at this time.	
11	PDT 13	Chapter 1 Addition: 1.3.4	See 4.12.8 & 4.12.8.1 below	All references to FAA A/C's should be noted in 2.1 as well as where there is a direct association between the nature or content of an applicable A/C and the NFPA section+D20. Reject The A/C on vehicle painting should also be noted in Chapter 2 - Reference Publications as well as Section 4.12.8 & 4.12.8.1 specifying lettering, numbering and striping. ACCEPT:	
12	JAW 4	Chapter 1 Addition: 1.3.4	and marked per the standards of *AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.*	FAA has performed research related to vehicle operations under low light and adverse weather conditions; both color and reflective safety stripe size were validated in these	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				studies. The color and reflective safety stripe size should adhere to this standard for trucks purchased with FAA funding. ACCEPT	
13	JAW 5	Chapter 1 Addition: 1.3.4.5	A graphic design may be included in meeting the reflective area requirements of the FAA AC but the stripe must radiate away from the graphic design and continue around the vehicle to meet the requirements *of AC 150/5210-5 Painting, Marking, and Lighting of Vehicles Used on an Airport.*	*Graphic designs often fulfill the reflective size area requirement but do not necessarily run around the vehicle so that it can be seen from any direction.* Reject: AC 150/5210-5 stands as written.	
14	TC 5	Chapter 2	As none are listed we question whether a list of "reference publications" was unintentionally omitted. If there are no "reference publications" then we believe this chapter should be deleted.	The inclusion of this chapter without references needs to be clarified. Accept: No additional references are being added to the NFPA 414.	
15	PDT 14	Chapter 2 Addition: 2.	**Addition:** Performance requirements for classes 1,2 and 3 vehicles have numerous Amendments related to NFPA 414 standards.	Performance requirement discrepancies have been listed below in numerous sections of NFPA 414. Reject: No applicable reference	
16	JAW 6	Chapter 2 Addition: 2.3.7	Reference Documents: Insert the following references. The following FAA specific reference documents are additional sources of information related to meeting the airport ARFF responses at FAA certified airports and are not referenced specifically within the *NFPA 414 Standard for Aircraft*	*These are the Federal Code and the FAA Advisory Circulars that contain the*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Rescue and Fire Fighting Vehicles 2007 Addition, but may have relevance to meeting this document requirement.	*requirements on the airport ARFF emergency response and should be listed for addition reference materials. Additionally, the following historic technical documents were used to validate the performance standards of both this and the NFPA document and they should also be listed in the FAA AC.* Reject: Not necessary for the intent of this AC. *FAA Reference Documents* *2.3.8 Federal Air Regulation, Part 139 Dated……..* *2.3.9 Standards of AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				2.3.10 150/5200-12 Fire Department Responsibility In protecting Evidence At The Scene of An Aircraft Accident *2.3.11 150/5200-31A Airport Emergency Plan* *2.3.12 150/5210-6D Aircraft rescue Fire and Facilities and Extinguishing Agents* *2.3.13 150/5210-7C Aircraft Rescue and Firefighting Communications* *2.3.14 150/5210-14A Aircraft Rescue and*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Firefighting Personnel Protective Clothing *2.3.15 150/5210-15* *Rescue and Firefighting Aircraft Station Building Design* *2.3.16 150/5210-17A Programs for Training of Aircraft Rescue and Firefighting Personnel* *2.3.17 150/5210-18* *for Interactive Systems Training of Airport Personnel* *2.3.18 150/5210-19 Driver's Enhanced Vision System (DEVS)*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				2.3.19 150/5220-4B Water Supply Systems for Aircraft Rescue and Firefighting Protection *2.3.20 150/5220-17A Design Standards for an Aircraft Rescue and Firefighting Training Facility* *2.3.21 FAA ASD-TR-73-13 Firefighting Effectiveness of Aqueous-Film-Forming-Foam (AFFF) Agents, Dated April 1973, Author George B. Geyer* *2.3.22 FAA report, Full-Scale Fire Modeling Tests of a Compact*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Rapid Response Foam and Dry Chemical Powder Dispensing System, Dated 1978, Author, George B. Geyer, Lawrence M. Neri, and Charles H. Urban *2.3.23 FAA report, DOT/FAA/CT-82/109 Equivalency Evaluation of Fire Fighting Agents and Minimum Requirements at U.S. Air Force Airfields, Dated October 1982, Author George B. Geyer* *2.3.24 Analysis of Test Criteria*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				for Specifying Foam Firefighting Agents for Aircraft Rescue and Firefighting DOT/FAA/CT-94/04 Dated 1994, Authors Joseph Scheffey and Joseph A. Wright *2.3.25* FAA DOT/FAA/AR-95/87 Full-Scale Evaluation of Halon 1211 Replacement Agents for Airport Fire Fighting Dated October 1995, Author Joseph A. Wright *2.3.26* *USAF report, AFRL-ML-TY-2002-4543, Evaluation of the TRIMAX*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				280 System, Dated December 2002, Author Jennifer L. Kalberer and Jennifer C. Sapnich[1] 2.3.27 *FAA report DOT/FAA/AR-03-45 Test and Evaluation of the Effectiveness of a Small Airport Firefighting System (SAFS) in Extinguishing Two-and Three-Dimensional Hydrocarbon Fuel Fires. Dated May 2003, Author Charles Risinger, Jennifer L.*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Kalberer, and Keith Bagot[2]. *FAA report Comparative Evaluation of the Effectiveness of a High-Performance, Multi-position, Bumper-Mounted Turret to the Performance of a P-19 Roof-Mounted Turret*[3]*, Dated June 2005, Author Keith Bagot*	
17	JAW 7	Chapter 3	Darrel, Note ADDED: Appendix C Fire Performance at end appendix	Reject: Not necessary for the intent of this AC.	
18	JAW 9	Chapter 3	I would like to have a comparison side-by-side performance chart inserted like this performance comparison chart to compare the *NFPA 414* document and the proposed changes to *FAA-19* Document. This is the area where the conversion to *NFPA 414* will most impact the building of the small Class 1, 2, and 3 vehicles. Also include the change reflecting the use of compressed air foam and the performance requirement for each class of vehicle.	This is a major change for those individuals that currently utilize the *FAA AC-10C and -19* documents. It would be very helpful for the first printing of the AC to include a direct comparison of performance related requirements to assure that the FAA and airport end user gets the best product for the	

[3] *Comparative Evaluation of the Effectiveness of a High-Performance, Multi-position, Bumper-Mounted Turret to the Performance of a P-19 Roof-Mounted Turret*[3], Dated June 2005, Author Keith Bagot.

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				most economical price and so that there is no confusion as to what are the performance requirement changes that reflect this document. A lot of information is being hidden in the transferring to the new **document.** Reject: Not necessary for the intent of this AC.	
19	JAW 10	Chapter 3	ADDITION to performance charts 4.1.1 a, b, c, d	The attached chart [*located after the comment resolution matrix]* should be included into the document because it reflects the current performance requirements and reflected performance changes related to the use of compressed air foam. I respectfully request that this additional chart be included in the document with the noted changes. Adopting *NFPA 414* is a drastic change in the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				way the FAA has purchased trucks and the performance requirements related to the smaller commercially available chassis vehicles. Without these noted additions in highlighted color, the cross-referencing of changes and how they would reflect in the vehicles purchased would be difficult to understand. As stated at the FAA/industry meetings held in the last year to assist the FAA in this conversion process, it was stated that the FAA has a strong economic reason for continuing the allowance and purchase of smaller commercially available chassis rapid intervention vehicles. Using the first catch-all category of *NFPA*	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				4.1.1 would require that the vehicle would have to be built on a large major ARFF vehicle chassis, which would double to triple the cost of this vehicle with no guarantee that the airport would be getting the vehicle that they need. Reject: Not necessary for the intent of this AC. Smaller commercially available chassis vehicles are used at airports for their quick response and their easy maneuverability in and around gates, parking garages, parking lots, hangars and other infrastructure of the airport. Fires in these areas can adversely effect the whole airport operation and need to be quickly addressed. Major ARFF vehicles cannot always enter these areas quickly and safely. It is important to the airport	

ID#	Source	Location	Comment	Justification	Note
				infrastructure that these smaller commercially available vehicles still be funded and their use encouraged to meet the airport emergency needs. Major ARFF vehicles require the construction of ARFF facilities that are utilized to house them. Restricting applications to only large ARFF vehicle chassis could increase cost dramatically to current and new airfield fire protection requirements.	
20	JAW 10	Chapter 3	ADDITION: The Minimum Fire Performance Effectiveness that a vehicle manufactured to this standard can be expected to achieve when addressing an aviation fuel spill fire is the following contained in *4.1.1 G* These fire sizes are listed to illustrate the fire protection that might be accomplished related to an FAA index airport A through E and should be considered when selecting vehicles that meet the *FAR Part 139* requirement. The *Appendix C* contains additional material related to how these fire sizes were established.	The FAA has for a long time needed some inexpensive method to evaluate new techniques for fire fighting. The FAA currently has no method of evaluating performance claims of manufacturers without a costly research and development effort. With a fire	

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td></td><td>performance standard, they can rationalize judgments based on technical information that they are provided. The FAA could ask to look at a minimum of available technical documentation and video events to help make relatively inexpensive determinations for future purchases without entering into costly research and development projects for each and every new piece of equipment proposed for FAA funding. Reject: Not necessary for the intent of this AC.</td><td></td></tr>
<tr><td>21</td><td>JAW 10</td><td>Chapter 3</td><td>4.1.1.g Minimum Fire Performance Effectiveness
<table>
<tr><th>Truck Classification</th><th>Fire Area *</th><th>Application Rate of Agent Foam **</th><th>Time Maximum Application for Total Extinguishment</th></tr>
<tr><td>Class 1</td><td>70 Foot Diameter, 3847 Sq. Ft.</td><td>60 GPM, Hand Line</td><td>60 Seconds</td></tr>
<tr><td>Class 2</td><td>90 Foot Diameter, 6360 Sq. Ft.</td><td>150 GPM, Turret</td><td>60 Seconds</td></tr>
<tr><td>Class 3</td><td>100 Foot Diameter</td><td>250 GPM,</td><td>60 Seconds</td></tr>
</table></td><td></td><td></td></tr>
</table>

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td></td><td>7853 Sq Ft.</td><td>Turret</td><td></td></tr>
<tr><td></td><td>125 Foot Diameter
12173 Sq Ft.</td><td>750 GPM Turret</td><td>60 seconds</td></tr>
<tr><td>Class 4</td><td>100 Foot Diameter ***
7853 Sq. Ft.</td><td>750 GPM Turret</td><td>30 seconds***</td></tr>
<tr><td></td><td>150 Foot Diameter
17,672 Sq Ft.</td><td>1250 GPM Turret</td><td>60 Seconds</td></tr>
<tr><td>Class 5</td><td>100 Foot Diameter ***
7853 Sq Ft.</td><td>1250 Turret</td><td>25 Seconds***</td></tr>
</table>
* Fuel for this performance fire test should be Aviation Grade Jet A fuel, minimum of 1,000 gallons per fire.
* * Application of dry chemical permitted to aid in total extinguishment in dual or encapsulated foam application to meet these performance tests is permitted.

* * Note: There are not many hydrocarbon fuel facilities left in the US that can do a 125 to 150 foot diameter fuel fire demonstration. Therefore the time to extinguish the fire was reduced since the application rate of fire fighting foam on these fires is much higher. Reject: Not necessary for the intent of this AC.
</td><td></td><td></td></tr>
<tr><td>22</td><td>JAW 11</td><td>Chapter 3
ADDITION: 3.3.14</td><td>ADDITION: 3.3.14

Brakes. NFPA - add hydraulic systems acceptable for commercially available class 1, 2 and 3 vehicles.</td><td>Commercially available chassis generally have hydraulic brake systems and are a low cost alternative to pneumatic brake systems.
Reject: Already Referenced in NFPA 414. 4.9</td><td></td></tr>
<tr><td>23</td><td>JAW 12</td><td>Chapter 3
ADDITION: 3.3.14.4</td><td>ADDITION: 3.3.14.4

Vehicles meeting Class 1, 2 and 3 generally are built on commercially available chassis and permitted to have hydraulic disc brakes and hydraulic disc/drum type brakes systems meeting DOT requirements, as provided by the original truck chassis manufacturer, including power brake type assist brakes with no modifications by the</td><td>Vehicles built on commercial chassis have served the FAA index airports for the last three decades. The NFPA document does</td><td></td></tr>
</table>

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			fire truck manufacturer. This provision also includes anti-locking type brakes systems.	not contain language to assure that hydraulic brakes and commercial chassis can be utilized to meet the class 1 vehicle requirements. Chassis that utilize variations of air and air pneumatic systems are very expensive and not warranted for meeting the requirements for a class 1, 2, and 3 vehicles. The smallest major ARFF chassis available would run approximately 150,000 to 200,000 dollars for a rolling chassis. Small truck venders deliver complete vehicles for this price. Reject: Referenced in NFPA 414 4.9	
24	BC[iv] 1	Chapter 3 Table 1	The footnote under Table 1 should be changed to read "*500 lbs of Sodium based dry chemical, 450 lbs. Potassium based dry chemical (i.e., Purple K Powder), 500 lbs of Halon 1211, or 460 lbs of HCFC Blend B (i.e. Halotron I)."	The original wording for clean agent weights was incorrect for the current clean agents approved for airport fire fighting. The 468 lbs appears to be a typographical error in	

ID#	Source	Location	Comment	Justification	Note
				reference to the 460 lbs of Halotron I approved for airport firefighting in accordance with Cert-Alert 95-03. Halotron I is currently the only approved clean agent to replace the existing 500 lbs installations of halon 1211. The reason 460 lbs is used for Halotron I instead of 500 lbs is that only 460 lbs of Halotron I would fit into the standard 500 lbs halon 1211 cylinder on an ARFF vehicle while at the same time maintaining the required level of fire fighting performance based on FAA data on typical fire fighting events and the performance ratio of Halotron I to halon 1211. If additional clean agents are approved for airport fire fighting in the future, the amount required might vary depending on what the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				acceptable fill density and fire fighting capabilities are for that agent. Therefore, if you need to put a place holder in for possible future approved clean agents, it would be recommended that the wording state "The weight requirement for approved clean agents replacing halon 1211 for airport fire fighting will be in accordance with the respective Cert-Alert approval issued for that agent." Reject: Identification of individual clean agents not required.	
25	JAW 8	Chapter 3 Table 1	Class 1; Water or Water/Foam: 120 (150) NFPA to 150 gallons of foam/water Class 1 vehicle.	One hundred and twenty gallon systems would require redesign of all known tank system quantities in production. Industry generally makes 100, 150, 200, 300, 500 gallon systems. Increasing requirement would be cost effective versus redesign and engineering cost to	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				make oddball size unit that has no other fire industry use. Airports that use current 100 gallon/500 pound systems would benefit from the increased safety factor of having 50 additional gallons of agent. Reject: Complies with Part 139 while maintaining two minute capability at 60 GPM, and NFPA 414 Table 4.1.1	
26	MHu 6	Chapter 3 Table 1	*(Class five (5) vehicles with allowable increase in gallonage in 500 gallon increments)* We question the language allowing 500 gallon incremental increases as it does not fall within the scope of the debate that was had surrounding this issue at the manufacturers' roundtable discussions. It is Rosenbauer's opinion that the language allowing 500 gallon increments should be removed from the draft circular and a 6th class of vehicle be added to reflect 4000 gallon or larger vehicle (capacity to be determined by the allowance for agents as set forth in Part 139 for indexed airports as we are not opposed to the 4500 gallon vehicle). Allowing increases by increment of 500 gallons places an unreasonable burden on ARFF vehicle manufacturers as most OEMs (Original Equipment Manufacturer) have set models and platforms to manufacture vehicles that meet the agent requirements of Part 139 certificated airports. In particular, the 3500 gallon vehicle has no place in meeting the mandates of the agent capacities under Part 139. Allowing the purchaser to pick any range of vehicle they desire places undue financial and engineering burdens on the OEM with the distinct possibility of building only one of these types of vehicles. Each additional size of vehicle if allowed will require pre-production engineering and prototype testing to make the vehicle ready for the market. This will have the effect	Accept	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			of causing manufacturers to raise the prices of vehicles to cover the costs of this engineering and testing effort. It is our opinion that there should be three classes of large vehicles: (class 4 - 1500 gallon) (class 5 – 3000 gallon) (class 6 – 4000 or 4500 gallon) and it is our position that these sizes of vehicles be restricted to those sizes and that the 500 gallon incremental allowance be eliminated from the proposed circular.		
27	TC 6	Chapter 3 Table 1	* 468 lbs clean agent Comment: We request that "468" be changed to "460".	A 460 lb capacity clean agent system was included in Paragraph 73 of the -10C AC after determining that was the amount of Halotron I clean agent that would be equivalent to the 500 pound Halon 1211 system that agent replaced. Accept	
28	JAW 31	Chapter 4	a. ADDITION: High pressure pump systems are permitted which provide foam at a rate of ≥ 1500 psi. provided they meet the discharge rate distance of table 3. b. ADDITION: Discharge rates may be reduced to 1/3 discharge rate of Table 3.	Recent USAF research has shown that high pressure application rates of ≥1500 psi are highly effective and efficient in fighting major pool fires. Fires were rapidly extinguished in ½ the time with 1/3 or less agent being utilized. These systems can substantial increase the capability of the rescue vehicle. Reject:	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Research still being developed.	
29	KB[v] 1	Chapter 4 1st Paragraph	Editorial - Remove the "and" from the " and/or" statement.	In Part 139.317 sates that art least one vehicle has to be equipped with Dry Chemical **OR** Clean Agent. This is not an "and/or" statement. Accept	
30	BC 2	Chapter 4 1st Paragraph	The third sentence that contains the phrase the "lowest practical cost" should be deleted.	This reference does not appear in the Advisory Circular relative to other systems or options, and the benefit that complementary systems offer has been proven over the years. For instance, the benefit of a clean agent is the value-added advantage of a specialty firefighting option that reduces or eliminates post fire collateral equipment damage. Approved clean agents for airport fire fighting are inherently slightly more expensive "up front" than commercially available dry chemicals but are	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				typically money saving measures when actual fires occur on valuable assets. Accept: Delete last Sentence.	
31	MHu 7	Chapter 4 Addition: 4	*(All moving parts requiring lubrication must have a means of providing for such lubrication. There must be no pressure lubrication fittings where their normal use would damage grease seals or other parts.)* What is the scope of this statement? Does this imply the requirement of a centralized lubrication system to be fitted to all ARFF vehicles? If so what is the criteria for the system in terms of capacity, specific fittings requiring lubrication, pump size, minimum and maximum pressures on the system, and /or duty cycles. What specifically does the term "all moving parts" define? Does it mean u-joints? Does it mean hose reels, HRETS, nozzles etc.? It is our view that this criteria, if adopted, needs to be well described to make the statement and its inclusion complete. How does this take into account manufacturers who utilize "lube for life" components? We believe a disclaimer should be added to this statement which is "at the manufacturer's discretion as necessary". A centralized lubrication system should only be offered as an option and that should be defined by the performance parameters of the system.	Accept in principle: Add "routine" after requiring.	
32	JAW 12	Chapter 4 ADDITION: 4.1	14 CFR 139.3 17 requires at least one vehicle to be equipped with dry chemical and/or approved clean agent regardless of airport index. Approved equivalent complementary agent systems referenced in Chapter 3 are acceptable optional additions to the basic vehicle when dictated by local operational needs. However, the primary function of the vehicles described in this reference is to provide an optimum level of ARFF suppression capability for the lowest practical cost. **ADDITION: 4.1. General** **ADDITION:** **Table 4.1.1. (c)(d)** Minimum clean agent capacity 150 pounds Class 1 Class 2 Class 3	Justification: Recent research has shown that multiple agent application may be justified to increase the effectiveness of the truck application. One hundred fifty pounds of clean agent is a minimum quantity that these trucks should hold. Any capacity smaller than 150 pounds can be met	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			In addition to these basic requirements the sponsor may select as an option to include a clean agent capacity tank of > 150 pounds quantity.	with the addition of a removable handheld or flight line extinguisher. Agent discharge rates for 150 pounds flight line extinguishers are ≥3.9 pounds per second. These extinguishers are typically u/l rated for a *10A:80B:C*. The 3.9 pound application rate provides the fire fighter with a system that has a sufficient safety factor to fight smaller scaled fires where their use would be appropriate. Reject: Does not meet Part 139 Requirements.	
33	JAW 13	Chapter 4 ADDITION: 4.1.1.7	ADDITION: 4.1.1.7. MAINTAINABILITY. 4.1.1.7.1 Use disconnect plugs, receptacles, junction boxes, bus bars, multiple-line connections in the electrical system, and readily detachable fittings in hydraulic and pneumatic systems, as applicable. All disconnect points shall be clearly labeled. All hydraulic and pneumatic lines and electrical wires shall be color or number coded. 4.1.1.7.2 Use a fastener system that is easily disassembled and reassembled for all cabinets, compartments, and bodywork that must be removed for maintenance, for repairs, or for replacement, and 4.1.1.7.3 Provides accessible connections where needed to attach trouble	Reject: No Justification	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			shooting, analytical and diagnostic equipment to appropriate vehicle subsystems. 4.1.1.7.4 The OEM frame shall not be cut, lengthened nor spliced to accommodate the fire package and chassis needed to accommodate the installation of the fire suppression systems, cabinets, 4.1.1.7.5 or other required equipment. Any changes or modifications of the chassis shall be performed in a safe manner keeping with the criteria listed above for the chassis and shall be acceptable if it is designed and installed in a manner that provides for quick disassembly, trouble shooting, and the safe operation of the vehicle.		
34	JAW 14	Chapter 4 AMEND OR CORRECT 4.1.2:	AMEND OR CORRECT 4.1.2: "The category of vehicles shall encompass a range of water capacity commencing at 250L (60 gal) and extending to over 22,710 L (6000 gal)." NFPA current page 414-9. Chart 4.1.1 page, *NFPA -414* (a) class 1 vehicles start at ≥454 liters to ≤1999L, at ≥120 gallons to ≤528. Note: *FAA FAR Part 139* allows minimum of 100 gallon water/foam and 450/500 pounds of dry chemical. The *NFPA 414* document is inconsistent. On page 414-9 it states 60 gallon minimum, chart on page 414-11 states 120 gallon system quantity minimum. This quantity should be increased to 150 gallon standard industry tank system quantity. This needs to be reconciled by requiring an amendment to the *NFPA 414* document.	One hundred and twenty gallon systems would require redesign of all known tank system quantities in production. This size container would require custom fabrication. Industry generally makes 100, 150, 200, 300, 500 gallon systems. Increasing water capacity requirement to 150 gallons would be cost effective versus redesign and engineering costs to make an oddball size unit that has no other industry use. Airports that use current 100 gallon/500 pound systems would	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				benefit from the increased safety factor of having 30 additional gallons of agent. Accepted in Principle: Change to Table 1	
35	PDT 40	Chapter 4 4.1.3 Compressed Air Foam System (CAFS)	**Addition:** Compressed Air Foam System (CAFS) allows for improved fire suppression capability. The CAFS must meet requirements of NFPA 1901, Chapter 22 sections 22.1 through 22.8.4.2. CAFS foam is described as equal to a discharge rate of 2 gpm (7.6 lpin) of water for every 1 SCFM (.028 SCFM) of compressed air discharge at normal operating pressure. CAFS must also have an expansion ratio ~ than 8: 1. CAFS is currently restricted to Class 1, 2 and 3 vehicles.	Chapter 22 of NFPA 1901 addresses compressed air foam systems. While this standard is for Automotive Fire Apparatus; many of the requirements of this section are applicable to CAFS on ARFF vehicles. The exception would be duration testing which is usually limited to the water on-board an ARFF vehicle instead of a fire hydrant source. Reject: NFPA 1901 is applicable to the structural fire fighting environment and does not directly correlate ARFF standards.	
36	PDT 41	Chapter 4 4.1.3 Compressed Air Foam System (CAFS), continued	**Amendment:** asterisk under the table: *Any discharge handlines or turrets that are dedicated specifically for CAFS, shall have smooth bore nozzles. Dispersed stream pattern requirements of Table 4.1.1 (c and d) shall not apply.	CAFS is only effective with straight bore nozzles. Fog nozzles strip most of the air out	

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td></td><td>of the foam as it leaves the nozzle, thus reducing expansion ratios to that of conventional foam. All of the CAFS testing listed in NFPA 1901 is with straight bore nozzles. Accept: ADD to CAFS para 4.13: Any handlines that are dedicated specifically for CAFS, must use smooth bore nozzles. Handline discharge rates of 30 GPM is permissible.</td><td></td></tr>
<tr><td>Tilized 37</td><td>PDT 42</td><td>Chapter 4
4.1.3 Compressed Air Foam System (CAFS), continued</td><td>Addition:
Table 3. CAFS Discharge Performance
<table><tr><td>CAFS Alone</td><td>1</td><td>Class 2</td><td>Class 3</td></tr><tr><td>Handline</td><td></td><td></td><td></td></tr><tr><td>CAFS Discharge Rate</td><td>30</td><td>30</td><td>30</td></tr><tr><td>Straight Stream Distance</td><td>> 65</td><td>> 66</td><td>> 67</td></tr><tr><td>Dispersed Stream Pattern</td><td>NA</td><td>NA</td><td>NA</td></tr><tr><td>Turret</td><td></td><td></td><td></td></tr><tr><td>CAFS Discharge Rate</td><td>N/A</td><td>60</td><td>60</td></tr><tr><td>Straight Stream Distance</td><td>N/A</td><td>> 150</td><td>> 150</td></tr><tr><td>Dispersed Stream Pattern</td><td>N/A</td><td></td><td></td></tr><tr><td>Minimum Total Flow Class
combination of hand lines and turrets</td><td>30</td><td>60</td><td>90</td></tr><tr><td>Dry Chemical</td><td></td><td></td><td></td></tr></table></td><td>CAFS provides improved fire fighting capability by reducing the amount of agent required to extinguish a fire. Many tests conducted by the Air Force Research Lab at Tyndall AFB indicate that CAFS is effective at an application rate of .024 gpm/sq.ft. Well established test standards dating back to 1962 conducted by the FAA and Naval Research Lab agree</td><td></td></tr>
</table>

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>with CAFS</td><td></td><td></td><td></td></tr>
<tr><td>Handline (Ibs/sec)</td><td>>5</td><td>>5</td><td>>5</td></tr>
<tr><td>Straight Stream Distance</td><td>> 65</td><td>> 65</td><td>> 65</td></tr>
<tr><td>Turret (Ibs/sec)</td><td>N/A</td><td>>7</td><td>>7</td></tr>
<tr><td>Straight Stream Distance</td><td>N/A</td><td>> 150</td><td>> 150</td></tr>
</table>
</td><td>that an application rate of .07 gpm/sq.ft. is the minimum required with conventional foam. Thus approximately a three fold improvement with CAFS.
In recognition of this improvement, the handline and turret discharge rates should be reduced accordingly.

REJECT: Flow and application rates are in table 4.1.1 (c) and (d) of 414.0. or addressed in previous comments</td><td></td></tr>
<tr><td>38</td><td>MHa 3</td><td>Chapter 4 Compressed Air Foam Systems (CAFS)</td><td>Compressed Air Foam Systems (CAFS):

Compressed Air Foam System (CAFS) allows for improved fire suppression capability when using water/foam. CAFS must have expansion rations of 6:1 to 10:1 with 8:1 being optimal. CAFS is currently restricted to Class 1, 2 and 3 vehicles except as the handline or a non-primary turret on Class 4 and 5 vehicles.</td><td>The restriction disallowing CAFS to only Class 1,2,3 again makes no sense? CAFS on a handline or a reduced rate bumper turret that is not the primary turret increases the capability of both as already shown in FAA testing data!</td><td></td></tr>
</table>

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				It appears to me that the large Apparatus OEM's are resisting this option as it may cause them re-engineering cost which they do not wish to occur. I will remind everyone of both Oshkosh's and Emergency One's comment on their fire suppression capabilities. They said they have NONE! They are truck builders!! Someone needs to find out when the last fire suppression innovation came from a large apparatus OEM, except to carry more water and foam and therefore make a bigger and more expensive apparatus? I don't mean to be critical, but, these are and have been the drivers of the ARFF environment. Reject: No Data to Support Class 4 and 5 Vehicle installations.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
39	DP 3	Chapter 4 Compressed Air Foam Systems (CAFS)	Demonstrated Compressed Air Foam System (CAFS) technology allows for improved fire suppression capability when using water/foam. CAFS must have expansion rations of 6:1 to 10:1 with 8:1 being optimal. CAFS has not been demonstrated on primary turrets of Class 4 and 5 vehicles.	*Ref: **NFPA 414 A.3.3.64.2 Primary Turret. "**Turrets are either primary or auxiliary depending on discharge rate and method of attack." Accept. Add "primary or auxiliary turrets" to paragraph 4.13 CAFS.	
40	JAW 30	Chapter 4 Addition: 4.13 CAFS	**Compressed Air Foam System (CAFS):** Compressed Air Foam System (CAFS) Classs 1, 2 and 3 vehicles, allows for improved fire suppression capability. CAFS must have expansion ratios of 6:1 to 10:1 with 8:1 being optimal. CAFS is currently restricted to Class 1, 2 and 3 vehicles as it has not been demonstrated on Class 4 and 5 vehicles. **ADDITION: 4.13** **AMEND:** (a) Compressed air foam turrets are permitted to be a straight bore nozzle distribution system meeting the appropriate throw range contained in table 4.1.1.(c) and (d).Accepted (b) A compressed air foam system should have a high pressure source downstream to energize and expand the foam expansion ration. **(c)** Compressed air foam system application a either a handline or turret delivery system; may reduce flow rates to 40 GPM; handline and 60 GPM turret system, provided they meet the throw range requirements in table 4.1.1. (c) and (d).	Compressed air delivery systems are more effective and increase finished foam production by a factor of 2 to 3 times a traditional foam production system and can out throw smaller standard pump type nozzle delivery systems. Allowing reduced flow rates increases foam delivery production time and reflects more efficient and effective firefighting techniques. The uniqueness of compressed air application is that a richer, thicker foam substance is produced,	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				which aids in rapid flow of the vaporization film and allows for increased flow range with a straight bore nozzle and at the same time flow rates can be reduced to increase the time of foam application. **A**CCEPT**:** Hand line discharge rates of 30 GPM and primary and auxiliary turrets discharge rates of 60 gpm are permissible.	
41	KG 4	Chapter 4 Addition: 4.13 CAFS	CAFS is now commonly known to have been proven to be highly effective as an agent delivery system and if for no other reason should be allowed on Class 4 and 5 vehicles.	CAFS has been tested, demonstrated and therefore proven on hand lines and low flow delivery systems for years. A hand line and low-flow delivery system mounded on a small chassis is basically the same as mounted on a large chassis apparatus and therefore should not be restricted to just the small vehicle. Further	

ID#	Source	Location	Comment	Justification	Note
				consideration should be allowed for the fact it often takes research and development and manufacturers many years to test and engineer delivery systems. The industry and end users should not be denied this outstanding technology until R/D and OEMs can catch up. If a manufacturer can produce the system and the customer wants it, they should have the superior product for the greater safety of the public. . Reject: No Data to Support Class 4 and 5 Vehicle installation	
42	JAW 15	Chapter 4 ADDITION: 4.1.7	ADDITION: 4.1.7 Class 1, 2, and 3 vehicles, commercially available chassis: This document's intent is to allow vehicles meeting Class 1, 2, and 3 performance requirements to be built on lower cost over-the-road DOT, OEM supplied commercially available chassis with custom built compartments and small fire equipment packages, which may include designs with fire pumps and pony-type engines, or stored pressure vessel type fire packages.	Commercially available chassis type Class 1, 2 and 3 vehicles have served the needs of smaller index airports for the last three decades with little to no compromise in performance or firefighting ability. Reject: Commercial	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				chassis's are not restricted in this document	
43	JAW 28	Chapter 4 ADDITION: 4.1.9.1.1	ADDITION 4.1.9.1.1: Class 1, 2 and 3, vehicles may utilize Original Equipment Manufacturer (OEM) provided full hydraulic brake systems. These systems may be of the full disc, disc/drum or full drum style hydraulic actuated brake systems. They must incorporate a provision for an emergency or parking brake capability and An ABS braking system shall be provided with the OEM supplied DOT chassis of the vehicle.	The use of lower priced commercially available OEM supplied chassis is a low cost alternative to a full major ARFF OEM supplied chassis for smaller vehicles. Reject: Already Referenced in NFPA 414 .4..9	
44	JAW 16	Chapter 4 ADDITION: 4.2.1.2.5	ADDITION: 4.2.1.2.5 (5) For commercial chassis Class 1, 2 and 3, vehicles using dual rear tires and single axle front wheels. The difference in load between axles may have a front/rear axle weight relationship greater than 40/60 when dual rear wheels are provided. This relationship shall not exceed 30/70 weight distribution to the rear axle. In addition, none of the component ratings shall be exceeded to accommodate the more asymmetric weight distribution, and all other performance requirements of this specification shall be met by the vehicle.	Commercially available small truck chassis have been in use for the last three decades. They have met the requirements of ARFF emergency services for smaller index airports with adequate fire protection effectiveness and efficiencies. Reject: Item is sufficiently addressed in NFPA 4.5.7.	
45	MHu 8	Chapter 4 Addition: 4.3	*The engine oil and transmission fluid filters must be of the full-flow type with a replaceable spin-on element.* This standard should only be applied to the class three and above vehicles and the term "per manufacturer's recommendation" should be applied to the class one thru	Accept: The engine oil and transmission fluid filters must be of the full-flow type with a	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			three vehicles	replaceable spin-on element for class 4 and 5 vehicles.	
46	JAW 17	Chapter 4 ADDITION: 4.4.4.1	ADDITION 4.4.4.1 Electrical system and warning devices All Class 1, 2, and 3 vehicles shall be equipped with at least dual batteries wired in parallel to assure that sufficient voltage and power is available to run specialized emergency lighting packages and air field radios. A) 12 volt electrical and starting B) 12 volt electrical and 24 volt starting C) 24 volt electrical and starting	Heavy voltage -loads draws are produced with high visibility emergency vehicle lighting, airfield lighting, FLIR cameras, monitors and emergency site lighting packages, and air field radios that would severally tax basic commercial systems supplied on Class 1,2 and 3 vehicles. Reject: 10d currently provides performance requirements for this electrical design specifications.	
47	MHu 9	Chapter 4 Addition: 4.6	*Anti-roll stability struts are approved.* Language in this statement needs to be expanded to state the following: "Anti-roll struts are approved ***if required due to suspension design to meet performance requirements and shall be at the manufacturer's discretion***." If a manufacturer needs to add anti-roll struts to a vehicle to meet performance requirements then these devices could be useful. But if a manufacturer does not require this additional item to meet the performance parameters as stated in the beginning of this section then they should not be required to provide them as such	ACCEPT: if required due to suspension design to meet performance requirements at the manufacturer's discretion."	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			inclusion is redundant.		
48	MM 6	Chapter 4 Addition: 4.6	Change wording "cab seat" to "driver seat" to clarify the intent.	**NFPA 414 Reference** Not Applicable Accept: Change Wording	
49	PHu[vi] 1	Chapter 4 Addition: 4.6	Addition 4.6 references an off-road, high-mobility suspension system capable of traversing an 8- inch (20 cm) diameter half-round at 35 mph (56 kph). While the detailed description given may be sufficient, we recommend incorporating an appropriate angle of traverse. We suggest testing this in the most adverse configuration that could be faced, conducting the test several times to ensure the maneuver can be repeatedly performed successfully by the average driver without benefit of special procedures.	Reject: Existing Test protocol is already accepted.	
50	TC 8	Chapter 4 Addition: 4.6	"Anti-roll stability struts are approved." Comment: We are unclear as to the definition of an "anti-roll stability strut". As this item is now approved for selection by a sponsor, the sponsor should know not only what the item is, but also what it is supposed to accomplish. If this item is further defined and remains approved then we request that an alternative mechanical link stability system be allowed as an additional sponsor selection. The sentence would then be revised to read "Anti-roll stability struts or a mechanical link stability device are approved."	As written, the requirement is ambiguous and needs to be clarified. Reject: Insufficient information on mechanical link stability.	
51	JAW 18	Chapter 4 ADDITION: 4.7.1	ADDITION: 4.7.1 A Tire selection AMENDMENT: 4.7.3.1 Vehicles meeting Class 1, 2, and 3 requirements built on commercially available chassis may be delivered with factory supplied DOT approved over-the-road or with aggressive tread designs for these small Rapid Intervention Vehicles unless the end user specifically specifies a need for a high floatation tire.	Factory provided OEM tires offer a lower cost vehicle alternative to having high floatation tires. These Class 1 2, and 3 vehicles typically are lighter in gross weight and thus do not usually require high floatation tires to make their responses.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				There are no known incidences where these types of Class 1 vehicles have not been able to make their response due to traction issues. These types have of vehicles have served their intended index airports for the last three decades. Large high floatation tires can raise the vehicle center of gravity causing an unstable vehicle platform and can cause long-term damage to the frame due to excessive vibration caused by the over-sized flotation tires. They will also void the OEM's frame manufactures warranty. Reject: Existing Test protocol is already accepted.	
52	JAW 19	Chapter 4 ADDITION: 4.7.2	ADDITION 4.7.2: A spare tire and rim of the same type as fitted on the truck shall be provided with the vehicle.	Replacement wheels might not necessarily be available or	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				delivered in a timely fashion should the vehicle have a flat tire or tire failure. It is important to have a spare available to the fire station. Reject: Already on this advisory approved options list.	
53	JAW 20	Chapter 4 ADDITION: 4.9.1.1	ADDITION 4.9.1.1: Air pressure * Note. Vehicles meeting Class 1, 2 and 3 requirements are generally built on commercially available chassis that are permitted to have hydraulic disc, hydraulic disc/drum type brakes systems meeting DOT requirements, as provided by the original truck chassis manufacturer and usually do not have a need for an air pressure gauge or low air pressure warning horn.	Commercial chassis offer the FAA a lower cost alternative vehicle to full ARFF major vehicles for smaller airport indexes. Reject: This advisory currently provides performance requirements for manufacturing as opposed to the design specifications requested.	
54	JAW 21	Chapter 4 AMENDMENT: 4.11.4.4	AMENDMENT: 4.11.4.4 INSTRUMENTS AND WARNING LIGHTS. The following instruments and warning lights shall be provided as a minimum: (4) Air Pressure (brake or other accessories) (If applicable) Insert	Commercially available chassis have hydraulic brake systems not pneumatic systems. Pressure source fire	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			(7) Water Tank - Level Indicator (If applicable) Insert (9) Low Air Pressure Warning(If applicable) Insert (15) FLIR Camera with a 10-inch minimum monitor meeting FAA 150/5210-19 DRIVER'S ENHANCED VISION SYSTEM (DEVS)	protection packages do not have water level indicators. Reject: Does not add anything to the technical content of the document.	
55	JAW 22	Chapter 4 AMENDMENT: 4.11.4.5	AMENDMENT 4.11.4.5: The cab shall have all the necessary controls (6) Pump control (if applicable)	Smaller truck pressure source systems would not have a pump; thus a pump control would not be required. Reject: Does not add anything to the technical content of the document.	
56	JAW 25	Chapter 4 Amendment: 4.11.4.8.1	Amendment: 4.11.4.8.1 ADD meeting the specification contains within FAA *AC 150/5210-19, DRIVER'S ENHANCED VISION SYSTEM (DEVS)*	Not all FLIR cameras meet the vertical and horizontal field of view ranges as stated in the FAA advisory circular and validated in the FAA test program. Horizontal field of view is an important issue since a narrow field of view doesn't provide a driver with	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				the needed peripheral vision to know if the driver is going to turn into another vehicle. Reject: This advisory circular already cross references A/C 5210-19 as superseding all NFPA requirements.	
57	JAW 23	Chapter 4 AMENDMENT: 4.11.5 (4)	AMENDMENT: 4.11.5 (4) All crew space shall be restricted to the interior of a fully enclosed cab. The maximum crew capacity of the cab (seated positions with approved seat belts) shall be clearly posted on a label in the cab. Commercial Class 1 vehicles delivered with factory seat packages are accepted. Seating does not have to provide for the wearing of SCBA tanks unless specified by the end user.	The intent of this standard is to buy trucks with off-the-shelf seating and interiors. Any departure from this in requiring of specialized seats to afford the wearing of SCBA's ubstantially increases the cost of the vehicle. Accept: Seating does not have to provide for the wearing of SCBA tanks unless specified by the end user (in class 4 and 5 only)	
58	PDT 35	Chapter 4 Addition: 4.12	**Exception:** .... The purchaser may request a pintle hook having a 30,000-pound (13,608 kg) capacity rating be attached to the rear fame cross member of the vehicle if its presence will not interfere with other components necessary for the required	Class 1, 2 and 3 vehicles are not typically capable of	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			performance for Class 4 and 5 vehicles onlv	towing 30,000Ibs. Accept in principle: Pintle hook on class I, II, and II vehicles not to exceed maximum towing capacity of the vehicle.	
59	DP[vii] 1	Chapter 4 ADDITION: 4.12	**1) ADDITION: 4.12 –**A towing hook/eye with shackles must be attached directly to the frame rails at the front and rear of the vehicle.	One towing hook/eye is sufficient. There is no empirical scientific evidence that supports a need for two hooks/eyes mounted on the front and rear of the vehicle. This two hooks/eyes requirement was removed from the old NFPA 414 document. Reject: Increases Utility function of the vehicle	
60	JAW 26	Chapter 4 Addition: 4.12.8.2	Addition: 4.12.8.2 The stripe shall be in accordance with FAA, *Standards of AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport* located on front sides and rear of vehicle.	Reject: Already referenced in the document	
61	PHu 2	Chapter 4 Amendment: 4.12.6	Amendment 4.12.6 references steps on the vehicle having to swing clear if they extend below the angle of approach, departure or ground clearance limits. We would suggest including the phrase “on ground contact” and make note that the steps must remain in usable condition after being demonstrated. Again, we recommend some performance testing be done to demonstrate that this can be successfully achieved.	Editorial Comment: not applicable	
62	DP 2	Chapter 4 Addition: 4.13	Delete current chart and change to:	Reject: Research does not support the data in	

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td>
ADDITION: 4.13 - MULTIPLE AGENT DELIVERY SYSTEMS:
Table 2. MULTIPLE AGENT HIGH PRESSURE DELIVERY TECHNOLOGY
(CAFS, Dry Chemical & Clean Agent Applied Independently and/or Simultaneously)
<table>
<tr><th>Handline and Turret Performance Criteria</th><th>Class 1. 2 & 3</th><th>Class 4 & 5***</th></tr>
<tr><td>Dry Chemical handline</td><td></td><td></td></tr>
<tr><td>Discharge Rate*</td><td>8 lbs/sec</td><td>8 lbs/sec</td></tr>
<tr><td>Discharge Rate w/Clean Agent entrained</td><td>6 lbs/sec</td><td>6 lbs/sec</td></tr>
<tr><td>Range (ft)**</td><td>≥90</td><td>≥90</td></tr>
<tr><td>Bumper Turret & extendable turret/boom</td><td></td><td></td></tr>
<tr><td>Discharge Rate*</td><td>8 lbs/sec</td><td>8 lbs/sec</td></tr>
<tr><td>Range **</td><td>≥90</td><td>≥90</td></tr>
<tr><td>Width</td><td>≥17 feet</td><td>≥17 feet</td></tr>
<tr><td>Halogenated Agent Handline</td><td></td><td></td></tr>
<tr><td>Discharge Rate</td><td></td><td></td></tr>
<tr><td>Independently & parallel with wtr/foam/caf</td><td>1 lb/sec</td><td>1 lb/sec</td></tr>
<tr><td>entrained in dry chemical stream</td><td>1/3 lb/sec</td><td>1/3 lb/sec</td></tr>
<tr><td>Range (ft)</td><td></td><td></td></tr>
<tr><td>independently**</td><td>≥40 ft</td><td>≥40 ft</td></tr>
<tr><td>entrained in dry chemical stream**</td><td>≥90 ft</td><td>≥90 ft</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Hose length</td><td>≥100 feet</td><td>≥100 feet</td></tr>
</table>
* Maximum discharge rate of dry chemical powder (no entrainment)
</td><td>the table.</td><td></td></tr>
</table>

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			** Testing of dry chemical powder not entrained in any other agent and tested under calm wind conditions at an inclination of 10 degrees or less for the nozzle. *** This technology has not been tested as Primary turret and therefore can only be used in conjunction with a Primary Turret and not as Primary Turret. Note: The agent delivery rates in this table are permissible as a result of FAA sponsored independent third party demonstrated fire suppression capability of a Multi Agent High Pressure delivery technology of CAF, DRY CHEMICAL & CLEAN AGENT with both independent and simultaneous delivery. Ref: FAA Technical Center. See reference FAA Engineering Brief #71. All other complementary agent delivery systems shall comply with NFPA 414 Table 4.1.1(c) and 4.11(d) Agent System Performance Parameters (U.S. Customary Units)		
63	KG 3	Chapter 4 Addition: 4.13 Table 2	(Table 2, Class 4 & 5 – This technology has not been evaluated on class 4 & 5 vehicles, NA) This technology should not be allowed in use with the primary turret of a large vehicle until properly tested. However, it should be allowed for use in all applications independent of the primary delivery of a class 4 & 5 vehicle such as hand lines and low-flow turrets.	The same hose reel is often used on small vehicles as used on larger ones. Simply because the large apparatus transports the technology to the fire instead of a small apparatus, the technology should not be excluded. A note to the effect that the delivery system is not acceptable to be used with the primary turret of a class 4 & 5 vehicle would suffice until further testing is accomplished. Reject: Not Economically	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Practicable to add a second complete delivery system to a vehicle for hand line operations.	
64	PDT 39	Chapter 4 Addition: 4.13 Table 2 NOTE:	**Addition:** Insert note to the specific referenced test supporting flow requirements for all secondary agents	The Note associated with Table 2 refers to testing that was performed validating the content in the table. No testing reference is identified as in other areas of this Draft *AIC*. Without these references the FAA has no means of defending the inclusion of performance standards that represent a departure from previously accepted standards. Specifically regarding halogenated agents, the FAA's fire research arm has not formally released its final report of the findings upon which this performance standard is based. If it has or intends to, reference to this report should be included in	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				this *AIC*. Accept in principle. Added Note to this Advisory.	
65	PDT 36	Chapter 4 Addition: 4.13 Table 2	**Request for Clarification**	The table implies that any two agent combinations may be used - dry chemical and foam or dry chemical and a clean agent. If so, can dual agent systems that utilize dry chemical and foam simultaneously (encapsulated dry chemical nozzles) meet the same flow rates listed on Table 2? The note following Table 2 specifies that the flow rates are based on three agents in simultaneously delivery and have been demonstrated to the FAA. Request for clarification should be submitted for separate discussion.	
66	PDT 37	Chapter 4 Addition: 4.13 Table 2	**Addition:** asterisk under the table: *Hose sizes should be predicated on the relative proportion of agent to be discharged."	NFPA Table 4.1.1 (c and d) 4d. - Complementary Agents specifies hose size as 1" inside	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				diameter. This hose size should allow for the increase or reduction of hose size proportional to flow as listed in Table 2. Reject: Irrelevant to the performance standards.	
67	PDT 38	Chapter 4 Addition: 4.13 Table 2 cont'd.	**Addition:** asterisk under the table: *Any agent delivery rate that is dependent upon a simultaneous flow of another agent, must have a mechanism to prevent the operator from discharging a single agent at the reduced flow rate."	The interpretation of this table indicates that dry chemical or halogenated agent cannot be used individually and must be discharged in conjunction with at least one of the other agents. If this is indeed the intention of the table then it should also address a nozzle device to ensure that at least two of the discharge orifices be flowing anytime the device is placed into service. This in effect will mean that for an electrical (Class C) fire either dry chemical or water must be discharged at the same time as the	

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td></td><td>halogenated thus negating the benefit of the clean agent by itself.
Reject: Training Issue</td><td></td></tr>
<tr><td>68</td><td>MHa
2a</td><td>Chapter 4
ADDITION: 4.13
Comment part 1</td><td>ADDITION: 4.13

MULTI AGENT HIGH PRESSURE DELIVERY TECHNOLOGYS
(CAFS, Dry Chemical & Clean Agent independently and simultaneously)

<table>
<tr><th>Handline and Turret Performance Criteria</th><th>Class 1. 2 & 3</th><th>Class 4 & 5
***See exception</th></tr>
<tr><td>Dry Chemical handline</td><td></td><td></td></tr>
<tr><td>Discharge Rate*</td><td>8 lbs/sec</td><td>8 lbs/sec</td></tr>
<tr><td>Discharge Rate w/Clean Agent entrained</td><td>6 lbs/sec</td><td>6 lbs/sec</td></tr>
<tr><td>Range (ft)**</td><td>≥90</td><td>≥90</td></tr>
<tr><td>Bumper Turret & extendable turret/boom</td><td></td><td></td></tr>
<tr><td>Discharge Rate*</td><td>8 lbs/sec</td><td>8 lbs/sec</td></tr>
<tr><td>Range **</td><td>≥90</td><td>≥90</td></tr>
<tr><td>Width</td><td>≥17 feet</td><td>≥17 feet</td></tr>
<tr><td>Halogenated Agent Handline</td><td></td><td></td></tr>
<tr><td>Discharge Rate</td><td></td><td></td></tr>
<tr><td>independently & parallel with water/foam/caf</td><td>1 lb/sec</td><td>1 lb/sec</td></tr>
<tr><td>entrained in dry chemical stream</td><td>1/3 lb/sec</td><td>1/3 lb/sec</td></tr>
<tr><td>Range (ft)</td><td></td><td></td></tr>
<tr><td>independently**</td><td>≥40 ft</td><td>≥40 ft</td></tr>
<tr><td>entrained in dry chemical stream**</td><td>≥90 ft</td><td>≥90 ft</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Hose length</td><td>≥100 feet</td><td>≥100 feet</td></tr>
</table>
* Maximum discharge rate of DRY dry chemical powder (no entrainment)
** Testing of DRY dry chemical powder not entrained in any other agent and tested under NO WIND conditions at an inclination of 10 degrees or less for the nozzle.
*** This technology has not been tested as Primary turret and therefore can only be used in conjunction with a</td><td></td></tr>
</table>

ID#	Source	Location	Comment	Justification	Note
			Primary Turret and not as Primary Turret. Note: The agent delivery rates in this table are permissible as a result of FAA sponsored independent third party demonstrated fire suppression capability of a Multi Agent High Pressure delivery technology of CAF, DRY CHEMICAL & CLEAN AGENT with both independent and simultaneous delivery. Otherwise, the standards of Tables 4.1.1 (c) and 4.1.1 (d) apply. Reject: Elements of EB-71 supported by FAA/USAF testing have been incorporated into table 2 of this AC		
69	MHa 2b	Chapter 4 ADDITION: 4.13 Comment part 2	REASONS FOR CHANGES: SINCE NO OTHER TECHNOLOGY DELIVERY SYSTEMS HAVE BEEN TESTED TO THE PROTOCOL OF E.B. 71 THERE IS NO BASIS TO CHANGE THE PERFORMANCE CRITERIA AS STATED BY E.B. 71. THEREFORE, THERE IS NO SUBSTANTIATION FOR ANY OF THE 'AS DRAFTED' CHANGES AS DEPICTED IN DRAFT TABLE 4.13. THE TABLE (ABOVE) AGREES WITH THE INDUSTRY TECHNICAL COMMITTEE'S (ASSIGNED TO THIS PROJECT) FINAL RECOMMENDATIONS AND IS IN AGREEMENT WITH E.B. #71 THE CURRENT STANDARD. THERE IS ALSO NO SUBSTANTIATION FOR EXCLUDING THE E.B. #71 PERFORMANCE STANDARDS FROM CLASS 4 & 5 APPARATUS BASED ON THE RATIONAL THAT THIS TECHNOLOGY HAS NOT BEEN TESTED ON THE CLASS 4 & 5 APPARATUS. THERE IS NO PUBLIC RECORD THAT HAS BEEN FOUND SHOWING ANY HANDLINE TECHNLOGY OR NON-PRIMARY TURRET TECHNOLOGY EVER BEING THIRD PARTY TESTED BEFORE BEING APPROVED FOR A.I.P. FUNDING ON ANY OF THE CLASS 4 & 5 APPARATUS. THERE IS NO PUBLISHED THIRD PARTY TESTING ON ANY SIZE ARFF VEHICLE OF THE HYDROCHEM® (ENTRAINED NOZZLE TECHNOLOGY) PRIOR TO FAA A.I.P. FUNDING – A **PATENTED SOLE SOURCE** TECHNOLOGY DELIVERY SYSTEM! THERE IS NO OTHER HIGH PRESSURE MULTI AGENT DELIVERY TECHNOLOGY (ON WHICH E.B.#71 WAS BASED) THAT HAS BEEN COMMERCIALIZED AND OR THIRD PARTY TESTED TO DATE THAT CAN SUBSTANTIATE ANY CHANGES TO E.B. # 71 IN REGARD TO ITS PERFORMANCE REQUIREMENTS AND TESTING PROTOCOL. ***FOR THE RECORD THE FOLLOWING IS A MORE DETAILED SUBSTANTIATION FOR THESE RECOMMENDED CHANGES TO TABLE 4.13 OF 150-5220-10D DRAFT.***		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			This included table is a derivative of the original Engineering Brief #71. The history behind EB #71 was based on reducing the confusion on operating performance requirements criteria for this and the delivery technologies. The confusion came from vendors telling FAA fire departments that their delivery technologies could produce the same results while in fact that could not and had never been tested to the same protocol. This caused several Bids to be delayed and in one case to be thrown out with the process starting all over again. EB #71 was to eliminate this confusion. (see attached testing results if more detailed information is needed on the criteria behind the establishment of the performance parameters of E.B. #71) For those that may not be aware or are new to the project, this Multi Agent High Pressure delivery technology offering was based on the ability to throw dry chemical powder DRY over 90 feet @ 10 degrees in a no wind condition. The performance parameters were based on the 'Optimum' delivery of each agent into the fire from a safe distance – maximizing their fire suppression capabilities. Entrainment of dry chemical powder in a water stream cannot produce the same results or 'Optimum' delivery as demonstrated by all of the FAA's own published documents. This table as currently drafted allows for any delivery technology (low or high pressure, entrained or thrown in buckets) to meet the Multi Agent High Pressure classification without demonstrated third party testing to the protocol established by E.B. 71. Without documented third party testing data that clearly meets all the performance and protocol criteria in the E.B. 71 table it is difficult to see how any changes can be justified. EB #71 set out in specific terms of what operation/performance requirements had to be met in order to meet the qualified bidder threshold in an A.I.P. funded RFQ. The table as currently written no longer meets the criteria of the high pressure multi agent delivery technology and therefore should be abandoned for the original E.B. #71. The title for this technology was changed, however, since the definition for this technology is now published in NFPA 414 Annex A.4.1.3 page 46, I would assume that we would pick that up rather than to confuse the matter more? And I quote: "New multi-agent delivery technology systems are available that deliver multiple agents simultaneously with higher than conventional discharge pressures. These systems can also deliver agents independently at lower flow rates than a typical system. They also deliver the fire extinguishing agents in a form that improves the fire suppression performance of each agent when compared to the agents delivered in a conventional		

ID#	Source	Location	Comment	Justification	Note
			manner (for example, dry chemical suspended dry within the fire envelope, halogenated agent suspended as a vapor within the fire envelope, and foam delivered independently to minimize contamination or wetting of dry chemical to create a vapor barrier and/or further cool the fire environment). These delivery technologies are designed to improve fire suppression capability of all agents." (reference NFPA 414 Annex A.4.1.3) Secondly, the capability to use the technology in Class 4 & 5 vehicles completely removes this increased capability and safety from both the hand lines that are found on these larger trucks and turret applications that are not associated with the primary turret. What has not been tested in these Class 4 & 5 vehicles is its use in association with the primary turret. This technology was not intended for the primary turret as this turret is the main fire stream for the vehicle and is what gives it reach well beyond the 90-100 foot reach in which this high pressure multi agent delivery technology excels. There is no justification to eliminate this delivery technology capability (which includes CAFS) from the Class 4 & 5 apparatus. After all, all hand lines on current Class 4 & 5 apparatus are exactly like the hand lines on all Class 1,2 & 3 apparatus. There is no justification to disallow on the Class 4 & 5 apparatus a better performing handline technology based on current practice. Further, this is the only commercial delivery technology that gives the ARFF Firefighter 150 feet of bundled handline. This is an obvious safety factor that needs to be considered. If however, the issue is the clean agent rate when applied independently then that rate can easily be change to 5 lbs per second for the larger Class 4&5 applications. AFCT thinks this is a waste of clean agent since 1 lbs/sec in combination with water/water foam/CAFS can put the fire out as much as 5 times faster and from a safer distance. There is nothing on this chart that FAA Technical has not approved- both at the NFPA 414 revision meetings and at the Technical Committee meetings held by the FAA-- that I am aware of except the Class 4 & 5 restriction on the primary turret. Just so that everyone is on the same page, we should review the technology testing done by Tyndall ARFF Research Facility for the FAA in 2004 that supports the creation of a new and separate set of performance standards and rated the technology SUPERIOR (see attached Tyndall executive summary to the FAA). • This technology was the first commercial dry chemical delivery technology to use High Pressure Breathing Air (dew point -64F) and not require nitrogen bottles for its pneumatic propulsion system. The safety hazard of removing these propulsion bottles from the apparatus for re-servicing was no longer		

ID#	Source	Location	Comment	Justification	Note
			required as re-servicing was now done through a high pressure hose attached to a breathing air compressor or cascade outside the vehicle. • This technology system was the first to offer ground level re-servicing of all agents. • This is the first delivery platform to effectively use a vacuum loading system for dry chemical powder and therefore introduced the concept to the industry. • The technology was the first to permit purging of the dry chemical hand line back into the storage tank, eliminating waste and environmental issues. • This technology was the first technology to offer- at the nozzle - agent selection of multiple agents (more than 2). • This technology was the first to commercially offer 150 feet of a bundled hand line containing dry chemical powder. • This technology platform was the first to provide CAF as a standard delivery technology. • This technology was the first technology to provide 4 agents to the nozzle and provide the capability to optimally present these agents from a safe distance into the heart of the fire. • This technology was the first to throw dry chemical powder over 90 feet in no wind conditions and at a 10 degree nozzle elevation with a delivery rate of 8 lbs per second. • This technology was the first to throw clean agent over 40 feet effectively. • This technology was the first to entrain small amounts of clean agent gas within the dry chemical stream to increase its effective range, as well, to over 90 feet. • This technology was the first to allow the simultaneous delivery of water/water foam/CAF in parallel with small amounts of clean agent gas (1 lb per sec) to extinguish 3D engine nacelle fires in 1/3 the time and from a safer distance. • This technology was the first technology to permit the simultaneous delivery of water/water foam/CAF, Clean Agent Gas and dry chemical powder with minimal contamination of the water/water foam/CAF and dry chemical stream. • This was the first delivery technology to not use water as it primary fire suppression agent and proved that less agent more effectively delivered can put out more fire, faster and from a safer distance. • This is the first delivery technology to attack the whole fire tetrahedron at once. • This is the first delivery technology that has proven the concept that water does not have to be the primary agent. • This technology has suppressed fire scenarios that were once thought impossible. And in every case has set new performance (fire suppression and firefighter standoff) standards for the industry when compared to other comparable delivery technologies.		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			• This is the ONLY dry chemical delivery technology that can extinguish 3D engine fires and keep them out as tested and demonstrated at Tyndall by the ARFF Research Laboratory and witnessed by the FAA Technical Group. Things that we have proven with our own testing but have yet proved to the industry are as follows: • This technology may be the most effective fire solution inside of aircraft cabin. This technology with ABC dry chemical powder can immediately drop the temperature within the cabin over 1000 degrees within 10 seconds without creating any steam! This technology can extinguish these types of fires faster and leave a much more survivable environment. We have already proven this capability in the structural market. This technology does not push fire! In other words it puts the fire out where it is and does not push the fire where fire is not as water delivery technologies do. • This technology is the only delivery technology that can get better performance with ABC dry chemical powder than the industry current does with PKP on petroleum based fires. ABC dry chemical powder is a universal powder than can be used effectively with this technology on all types of fire. ABC dry chemical powder is not only as or more effective than PKP, but it's cheaper and has less environmental impact. While all these things are great, the real issue is that Engineering Brief #71 was created to single out these performance standards and to permit this technology to be bought with AIP funding without the threat of protest and by eliminating the confusion as to what performance standards had to be met to become a qualified bidder All these technology advances listed above can only be accomplished with this delivery technology platform currently and these advances would not have been commercialized had it not been for this delivery technology and platform. As everyone knows the FAA convened a 10D committee to put forth a draft document for the FAA. This committee met on two separate occasions. Once at SAIC facility outside Washington and a second time at Boston Logan Airport. At both this meetings the FAA told the committee in no uncertain terms that EB #71 would be incorporated into the new 10D. And during the second meeting EB #71 was only slightly modified to remove from the chart the following: • Clean agent hose diameter requirements • Hose length requirements out to 150 feet – retaining 100 foot minimum The only other discussion was around whether or not these systems would require labeling at the nozzle denoting the delivery in lbs/sec for the clean agent gases since this was different from the published 5-7 lbs/sec for standalone delivery systems.		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			So our further Questions deal with the reasons for the changes and/or deletions that have been made subsequent to the last meeting of the committee which are as follows: • *Changing dry chemical discharge rate from 8 lbs/sec to ≥8 lbs per second and the removal of the footnote that the delivery was to be dry and independent of any entrainment (as in a water stream) has no substantiation?* Be mindful that anything less or more than 8 lbs/sec DRY has not been tested to the multi-agent protocol as specified by E.B. #71. • *Discharge rate of the dry chemical when clean agent gas is entrained within it from 6 lbs/sec to ≥6 lbs per second has no substantiation?* Be mindful that nothing on either side of the 6 lbs/sec has been tested to the multi-agent protocol as specified by E.B. #71. • *Dry chemical throw range of ≥90 feet was not changed but the footnote was removed which specified the testing protocol for this measure as established by the protocol testing as* specified by E.B. #71 *technology which was in a no wind condition and a nozzle angle of no more than 10 degrees and this change has no substantiation?* • While it makes sense to combine the handline and bumper turret standards the standards that were tested were different. The bumper turret can entrain clean agent in the dry chemical stream. However it provides for independent delivery of clean agent only at between 1 to 6 lbs per second depending on the nozzle requested to distances far greater than current standards. This allows for each agent to be independently used depending on the fire scenario. The changed is not substantiated on any published testing. • The Clean Agent delivery performance was changed from 'independently & parallel with water/foam/CAF as it was tested and as specified by E.B. #71 -- to 'discharge rate with foam'. There is no published substantiation for these changes. • And finally, all uses on a Class 4 & 5 apparatus were eliminated. There is also no substantiation for excluding the E.B. #71 performance standards from class 4 & 5 apparatus based on the rational that this technology has not been tested on the class 4 & 5 apparatus. There is no public record that has been found showing any handline technology or non-primary turret technology ever being third party tested before being approved for A.I.P. funding on any of the class 4 & 5 apparatus. There is no published third party testing on any size arff vehicle of the Hydrochem® (entrained nozzle technology) prior to FAA A.I.P. funding – a **patented sole source** technology delivery system! • Further, the E.B. #71 technology was never intended to be used in place of the primary turret on a Class 4 & 5 apparatus. The primary turret is the main delivery technology that gives the apparatus its maximum reach and delivery of water/foam which can be well over 200 feet. The high pressure multi agent technology excels inside 100 feet. There is no substantiation to exclude the E.B. #71 technology from anything except the primary turret on the Class 4 & 5 apparatus.		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Also, consideration needs to be given to the additional training requirements and confusion that may be created by having two completely different delivery handline technologies that are vastly different in fire extinguishments performance and standoff requirements as well as re-servicing requirements within a single station. This same argument can be made for CAF on Class 4 & 5 apparatus. A handline can be CAF'd from stored high pressure air for quite awhile greatly extending its reach, its fire suppression capability and vapor barrier creation. There is no rationale substantiation for the exclusion of CAF from class 4&5 apparatus. IN SUMMARY, this Class 4 & 5 argument from our view point may be driven by the lack of interest by most, if not all, of the larger apparatus OEM's who may have to re-engineer space requirements for the high pressure multi agent and CAF technologies. These OEM's proudly proclaimed at our two committee meeting on 10D – ***"We are truck manufacturers and no nothing about fire suppression!"*** Understanding their own feelings on their purpose in the Industry one must weigh this with any of their recommendations against any new fire suppression technology offering. FINALLY, as the FAA goes about addressing these questions and comes to rational conclusions, the following things need to be kept in play: • The **HydroChem® nozzle which is patented technology** owned by the Williams Company and is the **sole source** has been used and paid for with AIP funds by the FAA for over 10 years! To my knowledge and after a FAA document search no testing report was ever published on this technology prior to its approval by the FAA. Further, this technology is now used on almost all twin agent hand lines entraining the dry chemical powder in a water stream. While this technology is good, its main performance gain is beyond 100 feet where you need to attack a 3 dimensional fire (for which it was development by Williams Cos. to support the industrial refinery requirements). This technology based on our reading has never met 139, 414 or the current FAA ARFF standards in that the standards say the following about simultaneous delivery of dry chemical powder and water. The standard indicates that the water stream shall be parallel (which indicates not entrained) and the water/foam stream shall fall approx 10% behind the dry chemical stream. This cannot be attained with the entrainment technology as both agents arrive at the same place together in a very contaminated and inefficient slurry. The main gain from the entrainment technology was firefighter standoff and that was traded off for very inefficient use of the agents in the fire suppression process. • The **Snozzle® is also a patented delivery technology** of Crash Rescue. This technology is also **sole**		

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td>
sourced but has been tested and FAA approved.
• Halotron 1® is also a patented product of American Pacific and is also sole sourced and is FAA approved. In fact, it is the only FAA approved clean agent in a market where there are OBVIOUS better products from both the fire suppression and life heath safety issue that have been in existence since 1999. AFCT has tried for the past 7 years to get the FAA to approve DuPont's FE 36 but to no avail. AFCT has tried to get the FAA to produce a testing protocol for FE 36 and to date neither AFCT nor DuPont has received one. DuPont has given up trying to work with FAA technical on this as the FAA technical group keeps throwing up huge barriers to testing other products. It would seem that a better, safer product would be what the FAA would be shooting for?

ALSO, AFCT is enclosing with this letter as background material and substantiation to all the changes to the Draft 150-5220-10D that the company is recommending.

These documents include:
• Excel Spreadsheet of all testing of the high pressure multi agent technology.
• Tyndall ARFF Research Laboratory's Draft Executive Summary as presented to the FAA
• Graphical comparisons of the high pressure multi agent technology to other tested delivery technologies so that the general public can see the performance differences.
• A 'White Paper' on the science of the technology and why it does what it does in the fire suppression process.
• Letter and email correspondence substantiating data, testing and intent of testing that became the basis of E.B. # 71
Letter to Castilano & Marinelli
Reject: Elements of EB-71 supported by FAA/USAF testing have been incorporated into table 2 of this AC.
</td><td></td><td></td></tr>
<tr><td>70</td><td>JAW 29</td><td>Chapter 4
Addition: 4.13
Table 2</td><td>
<u>AMEND OR CHANGE: FAA, Table 2</u>
<table>
<tr><td>Clean Agent</td><td></td><td></td></tr>
<tr><td>• Discharge</td><td>≥3.9</td><td>N/A</td></tr>
<tr><td>• Discharge</td><td>≥3.9</td><td>N/A</td></tr>
</table>
</td><td>Agent Discharge rates for 150 pounds flight line extinguishers are ≥3.9 pounds per second. These extinguishers are typically Underwriter Laboratory (U/L) rated for a 10A:80B:C. The</td><td></td></tr>
</table>

ID#	Source	Location	Comment	Justification	Note
				3.9 pound application rate provides the fire fighter with sufficient safety factors to fight smaller-scaled flight-line-type fires that these systems might be used in. There have been no current firefighting evaluations that warrant a reduction of clean agent application, which was established and described in the *FAA DOT/FAA/AR-95/87 Full-Scale Evaluation of Halon 1211 Replacement Agents for Airport Fire Fighting* Dated October 1995.[4] In this evaluation the FAA's intent was to determine the minimum flight-line and airport firefighting performance requirements of known clean agents. This report contains	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				definitive data on firefighting performance that might be expected, their application rates, as well as minimum quantity requirements on FAA funded vehicles. What fire test protocol was accomplished and what published report validates any clean agents performance against aircraft specific running fuel fire at this application rate? *FAA DOT/FAA/AR-95/87 Full-Scale Evaluation of Halon 1211 Replacement Agents for Airport Fire Fighting*, Dated October 1995, report contains specific fire test protocols based on realistic fire threats that might be encountered in an airport emergency response. These are the same tests that were performed to allow the use of Halon	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				1211 over 40 ago. Was the 1 pound per second application rate tested to assure that it provides both extinguishment and fire safety protection for the fire fighter at this rate? In report *FAA DOT/FAA/CT-82/109 Equivalency Evaluation of Fire Fighting Agents and Minimum Requirements at U.S. Air Force Airfields*, Dated October 1982, Author George B. Geyer, on page 53 Summary of results item 7 states that " the simultaneous discharge of Purple K Powder and Halon 1211 from adjacent nozzles employing the A/S 32P-13 vehicle reduced the number of ground fire pans and aerial cans extinguished to a value below that demonstrated by either	

ID#	Source	Location	Comment	Justification	Note
				agent singly. The draft report distributed at the industry meeting clearly states that the use of the clean agent and dry chemical together resulted in less fire performance than either agent used alone. Why would the FAA pay more money for a truck system that has questionable performance gains over standard truck systems? At the industry/FAA meeting held in the summer of 2006, the representative of the most commonly used and approved clean agent product stated that he was unaware of any tests conducted to validate the use of clean agents and dry chemical simultaneously. He also stated that the application rate of 1/3 pound per second	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				could not even be detected at any throw range beyond 5 feet of the nozzle. Reject: Elements of EB-71 supported by FAA/USAF testing have been incorporated into table 2 of this AC.	
71	KG 2	Chapter 4 Addition: 4.13 Table 2	Engineering Brief No. 71 (EB-71), dated February 01, 2006 provides a table with notes establishing performance standards tested by the FAA. EB-71 further states that these criteria are considered acceptable to the FAA. Table 2 as proposed in this DRAFT AC is a modified version of the table found in EB 71. This modified version lacks several performance standards critical to this patented delivery system. **I highly recommend using the original table found in EB-71 instead of the modified version.**	First, by eliminating the notes requiring the maximum discharge rate of dry chemical powder, DRY with no entrainment, and testing under no wind conditions at an inclination of 10 degrees or less for the nozzle, the acceptable performance standards are completely negated. For example, if the performance standard does not include delivery of dry chemical DRY at 90 feet with eight pounds or less (not more) and parallel not entrained, then any system that discharges four agents from four containers would qualify as a	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				"Quad-agent" system. The results of the "Pulse Delivery" aspect of the delivery system are completely ignored. The point that may be missed is that this is not just four agents discharged from one point simultaneous onto the fire but rather is a "delivery system" that produces a performance set forth in the table found in EB-71. Secondly, after speaking with various OEM representatives present at the two separate industry review meetings I learned that there was no opposition to using the EB-71 table and that the OEMs and FAA R/D agreed with the performance standards. Reject: Elements of EB-71 supported by FAA/USAF testing have been incorporated into table 2 of this AC.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
72	JAW 30	Chapter 4 ADDITION: 4.14.1.4	**ADDITION: 4.14.1.4** WATER PUMP(S) AND PUMP DRIVE. c. The water pump(s) shall: (1) have sufficient capacity to supply the foam/water solution at the pressures and volumes required to simultaneously fulfill the discharge standards of Table 4.1.1.9(c) and (d)	Reject: Does not add anything to the technical content of the document.	
73	JAW 32	Chapter 4 ADDITION: 4.17.2.4.8	ADDITION: 4.17.2.4.8 A manifold system to allow re-servicing of high pressure gas propellant cylinders may be installed to preclude the need to remove pressure cylinders to re-service and place the fire protection package back in services.	All ARFF vehicles can be placed back in service more quickly if a means to re-service is provided without taking out or removing the propellant cylinders. This also helps to reduce the possibility of fire fighters injuries while handling heavy pressurized cylinders. Reject: Filling bottles on the vehicle takes no more time than replacing them.	
74	JAW 27	Chapter 4 AMENDMENT NFPA 4.18.7 (6)	AMENDMENT NFPA 4.18.7 (6): They should function during Are - this needs to be corrected to read ~~all~~ operations without the use of outriggers…..	*I* wrote *this originally. This is a typographical error by the NFPA document editor.* Reject: Not applicable to the advisory draft.	
75	MHa 4	Chapter 4 AMENDMENT: 4.18.6.6	AMENDMENT: 4.18.6.6 The amendment as written requires a skin penetrating nozzle on any extendable	Reject Not applicable to the advisory draft. Incorrect Statements	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			turret? The action removes from the arsenal of tools the capability to have an extendable turret to use only as an extension of the ARFF operator(s) in the truck, allowing the ARFF operator to place agent in places he otherwise may not be able to without getting out of the truck and deploying the handline. The Skin penetrator while another good tool for some applications should remain an option and not a requirement for any needing the other capabilities associated with the extendable turret. It is therefore our recommendation that this amendment be deleted. Also, I do not recall this issue being discuss at either one of the two committee meetings? Maybe someone can answer as to how this got included in the new document? Be mindful that this is only an opinion, and AFCT is by no means an expert in this area. Therefore, we defer to the experts on this one.	regarding the extendable turret with the penetrator.	
76	PHu 5	Chapter 4 Amendment: 4.18.6.6	We concur with Amendment 4.18.6.6, requiring extendable turrets to have skin penetrator nozzles, but respectfully request addition of a statement that the penetrator nozzle's length should be determined as appropriate for the aircraft using the airport. Recently, a DC-8 cargo aircraft flew into PHL with an active interior fire. A penetrator nozzle used by the responding ARFF was later determined to be too short to effectively penetrate into the cargo containers. We understand that there was no requirement for the PHL ARFF to provide protection for the cargo operations, but it is our view that penetrator nozzles (and all ARFF equipment) should be appropriate for the varied aircraft configurations using an airport.	Reject: Statements on the penetrator nozzle use at PHL are inaccurate.	
77	DP 4	Chapter 4 Amendment: 4.18.6.6	**AMENDMENT: 4.18.6.6** – If an extendable boom is specified by the purchaser, a skin penetrating nozzle must be provided if not already available on another indexed airport ARFF vehicle. The penetrating nozzle must be movable to allow for proper alignment of the penetrator to the aircraft fuselage for piercing operations. It must be capable of the minimum water/flow rate and pattern requirements of Tables 4.1.1(c) and 4.1.1(d).	Section 4.18.6.6 is applicable to piercing nozzles when specified. Booms are "extendable", not turrets. (See A3.3.64.2) This section as amended is not applicable to 4.18.6.6. The amendment should apply to 4.18.6. The text in 4.18.6 is	

ID#	Source	Location	Comment	Justification	Note
				incorrect. Where it states "extendable turret" should be replaced with "extendable boom" per Appendix A, A3.3.64.2. I would also recommend that a skin penetrating nozzle (piercing nozzle) should be an optional item if one is already mounted to an extendable boom on another indexed ARFF vehicle currently in use at the airport. Accept: Change Turret to Boom Reject: FAA position is to provide the additional penetrating capabilities for each boom purchased.	
78	JAW 33	Chapter 4 ADDITION: 4.19.1.1	ADDITION**: 4.19.1.1** **HANDLINES.** If a twin agent handline is specified for a dry chemical system, a nozzle that will **entrain or capture dry chemical** within the master stream of water agent flow may be provided if specified by the purchaser.	FAA/USAF has validated the following: a nozzle that will entrain or capture dry chemical	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				within the master stream of water agent flow is highly effective in fighting three-dimensional running fuel fire related to aviation fire fighting. Reject: Does not add anything to the technical content of the document.	
79	JAW 34	Chapter 4 AMENDMENT: 4.20.1.1	**AMENDMENT: 4.20.1.1 Master Stream Turret** The bumper turret may be considered the primary or master stream turret system provided it meets all the elements of the roof turret performance and throw range requirements contained in 4.1.1.1(d). This also includes extendable bumper turrets that reach to or near the ground level.	FAA/USAF research has shown that low ground application is far more effective than roof mounted application of agent. Low ground application eliminates foam getting on the windshield as overspray and restricting the operator's visibility. Information: High capacity roof turrets have proven to be wasteful and difficult to get at the seat of the	

ID#	Source	Location	Comment	Justification	Note
				fire. On the other hand, technologies which apply agent at the seat of the fire low to the ground increase the effectiveness of the vehicle. The FAA published a report called *Comparative Evaluation of the Effectiveness of a High-Performance, Multi-position, Bumper-Mounted Turret to the Performance of a P-19 Roof-Mounted Turret*[5], Dated June 2005, Author Keith Bagot which validates the effectiveness of low ground application of extinguishing agent. Overspray across the surface of the windshield of roof-mounted turret trucks can lead to misapplication and wastefulness of valuable extinguishing agent. The FAA should	

[5] *Comparative Evaluation of the Effectiveness of a High-Performance, Multi-position, Bumper-Mounted Turret to the Performance of a P-19 Roof-Mounted Turret*[5], Dated June 2005, Author Keith Bagot.

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				be embracing low ground attack bumper turrets and expanded foam application with complementary agents entrained or encapsulated into the master stream. This trend of spiraling cost can now be reversed based on the use of newer, more effective technologies. Reject: Primary Turret location is not specified.	
80	JAW 35	Chapter 4 AMENDMENT: 4.22.4.1.1	**AMENDMENT: 4.22.4.1.1 Agent performance** Halogenated agents shall meet the requirements of Agent System Performance Parameters as stated in 4.1.1 (c) English and 4.1.1.(d) Metric standards.	FAA/USAF research has shown the need to maintain a flow rate of ≥5 pounds discharge to assure a level of safety for aviation-based engine nacelle and ground fires. Reject: Discharge rate posted in NFPA 414	
81	JAW 36	Chapter 4 ADDITION: 4.24.5.1.3	**ADDITION: 4.24.5.1.3** The radio systems should be operable in both the keyed on and accessory position of the truck electrical system so that the vehicle can monitor airfield operations without the truck engine running.	Fire fighters are often on standby situations that may require the truck engine not to be operating. Reject: Unnecessary requirement.	
82	PHu	Chapter 4	Table 2 of the draft AC provides the requirements for agent delivery systems, and	Accept: Report	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	3	Table 2	differs from what is contained in the NFPA base document. We object to the deviation from the NFPA specification as this table proposes, unless the results of the cited independent third-party tests have been published and accepted by the expert community. Any such deviation from the NFPA 414 standard should be more thoroughly proved and substantiated beyond what is provided in this statement.	referenced in Note to Table 2.	
83	PHu 4	Chapter 4 Table 2	The second column of Table 2 notes this type of agent delivery system has not been evaluated for Class 4 & 5 vehicles, resulting in an entire column with "N/A" fields. The table would be more readable if this column was eliminated and the point noted in a footnote to the table.	Reject: Standard format for table structure.	
84	BC 3	Chapter 4 Table 2	It is suggested that the table be reformatted to be similar to the following:	Reorganization of table is necessary to identify turret discharge rates and handline discharge rates, and to fill in missing or ambiguous information. There are multiple required flow rates for the discharge of two compounds at a time, but nothing concerning when all three compounds are discharged together which is mentioned in the note under this table. Also, it is unclear what rate of discharge is required for foam. Reject: Standard format for table structure.	

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td>85</td><td>BC
4</td><td>Chapter 4
Table 2</td><td>
<table>
<tr><td></td><td>Dry Chemical Flow Rate</td><td>Foam Flow Rate</td><td>Clean Agent Flow Rate</td></tr>
<tr><td>Handline</td><td></td><td></td><td></td></tr>
<tr><td>dry chem/foam</td><td></td><td></td><td></td></tr>
<tr><td>dry chem/clean agent</td><td></td><td></td><td></td></tr>
<tr><td>foam/clean agent</td><td></td><td></td><td></td></tr>
<tr><td>dry chem/foam/clean agent</td><td></td><td></td><td></td></tr>
<tr><td>Turret</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>dry chem/foam/clean agent</td><td></td><td></td><td></td></tr>
<tr><td>foam/clean agent</td><td></td><td></td><td></td></tr>
<tr><td>dry chem/foam/clean agent</td><td></td><td></td><td></td></tr>
</table>
Reject: Standard format for table structure.</td><td></td><td></td></tr>
<tr><td>86</td><td>BC
5</td><td>Chapter 4
Table 2 Note</td><td>Please revise the note under Table 2 to read as follows: “The agent delivery rates in this table are permissible as a result of independent third party demonstrated fire suppression capability of a Foam/Dry Chemical/Clean Agent simultaneous delivery. While this system is based on the discharge of multiple agents, it is possible to discharge extinguishing agents individually. When discharging foam or dry chemical individually, the discharge rates of Tables 4.1.1(c) and 4.1.1(d) apply. The discharge rate for the clean agent, when discharged individually, is significantly less than that required for the two existing FAA approved 460 to 500 lbs clean agent systems (HCFC Blend B and Halon 1211). The performance when discharging the clean agent alone at this low flow rate has not been evaluated. It should be noted that clean agents used in conjunction with multiple agent systems should be approved by Cert-Alert for airport fire fighting and should have been tested under the protocols as listed in report DOT/FAA/AR-95/87, Full-Scale Evaluations of Halon 1211 replacement Agents for Airport Fire Fighting.”</td><td>Justification:
Clarification has been added to reflect that while the discharge rates for individually discharging foam and dry chemical can meet the requirements in Tables 4.1.1(c) and 4.1.1(d), it is not true for the clean agent discharge. It is our understanding that for the multiple agent systems that the clean agent is typically plumbed to the nozzle using a ¼” ID tube which would not be able to achieve the ≥5</td><td></td></tr>
</table>

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				lb/s requirement for clean agents in Table 4.1.1(d). The flow rate when discharging the clean agent alone is expected to be approximately 1 lb/s. In the past, manufacturers of multiple agent systems have highlighted the ability of the clean agent alone. However, as an FAA approved clean agent manufacturer, we believe it is important to make airport users aware that this discharge rate is lower than that of a typical clean agent system (whether HCFC Blend B or Halon 1211) and that the level of performance for the 1 lb/sec flow rate has not been fully evaluated for ARFF use. Language has also been added to ensure that airports are aware that the clean agent used with a multiple	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				agent system should be FAA approved for airport fire fighting. The FAA has used a standardized test protocol to approve replacements for halon 1211 (refs: DOT/FAA/AR-95/87, AGFSRS 71-1, and DOT/FAA-82/109) and has issued Cert-Alerts when an agent is approved (ref: Cert-Alert 95-03). Reject: Training Requirement	
87	TC 7	Chapter 4 Amendment: Table 4.1.1 (A) & (B)	"Evasive Maneuver test must be conducted at 35 MPH (56 KPH)." Comment: We suggest that the requirement be changed to 25 MPH (40 KPH) and that the amendment only reference testing on a prototype vehicle. Suggested wording follows: "Evasive Maneuver test must be conducted at 25 MPH (40 KPH) on any prototype vehicle in accordance with 6.3.2.6."	The 25 MPH (40 KPH) requirement is defined in NFPA 414 (2007), a document which is five years newer than the -10C AC which was effective in 2002. If NFPA 414 is meant to be the operative document, then the testing requirement in that document should be used. Reject: Evasive maneuver test has been in effect at 35MPH in the 5220-10c for five	

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td></td><td>years for AIP funded vehicles.</td><td></td></tr>
<tr><td>88</td><td>JAW 24</td><td>Chapter 4
Table 4.12.11</td><td>4.12.11 Storage volume and weight capacity, Class 1, 2, and 3 vehicle:

<table><tr><th></th><th>1</th><th>Class 2</th><th>Class 3</th></tr><tr><td>Minimum Total Compartment Storage Area</td><td>220 Cu. Ft.</td><td>330 Cu. Ft.</td><td>330 Cu. Ft.</td></tr><tr><td>Minimum Total Equipment Weight</td><td>500 Lbs.</td><td>1,000 Lbs.</td><td>1,500 Lbs.</td></tr></table>
The minimum total compartment storage area shall be as listed in Table 4.1. (f) English and (g) Metric, with a minimum total equipment weight capacity as listed in Table 4.12.11 to accommodate the FAA’s required minimum response tool and equipment requirements.

a. If the equipment specified by the purchases exceeds these minimum requirements, the purchaser shall specify the total cubic feet of storage space and equipment weight allowance required.

b. If a pump-pony engine is specified, it may require the installation of the pump-pony engine to be installed or utilize some of the storage volume of the lower compartments.</td><td>Both FAA and NFPA have a minimum tool and equipment requirement to be carried on ARFF vehicles. This minimum volume and weight requirement should accommodate these requirements on Class 1, 2 and 3 vehicles with commercially available chassis vehicles with custom body compartments and firefighting packages.

Reject: No justification for table values. Refer to 414 A.3.3.71.2</td><td></td></tr>
<tr><td>89</td><td>PHe 2</td><td>Chapter 5</td><td>The performance requirements of this standard lack engineering justification and details found in other sections of the document. Over 12 pages of NFPA 414 are dedicated to ARFF vehicle performance criteria. Less than one-half page of the Interior Access Vehicle section lists ambiguous language for all requirements of the vehicle, and it indicates that this section is a stand alone chapter with no corresponding requirement of other chapters.</td><td>Reject: These vehicles are currently under production and the standards provided here are the FAA’s minimum performance</td><td></td></tr>
</table>

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			1. Example, the wall to wall turning diameter of this vehicle is two times the vehicle length. All other vehicles in this standard have a wall to wall turning diameter of three times the vehicle length. 2. No criteria is established for weights, overall dimensions, field of vision, engine characteristics, engine cooling system, fuel system, fuel capacity, exhaust system, vehicle electrical system, battery chargers, vehicle drive, all-wheel drive, axle capacity, suspension, rims, tires and wheels, brakes, air system, steering, instruments, warning lights, controls, etc. 3. What is the engineering basis for the 15 degree tilt table test? What does "not fully loaded" mean in Amendment 5.4.2? 4. What is the engineering basis for the platform floor material loading and entire platform loading? 5. The only platform size is a vague description that it must be large enough to open the aircraft door (what size aircraft, which door?) and allow fire fighters and their equipment to safely access the aircraft (how many fire fighters, what equipment?).	requirements for AIP funding.	
90	PHe 3	Chapter 5	For the Class 4 and 5 vehicles, there are a number of items of concern of individual member companies. However, there is unanimous consensus in the following areas: 1. Most manufactures have designed one or two models for the Class 5 category. The new standard allows the purchaser to specify water capacity in 500 gallon increments above 3,000 gallons. While this is an improvement over the infinite number of combinations allowed by NFPA 414, it would create six or more models that would have to be designed and tested individually. The cost would be substantial and the number of companies willing to make so many different designs would tend to eliminate competitive bids. 2. Many of the Annex A statements are ambiguous: 5a. "Reduced under axle and underbody clearances …" - reduced by how much? 5b. "Tag or other non-powered axle(s) …" – does this apply to 6x6 vehicles typically used for 3,000 gallon units? 5c. Vehicle stability systems – what type of systems? 5d. "Passive or active suspensions components …" – is this different from the off-road, high mobility system or anti-roll struts listed in Addition 4.6? If so, what are the performance criteria?	Reject: These vehicles are currently under production and the standards provided here are the FAA's minimum performance requirements for federal grant-in-aid assistance.	
91	PHe 4	Chapter 5	This statement of the FAMA organization is intended to inform the FAA of its concern about the impact of the current language of the proposed Draft AC	Reject: These vehicles are currently under	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			150/5220-10D, and the impact it would have on the ability of its member companies to comply with the standard and meet customer requirements. It is also the membership's concern that the current language would pose significant financial hardships in meeting the requirements (custom chassis in place of commercial chassis for the Class 1, 2 and 3 vehicles would more than double the costs of these vehicles). Design, building and testing of a poorly defined Interior Access Vehicle would result in tremendous cost and many types of vehicles meeting undefined performance requirements. Likewise, opening Class 5 apparatus for multiple water tank sizes would result in extremely costly vehicles (first to meet the multiple design requirements, and secondly in the reduced volume of standardized vehicles – imagine the cost if only one customer orders a 3,500 gallon unit). The increased cost and complexity of the vehicles would result in fewer vehicles purchased (extending the life cycle of the current vehicles and depriving the end user of technological and safety advancements available by replacing an ageing fleet sooner). The end user would also bear the burden of higher training and maintenance cost over the life of the vehicle (custom chassis for the Class 1, 2 and 3 vehicles, unproven specialty vehicle designs for the Interior Access Vehicle and new multiple vehicle designs for the Class 5 units).	production and the standards provided here are the FAA's minimum performance requirements for federal grant-in-aid assistance.	
92	KB 2	Chapter 5 Addition	Change the end of the sentence to: "….that **meets at least the agent** requirements of CFR Part 139.317**(a).**	The bold underlined text clarifies that the vehicle should have at least the agent capacity of Index A requirements but may be engineered to carry more. Accept:	
93	JAW 37	Chapter 5 Addition: Chapter 5	**ADDITION 5.4.3:** Vehicle stability systems Anti-roll stability struts are approved	Anti-roll, passive systems mounted to the vehicle and the safety outriggers will reduce roll tendencies while the vehicle is traveling	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Passive or active suspensions components to increase the stability of the vehicle while decreasing the rollover threshold are approved.	on the airfield as well as being setup for entry egress into an aircraft. These vehicles inherently have a high center of gravity. Active suspensions components can increase the stability of the vehicle while decreasing the rollover threshold while being driven as well as when the vehicle is being leveled against the aircraft. This will increase the safety and operation of the vehicle. The industry will expect these vehicles to be able to go anywhere to an accident on the airfield that we currently require and ARFF vehicle to go. The FAA requires all ARFF vehicles to meet a 30-degree tilt table angle with no chocks or counter roll devices	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				inserted between the tire and the table. These vehicles would clearly benefit from the installation of passive struts as well as active suspension systems. Why not fix the problem in the earliest stages of the FAA-funded program for these vehicles? Not enough research has been done on the side slope and stability requirements of these vehicles. Reject: The minimum required performance standards are listed in chapter 5. All other subsystems are at the manufacturer's discretion.	
94	MHu 10	Chapter 5 Addition: Chapter 5	It is Rosenbauer's position that this entire section be removed from the circular until more definitive data is developed regarding these vehicles. In particular the requirement for tilt testing is based on what criteria? On what basis did the NFPA arrive at its conclusions? Only recently has one of these devices been tested and there are several designs for this vehicle in process by various companies. These	Reject: These vehicles are currently under production and the standards provided here are the FAA's	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			companies in the development process (including Rosenbauer) are still reaching conclusions about these vehicles and to impose standards without ever having consulted the manufacturers involved in research and development is misguided in our view. The NFPA adopted this standard for an interior access vehicle but the process was marred in our view by emotion and is backed up with little engineering data. Although the goal of the interior access vehicle is admirable and we agree with its conceptual ideas, adopting the NFPA standard will defeat the purpose of the idea and place unreasonable and possibly unreachable performance goals on manufacturers.	minimum performance requirements for federal grant-in-aid assistance.	
95	DP 5	Chapter 5 Amendment: 5.1.3	**AMENDMENT: 5.1.3 -** The vehicle must provide access to sill heights of between 2 feet (0.6 meters) and at least the lower sills of all decks on indexed aircraft operating at the airport. This sill height is sufficiently low enough to allow access to the lowest sill height aircraft currently in operation (e.g. DC9) that does not have its own integral stairs or if the aircraft landing gear is compromised.	The minimum height identified in NFPA 414 "**5.1.3** The vehicle shall provide access to sill heights of between 0.6 m (2 ft) and the upper door sills of aircraft operating at the airport." was written to insure that the Interior Access Vehicle (IAV) could be used for aircraft emergencies when the landing gear has been compromised. The need for access to the upper decks on the A-380, B-747 and C-5 are also a primary concern for life safety. Reject: 24 inch sill	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				height does not require specialized vehicle for entry.	
96	PHu 6	Chapter 5 Amendment: 5.1.3	Amendment 5.1.3 contains a proposed addition regarding interior access vehicles. While we strongly concur with this addition, the current wording makes reference to minimum sill height access, but does not provide any guidance regarding maximum sill heights. We recommend adding text to aid in specifying the maximum height that the integral stairs should be able to reach. The height of the A380 upper deck door sill is 26 feet. It may be sufficient to note the height of some other door sills and state that the vehicle should be capable of functioning with all aircraft configurations likely to use the airport.	Reject: This advisory covers the requirement.	
97	PHu 7	Chapter 5 Amendment: 5.4.2	Amendment 5.4.2 regarding stair trucks with integral stairs states that "the platform is not required to be fully loaded to the design weight capacity during the 15 degree tilt test." We consider this a hazard as proposed, unless the system can be prevented from operating in such condition and recommend that the system be tested in the complete range of potential uses that could be experienced in an emergency.	Reject: Platform Tilt is tested to 15 degrees as a static stability requirement. This AC requires leveling to within 5 degrees of horizontal for operational use.	
98	TC 9	Chapter 6 AD(sic)MENDMENT: 6.1	"The vehicle must be provided with all fire fighting agent and propellants to make it operational upon delivery." Comment: Historically, enough agent has been provided with a federally funded vehicle to 1) make the vehicle fully operational and 2) provide a refill of all agents. We suggest that this sentence be amended to provide more specific direction to the vehicle manufacturer including a list of the items to be provided such as: **For every vehicle** Two complete fills of the foam tank (initial fill and refill) **For a vehicle equipped with a dry chemical system** Two complete fills of the dry chemical tank (fill and refill)	To provide clarity, the vehicle manufacturer must know the exact requirements for fire fighting agents and propellants to be priced in its bid. Reject: AIP funding is for one fully equipped, ready to use vehicle.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			One spare nitrogen cylinder One dry chemical fill funnel **For a vehicle equipped with a clean agent system** Two complete fills of the clean agent tank (fill and refill) One re-service kit *(this is an option listed in 4.22.1.1.1 but not in A.4.1.5)*		
99	DP 6	Chapter 6 Amendment: 6.1	**ADDITION: 6.1** – The vehicle must be serviced prior to delivery with lubricants, brake and hydraulic fluids, and a cooling system fluid, all of which must be suitable for use in the temperature range expected at the airport. The vehicle must be provided with all fire fighting agents and propellants to make it operational upon delivery.	This should be changed to "Addition: 6.1". Section 6.1 should not be replaced in its entirety with the proposed amendment. Accept	
100	MM 7	Chapter 6 Amendment: 6.1	Need clarification / definiton for the term "serviced" - does it mean "top up fluids and check filters and change if necessary, belts" or "change all fluids and filters, belts" prior to shipping from factory.	**NFPA 414 Reference Not Applicable** Accept in principle	
101	PHu 8	Chapter 6 Amendment: 6.1.5	There is a reference in proposed Amendment 6.1.5 regarding training on use of the equipment. The current version of the AC refers to a minimum of 5 days training, but the draft AC only refers to a maximum number of days for training (up to a maximum of 5 consecutive days; up to 8 days where an extendable turret is installed). We believe that this section should reference a minimum period as was previously delineated. It would be our preference to specify the training in terms of a demonstration of standard performance levels vs. the use of hard time limits.	Reject: Sufficient time under federal funding to complete the required training. Additional training time is available under local funding.	
102	PDT 15	Chapter 6 Amendment: 6.1.5	**Amendment:** as appropriate (see 6.1.5 below)	**NFPA 1.3.2.3.8** Place the A/C language currently associated with 6.1.5 regarding on-site operation care and maintenance instruction upon delivery of the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				vehicle, under this section to conform more logically to NFPA414. Reject: Training requirements of the OEM belong under chapter six more logically than under the Parts manual (Chapter one)	
103	PDT 16	Chapter 6 Amendment: 6.1.5	**Amendment:** as appropriate (see 6.1.5 below)	**NFPA 1.3.2.38.9** Place the A/C language currently associated with 6.1.5 regarding the location, duration and training material upon delivery of the vehicle, under this section to conform more logically to NFPA 414. Reject: Training requirements of the OEM belong under chapter six more logically than under the Parts manual (Chapter one).	
104	TC 10	Chapter 6 Amendment: 6.1.5	"The technician should also provide initial adjustments to the vehicle for operational readiness and mount any ancillary appliances included as part of the vehicle that were not factory installed." Comment: We suggest that the sentence be amended to read "The technician should also provide initial adjustments to the vehicle for operational readiness."	A manufacturer's training technician should provide training, and not be responsible for mounting ancillary	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				appliances (auxiliary equipment). The responsibility for mounting these items should be the sponsor's, particularly as the auxiliary equipment items described in A4.2.1 "are not available for ARFF vehicle specification under this advisory circular.". Accepted in principle	
105	TC 11	Chapter 6 Amendment: 6.3.2.6 -	"Evasive Maneuver test must be conducted at 35 MPH (56 KPH)." Comment: We suggest that the requirement be changed to 25 MPH (40 KPH) and that the amendment reference testing only on a prototype vehicle. Suggested wording follows: "Evasive Maneuver test must be conducted at 25 MPH (40 KPH) on any Prototype Vehicle in accordance with 6.3.2.6."	The 25 MPH (40 KPH) requirement is defined in NFPA 414 (2007), a document which is five years newer than the -10C AC which was effective in 2002. If NFPA 414 is meant to be the operative document, then the testing requirement in that document should be used. Reject: Evasive maneuver test has been in effect at 35MPH in the 150/5220-10c for five years for AIP funded vehicles.	
106	PDT	Annex A	**Amendment:** 2,b: Remove the exclusion for added width for stability purposes.	**Annex A 4.1.5, 2,b**	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	77	Amendment: 4.1.5, 2,b		As ARFF vehicles are not-considered highway vehicles by DOT and EPA definition, typically are exempt from state licensing requirements as publicly owned vehicles and rarely leave airport property except under emergency conditions, requirements that limit vehicle width carry no practical benefit or objective. In emergency situations the vehicles have universal right-of-way under the Uniform Traffic Code and other standards. Under non-emergency circumstances (maintenance or special events) ARFF units are typically escorted and the end user if necessary can acquire a highway permit for their temporary operation off of the airport (not unlike heavy cranes).	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Further, limiting the width imposes a higher vertical center of gravity on the chassis that cannot be overcome in every instance by suspension enhancement. Reject: Maintain the intent of NFPA 414 para. 4.2.2.2.	
107	PDT 81	Annex A Amendment: 4.1.5, 8,i	**Amendment:** 8,i: Remove the exclusion of turrets control accessibility to driver and crewmembers.	Disallowing the ability of a crew member from assisting with turret operations may negatively impact the safe and effective response to an emergency. The workload on the driver (e.g., operating the vehicle, communicating on the radio, initial command of the incident and directing the turret) has and will continue to be problematic. Cab resource management is essential to effective ARFF fire control. Reject: Current configuration allows multiple users from a	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				single control. Additional packages stations are not available under federal funding.	
108	DP 7	Annex A Amendment: A4.1.5	The following items from the options list A4.1.5 are not approved options for funding: • 8g. Turret controls located in the cab or on the roof platform. • 8i. Turret(s) control(s) accessible both to the driver and the crew member. Where else on the vehicle are you going to mount a turret control, especially if you only have a single vehicle operator? This is in conflict with NFPA 414.	**Ref: NFPA 414 4.18.4** **"**The purchaser shall specify whether a manually operated or a power-assisted turret shall be provided. Where a manually operated turret is specified, controls shall be in the cab, operation force shall be less than 133.4 N (30 lbf), and an indication of turret elevation and azimuth shall be provided…" Accept in principle; 8g Reject: 8i. Current configuration allows multiple users from a single control. Additional packages stations are not available under federal funding.	
109	KG 5	Annex A Amendment: A4.1.5	The following items from the options list A4.1.5 are not approved options for funding: 8g:	This must be an editorial mistake. Accept in principle; 8g	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			If turret controls located in the cab or on the roof platform are not allowed, then where are they allowed? They have to be allowed in the cab.		
110	KG 6t	Annex A Amendment: A4.1.5	The following item from the options list A4.1.5 is not approved options for funding: 8g:	Accept in principle; 8g	
111	MHa 5	Annex A Amendment: A4.1.5	AMENDMENT: A4.1.5 8 g & 8i These should not be omitted from the options list unless these are requirements somewhere else. This has to be the reasons they are not options. I am assuming that if you have a turret it is required to have 8 g & i ???? If that is the case then your draft text is correct. In any case this language is not clear and may lead to un-intentioned confusion.	Accept in principle; 8g Reject: 8i. Current configuration allows multiple users from a single control. Additional packages stations are not available under federal funding.	
112	MHu 11	Annex A Amendment: A4.1.5	ADOs **should not** have the ability to approve any of the optional items listed for submission to them as the ADOs in all districts have demonstrated their inability to fairly assess and administer the language of the current circulars. If specific items are to be included as "optional" items then those options and their defining parameters need to be clearly spelled out so the purchaser and/or the ADO understands what is being optioned. If the ADO is given the ability to approve or deny items in this list then the ADO must be given specific parameters and instructions within the circular to guide them in the decision making process. Furthermore the instructions must be equal and interpreted in the same way by all ADOs which means that direction to the ADO *must* come from headquarters FAA or be clearly defined in the circular. ADOs in all regions have been unequal in interpreting the language of the current circular and there is no consistency in any of their interpretations at this time. Allowing the ADO to approve and interpret these options as proposed will lead to increased protests and make the production of a consistent ARFF vehicle virtually impossible. This will lead to higher costs and an increase in bid protests.	Reject: Interpreting site specific considerations is the function of the ADO	
113	MHu 12	Annex A Amendment: A4.1.5	The items listed below which we have responded to do not have substantive data associated with them to prove their validity for inclusion. Furthermore, aspects of some of these items clearly favor certain companies who could participate in the	General Comment	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			market if they chose to but only do if their "criteria" is followed and special exceptions are made by FAA to accommodate them. This appears to be the case and is beyond the scope of what was agreed to in the meetings held by FAA This has been the issue within the NFPA process and has led to our referral of that document as being skewed and emotional rather than based on solid engineering grounds.		
114	MHu 13	Annex A Amendment: A4.1.5	1f. Navigation System of Drivers enhanced vision system (DEVS). Item should be at purchaser's discretion and remain a selectable optional item requiring no ADO approval	ACCEPT: Deleted from A4.1.5.	
115	MHu 14	Annex A Amendment: A4.1.5	2a. Added payload capacity (GVWR) to carry special equipment where the purchaser identifies added equipment. The ADO does not have the technical ability to address this issue. The vehicles produced today are carefully thought out by engineering staff with a high degree of specialization in this field. Vehicles are designed with payload capacities based on design parameters that are clearly defined in the existing circular and increasing payload because a customer deems it necessary places an undue burden on the manufacturer and places them in the position of having to spend and enormous amount of time and money in engineering to accommodate this request for a single vehicle. Adding payload can upset the already critical weight and balance issues associated with these vehicles. The current statement in the existing circular adequately covers payload issues and the ADO should not be allowed to make engineering calls like this.	Reject: Increased GVWR without ADO review potentially affects fair competition.	
116	MHu 15	Annex A Amendment: A4.1.5	2c. Audio-visual devices that meet or exceed the field of vision provided by wide-angled mirrors. Item needs to be more clearly defined to address what type of devices and what the rationale behind this is. ADOs do not have the technical expertise to address this highly complex issue. As this is clearly taken verbatim from the NFPA document it our position that it is in place only because one manufacturer who has influence within the NFPA committee was successful in getting it placed in that document to benefit that manufacturer. Rosenbauer's position is that it can be specified by customers but does not need ADO approval.	Reject: Audio visual devices without ADO review potentially affects fair competition	
117	MHu	Annex A	3a. Engine that operates at necessary performance above 2000 ft (609.6m) elevation.	Reject: Due to limited	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	16	Amendment: A4.1.5	Current engine manufacturers design parameters adequately cover this item and no ADO approval should be required. Item should be removed as it is not necessary	regional applications, ADO's will retain oversight for approval.	
118	MHu 17	Annex A Amendment: A4.1.5	3b. Radiator shutters. Item should be removed as modern engine design has made this item obsolete and adds unnecessary cost to the vehicle	Reject: Due to limited regional applications, ADO's will retain oversight for approval.	
119	MHu 18	Annex A Amendment: A4.1.5	3c. Engine coolant filter. Item should be removed as coolant filters are common items seen in all current specifications and usually included as standard equipment and need not be approved by the ADO. Item should be inserted at customers discretion.	Reject: While common, it may not be standard on all applications. ADO's will retain oversight for approval. Approval without ADO review potentially affects fair competition.	
120	MHu 19	Annex A Amendment: A4.1.5	3d. Silicone coolant and heater hoses. Item should be removed as silicone hoses are common items seen in all current specifications and usually included as standard equipment by all major OEMs	Reject: While common, it may not be standard on all applications. ADO's will retain oversight for approval. Approval without ADO review potentially affects fair competition.	
121	MHu 20	Annex A Amendment: A4.1.5	3e. Heated diesel fuel-water separator. Item should be included as an optional item that can be chosen by the purchaser at their discretion. This is a common item seen in many specifications.	Reject: While common, it may not be standard on all applications. ADO's will retain oversight for approval. Approval without ADO review potentially affects fair competition.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
122	MHu 21	Annex A Amendment: A4.1.5	3f. Automatic drain(s) for the diesel fuel-water separator. Item should be included as an optional item that can be chosen by the purchaser at their discretion. This is a common item seen in many specifications.	Reject: While common, it may not be standard on all applications. ADO's will retain oversight for approval. Approval without ADO review potentially affects fair competition.	
123	MHu 22	Annex A Amendment: A4.1.5	3g. Auxiliary fuel tank(s) commensurate with the need to meet local requirements. Language should be modified to exclude a purchaser from requesting additional or larger fuel tanks. If the desire of the FAA is to allow larger fuel tanks then a specific standard for the additional fuel capacity should be clearly spelled out in the circular so OEMs are not spending additional time to engineer each individual vehicle to meet a customer's desire.	Accept: Move from ADO approved options list to not approved options list	
124	MHu 23	Annex A Amendment: A4.1.5	3h. Stainless steel exhaust systems and muffler. We question why this is even in this list as most OEMs provide this feature as a standard. What is the rationale for seeking it as an optional item or one that needs ADO approval?	ACCEPT Removed from list	
125	MHu 24	Annex A Amendment: A4.1.5	5a. Reduced under axle and underbody clearances to provide a more stable performance on pavement when the vehicle suspension is designed to permit instantaneous adjustment to the required height for off pavement travel. If this standard is to be allowed the reduced underbody and axle clearance heights need to be clearly spelled out. What is the criteria for those entities who do not provide this type of suspension? Are the reduced clearances applicable to all ARFF vehicles? We think not. This particular statement is designed to allow only one manufacturer that we know of to deviate from the accepted clearances in place and could give an unfair advantage in the purchase process. It is our view that that this entire section should be removed from inclusion in the circular as it is clearly proprietary and sets standards that prevent fair and open competition.	Reject: Fair and open competition is the reason that this item is on the ADO options list.	
126	MHu	Annex A	5b. Tag or other non-powered axle(s) to assist weight distribution and/or stability	Reject: Fair and open	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	25	Amendment: A4.1.5	requirements. On what basis is this rationale predicated? What are the criteria for these "tag axles" how do they fit within the existing designs of ARFF vehicles? If this is to be included it requires more definitive data as to how and where such devices may be incorporated in the design of the vehicles. This is clearly skewed towards one manufacturer in particular and will set the stage for one sided competition placing those OEMs who do not need or utilize this sort of arrangement on their platforms in an unfair position. If this language is to be left in the document then the wording "as applicable and at the manufacturer's discretion" should be inserted.	competition is the reason that this item is on the ADO options list.	
127	MHu 26	Annex A Amendment: A4.1.5	5c. Vehicle stability systems. There needs to be clearly defined data/instructions concerning "vehicle stability systems" as this vague reference leaves the door wide open to interpretation. What are the criteria and what is the standard? Is this standard validated by testing data? If no rational data exists then this reference needs to be removed from the circular.	Reject: if required due to suspension design to meet performance requirements at the manufacturer's discretion. Various possibilities of implementing this item is the reason for ADO review.	
128	PHu 9	Annex A Amendment: A4.1.5	The proposed Amendment A4.1.5 to ANNEX A provides a list of options that are specified as not being approved for inclusion on the vehicle unless justification is provided to the Airport District Office (ADO). We understand that some items may not be needed due to inapplicability, (e.g. an engine block heater in a sub-tropical climate), but we strongly recommend that some of these options should be made standards, including: 5c (vehicle stability system); 5e (spare tire); 7d (FLIR heads-up display located in the cab) and especially item 1F (Navigation System of Drivers Enhanced Vision System (DEVS)).	Reject 5c: See above. Accept in principle 5e: Automatically approved one spare Reject 7d: Still requires ADO approval Accept 1f:	
129	PHu 10	Annex A Amendment: A4.1.5	It is our view that commercial airliners should be equipped with crash-activated emergency locater transmitters (ELTs) with Global Position System (GPS) technology and that airport rescue services should be correspondingly equipped in	Comment; not applicable to this draft. Applicable to DEVS	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			order to instantly locate downed aircraft in low visibility conditions.	A/C under separate revision.	
130	PHu 11	Annex A Amendment: A4.1.5	Subsequent to the 1990 ground collision of two aircraft at Detroit Metropolitan Wayne County Airport (DTW), in Detroit, Michigan, where ARFF response was hindered by fog conditions, the FAA conducted an excellent research program resulting in the development of the DEVS concept. Elementary to it was provision of an onboard navigation system that would easily show a responding ARFF vehicle driver the location of the accident. While crash-activated ELTs are not yet required on all air carrier aircraft, they are required on all those with payloads of less than 18,000 lbs and are standard on most foreign air carriers. Even without the benefit of an ELT, an ARFF vehicle operator can use the navigation system to find the last known aircraft position as provided by the air traffic controller. The navigation system is superior for this task compared to the FLIR component of the DEVS system, which is acknowledged to have a limited range in low visibility conditions.	Comment; not applicable to this draft. Applicable to DEVS A/C under separate revision.	
131	PHu 12	Annex A Amendment: A4.1.5	The navigation system was also designed to provide command and control information to the incident commander, as acknowledged in the existing version of this AC. It should also be noted that airports without formal low visibility operations plans (per AC 120-57) can experience category I landings with visibility down to 1800 feet horizontal. The ARFF navigation component of the DEVS system is critical in expediting the ARFF response in such limited conditions.	Comment; not applicable to this draft. Applicable to DEVS A/C under separate revision.	
132	PHu 13	Annex A Amendment: A4.1.5	In addition, we recommend equipping all ARFF vehicles with vehicle performance data recorders and automatic video-recording systems that activate when the vehicle emergency lights are activated. These systems capture data that is essential in the investigative phase following an accident or incident and can be supported at very little cost.	Comment; not applicable to this draft. Applicable to DEVS A/C under separate revision.	
133	TC 12	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **2a.** "Added payload capacity (GVWR) to carry special equipment where the purchaser identifies added equipment." Comment: It is impractical for a manufacturer to arbitrarily modify the standard GVWR of each of its models without making major design changes which would be	We believe that Paragraph A4.2.1 provides sufficient support of our suggestion that this item be included with the items that are not approved for funding. Paragraph A4.2.1 reads	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			very costly.	"All vehicles are designed for a maximum GVWR or maximum total weight, which should not be exceeded by the apparatus manufacturer or by the purchaser after the vehicle has been placed in service. There are many factors that make up the rated GVWR, including the design of the springs or suspension system, the rated axle capacity, the rated tire and wheel loading, and the distribution of the weight between the front and rear wheels." Reject: Increased GVWR without ADO review potentially affects fair competition.	
134	TC 13	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **3b.** "Radiator shutters." Comment: We have not installed radiator shutters on an ARFF vehicle for several decades. We suggest that the item be amended to read	Modifying the sentence would mean that if the option were selected, a vehicle manufacturer would not be required to provide radiator shutters if it has made the determination that	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			"Radiator shutters shall be provided if required by the vehicle manufacturer for operation in a cold climate."	they are not necessary. Reject: While common, it may not be standard on all applications. ADO's will retain oversight for approval. Approval without ADO review potentially affects fair competition.	
135	TC 14	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **3c.** "Engine coolant filter" Comment: An engine coolant filter is something that should be made a standard item on each vehicle for preventive maintenance reasons.	This item was standard in Para. 44.f of the -10C AC. Reject: While common, it may not be standard on all applications. ADO's will retain oversight for approval. Approval without ADO review potentially affects fair competition.	
136	TC 16	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **3f.** "Automatic drain(s) for the diesel fuel-water separator" Comment: We request that this item be removed as an approved option for environmental reasons.	Having an automatic drain on the fuel-water separator could allow fuel to be discharged to the ground along with any water. If the automatic drain should fail, a large quantity of fuel could be discharged to the ground without the driver being aware that	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				an event adversely affecting the environment is occurring. Accept	
137	TC 17	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **3g.** Auxiliary fuel tank(s) commensurate with the need to meet local requirements" Comment: We request that this item be removed as an approved option because the amount of fuel to be carried on a vehicle is already defined in the amended 4.3.3.5.1.	Only one fuel tank capacity should be provided on each vehicle, and that has been defined in the amended 4.3.3.5.1. It would be impractical for a manufacturer to arbitrarily add auxiliary fuel(s) tanks to meet "local requirements". Accept	
138	TC 18	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **4b.** "On-board battery charger / conditioner" Comment: We suggest that this option be made standard as 4.4.2.1 already requires a battery charger. Making the battery charger described in 4.4.5 standard would mean that a manufacturer would only have to provide one battery charger / conditioner on all vehicles.	Providing the same battery charger / conditioner on all vehicles will reduce cost. Reject: Already automatically approved.	
139	TC 19	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **5b.** "Tag or other non-powered axle(s) to assist weight distribution and/or stability requirements."	The FAA has never allowed a non-powered axle to be installed on an ARFF vehicle and we believe that such a dramatic change in the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Comment: We request that this item be removed as an approved option because it would allow a non-driving axle to be installed which is contrary to the all-wheel drive requirements in 4.5.5.	FAA 's position would require a detailed review prior to approval. Reject: Fair and open competition is the reason that this item is on the ADO options list.	
140	TC 20	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 require justification to get ADO approval:** **5c.** "Vehicle stability systems" Comment: All manufacturers do not need to include vehicle stability systems to "increase the stability of the vehicle". A manufacturer should be able to use those systems if necessary in the design of a vehicle, but other manufacturers should not be forced to include them if not part of a proven design as that would only add cost. We suggest the wording be amended to read "Vehicle stability systems if required by vehicle design."	The stability of a vehicle is already defined in Table 4.1.1a using "side slope stability", "dynamic balance", "evasive maneuver test" and "J turn test criteria". Reject: if required due to suspension design to meet performance requirements at the manufacturer's discretion. Various possibilities of implementing this item is the reason for ADO review.	
141	TC 22	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 are not approved options for funding:** **8g.**	Turret controls are provided in the cab on the majority of ARFF vehicles built.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			"Turret controls located in the cab or on the roof platform." Comment: We suggest that the sentence be amended to read "Turret controls located on the cab platform". This would allow the placement of turret controls in the cab, which is where they are normally mounted, adjacent to the driver.	Accepted	
142	TC 23	Annex A Amendment: A4.1.5	**The following items from the options list A4.1.5 are not approved options for funding:** **8i.** "Turret(s) control(s) accessible both to the driver and the crew member." Comment: We suggest that this item be removed from the "not approved" option list and that it be added as a standard requirement.	ARFF vehicles have historically been designed to allow turret operation by both the driver as well as one additional crew person which is particularly important during an emergency situation. 4.18.5 reads "Turret controls for both foam and dry chemical turrets shall be accessible both to the driver and the crew member." 4.20.1 reads "Where a bumper turret or ground sweep nozzle(s) is provided, the controls shall be mounted inside the cab within easy reach of the driver and a crew position." Accepted	
143	TC 15	Annex A Amendment: A4.1.5 -	**The following items from the options list A4.1.5 require justification to get ADO approval:** **3e.**	Paragraph 4.3.3.3.1 already requires that a "heated fuel/water separator equipped	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			"Heated diesel fuel-water separator" Comment: We suggest that the wording be amended to read "Heated diesel fuel-water separator if a gasoline engine is provided"	with a manual drain shall be supplied where the vehicle is equipped with a diesel-fueled engine." Reject: comments do not reflect items discussed in 3e.	
144	TC 21	Annex A Amendment: A4.1.5 -	**The following items from the options list A4.1.5 require justification to get ADO approval:** **5d.** "Passive or active suspensions components to increase the stability of the vehicle while decreasing the rollover threshold." Comment: All manufacturers do not need to include passive or active suspension components to "increase the stability of the vehicle". A manufacturer should be able to use those components if necessary in the design of a vehicle, but other manufacturers should not be forced to include them if not part of a proven design which would add unnecessary cost. We suggest the wording be amended to read ""Passive or active suspensions components to increase the stability of the vehicle while decreasing the rollover threshold if required by vehicle design."	The stability of the vehicle is already defined in Table 4.1.1a using "side slope stability", "dynamic balance", "evasive maneuver test" and "J turn test criteria". Reject: if required due to suspension design to meet performance requirements at the manufacturer's discretion.	
145	KB 4	Appendix A Amendment: A4.1.5 Unapproved options list	Remove 8g from list.	These controls are interpreted to be manual backup controls not primary controls. Therefore they should be allowable options for	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				selection by the purchaser. Accept	
146	KB 5	Appendix A Amendment: A4.1.5 Unapproved options list	Remove 8i from list.	Some departments may want to have the capability of operating the controls from either the operator's position or a crew position based manpower situations. Reject: Secondary controls not required.	
147	TC 24	Annex B	**A. The following are approved options and require no further justification.** "Lubrication - Continuous duty cycle lubrication systems for suspension parts have shown the ability to extend the time before repair and maintenance is required on over-the-road as well as heavy excavation equipment. The installation of this type is in line with the FAA's goal of extending vehicle service life." Comment: We request that the item be revised to reflect all lubrication joints on a vehicle including hose reels, roof turrets, bumper turrets, low attack turrets and High Reach Extendable Turrets. The revised sentence would read "Continuous duty cycle lubrication systems for all components requiring lubrication on a vehicle have shown the ability to extend the time before repair and maintenance is required on over-the-road as well as heavy excavation equipment.	Para. 11k. in the -10C reads "Includes as optional, the installation of continuous duty cycle lubrication systems for suspension lubrication points and other mechanical equipment joints to increase the duty cycle of components and extend the useful life of the vehicle. Accept:	
148	TC 25	Annex B	**A. The following are approved options and require no further justification.** "Air Conditioning"	Air conditioning is an allowable option in 7e. Accept	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Comment: We suggest that this item be deleted from this section in its entirety.		
149	TC 26	Annex B	**A. The following are approved options and require no further justification.** "The election of a "pintle hook" in addition to "two towing eyes…" Comment: We suggest that this item be deleted from this section in its entirety.	As written, the wording in the first column notes that the pintle hook would be provided in addition to "two towing eyes…" while the wording in the second column notes that "The substitution of it (pintle hook) for the two rear-towing hooks/eyes…". A pintle hook is already an allowable addition (A4.1.5 1b.) to "at least two large two eyes or tow hooks" in 4.8 (Towing Connections). Accept	
150	TC 27	Annex B	**A. The following are approved options and require no further justification.** "Windshield deluge system" Comment: We suggest that this item be deleted from this section in its entirety.	A windshield deluge system is an allowable option in 1d. Accept	
151	TC 28	Annex B	**A. The following are approved options and require no further justification.** "Means to keep brake system air reservoir up to operational pressure…" "House air	The wording change will more accurately reflect the intent of the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			fitting" Comment: We suggest that the words "House air fitting" be changed to "Air inlet on vehicle for use with house air compressor	item Accept	
152	TC 29	Annex B	**A. The following are approved options and require no further justification.** "Hoisting System" "Lift system required: Manual: _____ Electric: _____ Comment: It is impractical to give a sponsor the option of selecting either a manual or an electric system as a choice may not be available on a manufacturer's ARFF vehicles. We suggest an amendment reading "A manual or electric lift system capable of operation from the ground shall be provided."	Each manufacturer's standard lift system is different by design, and may be either manual or electric. Accept in principle	
153	TC 30	Annex B	**B. The following clarifications are specifically noted in the AC as purchaser options that require approval by the local FAA Airports District or Regional Office.** "Water Reservoir, Pump and Piping… Materials compatibility with local water characteristics – This provision is not intended to involve the purchaser in the selection of materials. It is, however intended to minimize the lifetime costs of vehicle ownership by alerting both the manufacturer and the purchaser of the need to identify the most likely sources of water to be used in the ARFF vehicle and to ensure that the properties of that water and the materials selected by the manufacturer for tank fabrication and the related piping are compatible. Airport ARFF water supply has unusual characteristics: Yes: _____ No: _____ Identify unusual properties:"	Water reservoirs, pumps, and piping are chosen by manufacturers to minimize the possibility of corrosion and component failure. Accept: AC 150\5210-6 Supplies information on water sources and content.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Comment: This item should be deleted in its entirety as it is entirely subjective with no description of which specific "water reservoir, pump and piping" modifications would have to be made by a manufacturer.		
154	TC 31	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**1e.** "Training video tape covering the operation of the vehicle" Comment: This item should not be an option but should be included as an integral part of the on-site training described in the Amendment 6.1.5.	Including the item as a part of the training package would provide better training. Rejected: Already automatically approved	
155	TC 32	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4c.** "Auxiliary generator(s) installed in accordance with NFPA 1901, Chapter 23" Comment: Can the sponsor specify the capacity of the auxiliary generator?	Having a manufacturer provide its standard auxiliary generator will reduce cost. Accept	
156	TC 33	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4e.** "High-intensity spotlight(s) mounted on the primary turret nozzle(s), with controls located in the cab instrument panel" Comment: We request that the option be amended to define the number of spotlights that can be provided and to clarify whether the light(s) should be a 12 volt halogen or a 12 volt High Intensity Discharge (HID) type. A suggested sentence would be "One or two (specify number) 12 volt halogen high intensity spotlight(s) or one 12 volt High Intensity Discharge (HID) (specify type) light(s) mounted on the primary turret nozzle(s), with controls located in the cab instrument panel"	Change would be made to provide clarification. Reject: Lighting packages are determined by the sponsor within the vehicle's capability.	
157	TC 34	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4f.** "Two high-intensity type floodlights, mounted on each side of the vehicle" Comment: There are many types and styles of floodlights that would meet this requirement. May a sponsor specify the type and style of light required or can the manufacturer provide his standard high-intensity type floodlight?	Having a manufacturer provide its standard style of light for this option will reduce cost. Reject: Lighting packages are determined by the sponsor within the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				vehicle's capability.	
158	TC 35	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4g.** "Two high-intensity fog-type driving lights mounted on the front bumper" Comment: We request that the option be amended to allow lights which are mounted on the front of a vehicle, but not necessarily on the front bumper. A suggested sentence would read "Two high-intensity fog-type driving lights mounted on the front of the vehicle"	The manufacturer would be allowed to provide lights based on its particular vehicle design. Reject: Lighting packages are determined by the sponsor within the vehicle's capability.	
159	TC 36	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4h.** "Two high-intensity driving lights mounted on the front bumper" Comment: We request that the option be amended to allow lights which are mounted on the front of a vehicle, but not necessarily on the front bumper. A suggested sentence would read "Two high-intensity driving lights mounted on the front of the vehicle"	The manufacturer would be allowed to provide lights based on its particular vehicle design. Reject: Lighting packages are determined by the sponsor within the vehicle's capability.	
160	TC 37	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4i.** "Two high-intensity floodlights on the rear of the vehicle" Comment: We suggest that the option be amended to read ""Two high-intensity floodlights on the top rear of the vehicle with a switch on the instrument panel in the cab. These lights shall also be activated when the vehicle transmission is in reverse gear."	The revised sentence would define the location of the lights better, and having the lights activate in reverse would provide better visibility when backing. Reject: Lighting packages are	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				determined by the sponsor within the vehicle's capability.	
161	TC 38	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4j.** "Map lights on each side of the dash; a control switch on the instrument panel in the cab for control of the lights" Comment: We request that the sentence be amended to allow the use of an alternative means of installing map lights which is common in the automotive industry. The revised sentence would read "Manufacturer's standard map lights, which may be either one map light on each side of the dash with a control switch on each light or one switch for both lights on the instrument panel; or ceiling mounted map lights with a control at each light."	Allowing a manufacturer to provide its standard map light installation will reduce cost. Reject: Lighting packages are determined by the sponsor within the vehicle's capability.	
162	TC 39	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4k.** "Rotating beacon-type lights on the top deck and visible for 360 degrees in the horizontal plane; a control switch on the instrument group panel in the cab for control of the light." Comment: We suggest that the option wording be amended to read "Vehicle manufacturer's standard rotating beacon-type light(s) or standard rotating beacon type mini-lightbar(s) on the top deck and visible for 360 degrees in the horizontal plane; a control switch on the instrument group panel in the cab for control of the light(s)."	Allowing a manufacturer to provide its standard rotating beacon type lights or mini-lightbars will reduce cost. Reject: Lighting packages are determined by the sponsor within the vehicle's capability.	
163	TC 40	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**4l.** "Strobe-type light(s) on the top deck and visible for 360 degrees in the horizontal plane; a control switch on the instrument group panel in the cab for control of the light(s)." Comment: We suggest that the option wording be amended to read "Vehicle manufacturer's standard strobe-type light(s) or standard strobe-type mini-lightbar(s) on the top deck and visible for 360 degrees in the horizontal plane; a control switch on the instrument group panel in the cab for control of the light(s)."	Allowing a manufacturer to provide its standard strobe-type lights or mini-strobe lightbars will reduce cost. Reject: Lighting	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				packages are determined by the sponsor within the vehicle's capability.	
164	TC 42	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**5e.** "Spare tire(s)" Comment: We suggest the option wording be revised to read "One spare tire and wheel/rim assembly provided with but not mounted on the vehicle."	Using the wording from the -10C AC will clarify that only one spare tire and wheel can be provided which will reduce cost. Accept	
165	TC 43	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**5f.** "Bead locks on tires and rims" Comment: We suggest the option wording be revised to read "Bead locks on tires and rims including the spare tire and rim that option is requested."	Enhance interchangeability of spare tires and wheels as all tires and wheels will match. Accept	
166	TC 44	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**6a.** "Air brake reservoirs drain valve(s) actuated by the driver from a location or compartment not requiring a creeper to access the actuator" Comment: We suggest that an amendment be written making access to air reservoir drain valves a standard item rather than a selectable option. The sentence could be revised to read "Air brake reservoir drain valve(s) shall be located at the lowest point of the vehicle and be accessible from the side(s) of the vehicle."	Standard in Para. 32b in the -10C AC. It will be more likely that the drains will activated on a regular basis if they are accessible from the side of the vehicle instead of having and individual look for a creeper to access them from under the vehicle. Reject: Already automatically approved	
167	TC	Annex B	**7a.**	This feature was	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	45	A4.1.5 – Miscellaneous Comments for Approved Options	"Tilt and telescoping steering wheel" Comment: A tilt and telescoping steering wheel has become a standard feature in the automotive industry, whether on cars or trucks. Considering the number of different driver who could drive an ARFF vehicle, this item should be a standard featurerather than a selectable option.	standard in Para's.27 and 33e. of the -10C AC. Reject: Already automatically approved	
168	TC 46	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**7f.** "Air-suspension-type driver [passenger(s) seat(s), with vertical, fore and aft adjustment" Comment: We suggest that the description be amended to read "Air-suspension-type driver [passenger(s) seat(s), with vertical, fore and aft adjustment" on a vehicle without a high mobility suspension"	Air suspension seats are not required on a vehicle equipped with a high mobility suspension. Reject: Already automatically approved	
169	TC 47	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8b.** "Automatic foam proportioning system, permitting use of 3 percent and 6 percent foam concentrates automatically when selected (change of proportioning plates not required)" Comment: This item is not one that is commonly used. Allowing this to be a selectable option means that a manufacturer would have to design another foam system in addition to providing the more common around-the-pump and electronic systems available today. We suggest that the sentence be revised as follows: "A manufacturer's automatic foam proportioning system, permitting use of 3 percent and 6 percent foam concentrates automatically when selected (change of proportioning plates not required)" is an acceptable means of proportioning foam."	Limiting the number of foam proportioning systems to the ones commonly used by each manufacturer. Reject: Already automatically approved	
170	TC 48	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8d.** "Foam tank drain valve(s), drain line, and hose that facilitate draining the tank into specified container(s) positioned on the ground within 3m (10 ft) in either horizontal direction of the foam tank drainage system" Comment: We request that this item be amended to clarify what is meant by the words "in either horizontal direction of the foam tank drainage system."	Will provide clarity and better understanding of what is required. Reject: Language change is not necessary	
171	TC	Annex B	**8e.**	There is no selectable	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	49	A4.1.5 – Miscellaneous Comments for Approved Options	"Manually operated roof turret with controls located in the cab, the operation force of the controls requiring less than 134.4 N (30 ft-lb) including in-cab indicator of turret elevation and azimuth" Comment: We suggest this item be amended, moving it to the options "not approved for funding."	option to provide manual cab controls for bumper turrets, whether a low flow secondary type or a high flow primary type. There is also no option allowing manual controls in the cab for a High Reach Extendable Turret. With the prevalence of electronic joystick turret controls, manual controls are not necessary Reject: Will remain automatically approved	
172	TC 50	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8f.** "Manually operated roof turret with controls located on the cab roof platform, the operation force of the controls requiring less than 134.4 N (30 ft-lb) including in-cab indicator of turret elevation and azimuth" Comment: We suggest this item be amended, moving it to the options "not approved for funding."	Roof turret design has advanced to the point where manually operated roof turrets are seldom used. Requiring a manufacturer to offer numerous styles of turrets would be cost prohibitive. Reject: Will remain automatically approved	
173	TC 51	Annex B A4.1.5 – Miscellaneous Comments for	**8h.** "Manually override of roof turret functions in the cab not exceeding 134.4 N (30 ft-lb) operation forces"	There is no selectable option to provide manual cab controls for bumper turrets,	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
		Approved Options	Comment: We suggest this item be amended, moving it to the options "not approved for funding."	whether a low flow secondary type or a high flow primary type. There is also no option allowing manual controls in the cab for a High Reach Extendable Turret. With the prevalence and reliability of electronic joystick turret controls, manual overrides are not necessary Reject: Will remain automatically approved	
174	TC 52	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8m.** "Video recorder for color and/or FLIR camera(s) Comment: We suggest the option wording be amended to read "Digital video recorder for color and / or FLIR camera(s)" **Added to AC**	Digital video recorders have become the standard in the industry with video tape recorders becoming obsolete. Accept	
175	TC 53	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8o.** "Pre-connect handlines and nozzles (water/ foam / combined / auxiliary agent / mounted parallel entrained streams" Comment: This item conflicts with 4.19 which reads "Preconnected handlines shall be those handlines for discharging water or foam, or both, that are specified by the purchaser as intended for use as primary ARFF equipment. All other handlines that are installed on the vehicle shall not be considered as being preconnected handlines." The definition of just what an allowable preconnected handline is needs to be defined. **ADDED to the AC**	To provide clarity. Accept	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
176	TC 54	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8s.** "Fire system pressure gauge / light / warning on the cab instrument panel grouping and / or on the side structural control panel" Comment: We request that the option wording be revised to read "Fire system pressure gauge / light / warning on the cab instrument panel grouping and on the side structural control panel if that option is requested"	The installation of this item on the cab instrument panel grouping should be standard. Reject: Language change unnecessary	
177	TC 55	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8t.** "Foam-liquid tank level gauge / light / warning on the cab instrument panel grouping" Comment: We request that the item be amended to allow the use of an LED indicator and to make it standard which is the industry norm. The sentence would be revised to read "Foam-liquid tank level gauge or indicator / light / warning on the cab instrument panel grouping."	The change would allow the use of a foam tank level indicator other than a gauge / light / warning and would allow the driver to immediately know how much foam is available. Reject: Language change unnecessary	
178	TC 57	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8u.** "Remote foam / water liquid level gauge / light / warning on the side panel and / or supply / service locations" Comment: We request that the item be amended to allow the use of LED indicators and to make them standard which is the industry norm. The sentence would be revised to read "Foam-liquid tank level gauge or indicator / light / warning on the cab instrument panel grouping."	This change would allow an individual using the side foam / water fills to immediately know how much foam and water are in the respective tanks. Reject: Language change unnecessary	
179	TC 58	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8v.** "Bumper turret and / or ground sweep valve controls located in the cab" Comment: This item should be removed from the allowable option list and made standard when either a bumper turret or ground sweep is selected.	The driver needs immediate access to a bumper turret ground sweep valve control.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Reject: Will remain automatically approved	
180	TC 59	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8w.** "Undertruck nozzle valve control in the cab" Comment: This item should be removed from the allowable option list and made standard when the undertruck nozzle option is selected.	The driver needs immediate access to the undertruck nozzle valve control. Reject: Will remain automatically approved	
181	TC 60	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8x.** "Auxiliary agent pressurization control on the cab instrument grouping" Comment: We suggest that the option wording be amended to read "Dash pressure gauges/indicators shall be installed that, when the auxiliary agent system (dry chemical or clean agent) is activated, will allow the vehicle operator to determine the propellant reservoir status as well as the agent system operating pressure."	Changing the sentence will provide clarification. This wording was used in Para. 70f of the -10C AC. Reject: Will remain automatically approved	
182	TC 61	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**8y.** "Remote mounted instrument and control panel (structural panel)" Comment: The definition of a "structural panel" needs to be clarified as the limited structural panel / system that has been available as an option in the past on ARFF vehicles does NOT meet the requirements for a structural panel / system required for a Class A NFPA 1901 structural pumper. We suggest that the following wording which was used in the -10C would be appropriate: "The purchaser may specify a limited structural exterior panel, which includes – (1) Engine instruments and pump controls, including a tachometer, an oil pressure gauge, a temperature gauge, and a pressure control; pump shift; manual metering control; two compound suction-pressure gauges; water tank isolation valve; and panel lights. (2) Either one or two 2-1/2 inch discharge valves shall be provided. Each discharge valve shall be provided with pressure gauge and bleeder. One manual metering control shall be provided.	Having a basic structural panel / system description will reduce cost. ACCEPT Definition of structural panel	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			(3) One 2-1/2 inch and one large diameter suction inlet connection with bleeder shall be provided, if specified. (4) A priming pump and reservoir shall be provided if specified."		
183	TC 41	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**Suggested New Item – Addition** "LED type light(s) or LED mini-lightbar(s) on the top deck and visible for 360 degrees in the horizontal plane; a control switch on the instrument group panel in the cab for control of the light(s)." Comment: We suggest that this item be added as an alternative option to rotating beacon or strobe type lights.	More customers are requesting LED lights because of the lower AMP draw. Reject: LED's are not currently restricted from use.	
184	TC 56	Annex B A4.1.5 – Miscellaneous Comments for Approved Options	**Suggested New Item – Addition** "Water tank level gauge or indicator / light / warning on the cab instrument panel grouping" Comment: We suggest that this item be made standard as it is the industry norm.	The change would allow the driver to immediately know how much water is available. Reject: already standard under 4.11.4.4	
185	JAW 38	Appendix A	Only one each of the following training devices is eligible for federal funding assistance per location. Training devices are a physical Aircraft Skin Penetration Device and a Computer-based Simulation Training system.	Comment Only	
186	JAW 38	Appendix A	AMEND: (location) This statements needs to be explained. Is it the airport or the fire station that the truck is deployed from?	Since the FAA will fund an elevated device for each fire station on the airfield, will it purchase one or the other training system with the purchase of each truck elevated boom system? This needs to be clarified. Accept	
187	KB 3	Appendix A	Move the entire first paragraph under "1. Aircraft Skin Penetration Training Device" to the lead in section above that header.	This paragraph leads into the section of both	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				types of training devices not just the one in paragraph #1. Accept	
188	DP 8	Appendix B 1st Worksheet	The election of a "pintle hook" in addition to a towing eye..." | Towing other vehicles with an ARFF vehicle is not a common practice. However, some operators believe that the pintle hook enhances operational flexibility. The substitution of it for the rear-towing hook/eye, that are intended to facilitate ARFF vehicle recovery in the case of breakdown or a stuck vehicle, does not impact the vehicle's fire fighting performance or, to any great extent, its recoverability. | Rear towing eye: OR Pintle Hook: Yes _____ No _____ | Pintle hook: Yes _____ No _____	One towing hook/eye is sufficient. There is no empirical scientific evidence that supports a need for two hooks/eyes mounted on the front and rear of the vehicle. This two hooks/eyes requirement was removed from the old NFPA 414 document. REJECT: Item removed from Appendix B	
189	PHu 14	Appendix B 1st Worksheet	The proposed APPENDIX B provides a table containing a list of options available for ARFF vehicles in addition to those discussed in NFPA 414 Annex A. The proposed text states that the "following are approved options and require no further justification. Options not in this list are not authorized for the participation of federal funding." The text above the table shows a blank line and a notation under the line for the "Name and Title of FAA Approving Official." It is not clear why there is a need for an approving official if these options are pre-approved and require no further justification.	Accept	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
190	PHu 15	Appendix B 1st Worksheet	Some of the subsystems in the table are not provided with any rationale for the position. We believe that the text for the rationale should be provided in each case.		
191	PHu 16	Appendix B 1st Worksheet	The format used in the 3rd and 4rth columns for purchaser's selection in the two assembled classes of vehicles is inconsistent. It is not clear why some of the entries in the column for "Purchaser's Selection Class 1, 2 and 3" (3rd column) are blank and some have the same text as the 4rth column.	Reject: Self Explanatory	
192	PHu 17	Appendix B 1st Worksheet	The rationale for the entry regarding "Means to keep the brake system air reservoir up to operational pressure…" lacks any definitive rationale. It is not clear why this would be dependent on the local resource requirements, as it currently states. Nor is it clear how "cost effectiveness" is related to the "as-built" vehicle performance. The rationale concludes by stating that "It is viewed as a local operational decision." This would seem implicit to each of these subsystems and should not need to be stated.	Reject: Self Explanatory	
193	PHu 18	Appendix B 1st Worksheet	Regarding the entry on maintaining air reservoir pressure, it would seem that it is essential to ensure the air reservoir is kept at operational pressure, or the vehicle would have to remain in the fire station until the air pressure is up to a safe level, which would delay the vehicle response time.	REJECT: Operational Procedure	
194	PHu 19	Appendix B 1st Worksheet	The two subsections A & B under APPENDIX B should be clarified to use a consistent grouping of vehicles. It appears that subsection A addresses Class 1-5 vehicles (in 2 subsets of 1-3 and 4 & 5, which are defined on page 1 of the draft AC) whereas subsection B divides the vehicles in those having from 60 to 528 gallons and those having from 528 to 1,585 gallons water capacity. This would encompass vehicles smaller than Class 1 vehicles (60 – 120 gallons) up to Class 4 vehicles, leaving Class 5 vehicles unaddressed.	Accept: Previously identified	
195	DP 9	Appendix B 2nd Worksheet	Extendable Boom -Option | FAA will fund one extendable boom per station at each Index B through E airport. | Extendable Boom: Yes _____ No _____ In all of the columns at the bottom of the page, the phrase "High Reach Extendable Turret" or "Extendable turret" should be changed to "Extendable Boom" to remain consistent with the new terminology identified in NFPA 414 Appendix A, A3.3.64.2. The turret is not extendable. It is mounted to an extendable boom that is moved on a	**Ref: A.3.3.64.2 Primary Turret.** "…There are several types of booms. The "single axis boom" is remotely operated on a single axis. A "single axis extendable boom" is remotely operated and is capable of being moved on a single axis	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			single or multiple axes.	that can also be extended. A "multiple axis extendable boom" is capable of being extended and operated on both a horizontal and a vertical axis." The incorrect and subjective term "High-Reach Extendible Turret" was supposed to be changed in the last revision of NFPA 414 but was overlooked. ACCEPTED in principle	
196	PHu 20	Appendix B 2nd Worksheet	The entry for DEVS provides a rationale that approves the inclusion of FLIR for night vision but states that justification is needed for navigation and/or tracking systems. This feature should not require justification as we have commented earlier, as it is an excellent way to facilitate a rapid ARFF response.	Reject: Previously Completed	
197	PHu 21	Appendix B 2nd Worksheet	ALPA supports fielding a robust ARFF response at all airports with air carrier operations as it will positively impact airport safety. We look forward to continue working with the FAA and other interested parties with respect to this issue.	Comment only	
198	KG 7	Appendix B Worksheet for Subsystem Component Selection, Heated Mirrors:	Heated mirrors should be allowed on Class 1, 2, and 3 vehicles.	This is true for the same reason they are allowed on Class 4 and 5 vehicles. They are necessary to see clearly	

ID#	Source	Location	Comment	Justification	Note
				in bad weather. They are also standard equipment on most commercial chassis. Accept	
199	JAW 39	Appendix C	**APPENDIX C** Information Rational: One omission in this FAA document and the NFPA document is that it contains no firefighting performance standard or guide by which vehicles are measured or new technology may be tested against to determine the validity of any manufacturer's claim that their product is better in fire extinguishing or fire knockdown than current specified systems. There is currently sufficient information gathered in historic documentation published by the FAA and other significant foam application research efforts such as DOD, USAF, US NAVY documentation that validate a minimum performance testing requirement for each of the classes of the small combined agent vehicles or Rapid Intervention Vehicles (RIV). The performance chart proposed (see chart APP-C Minimum Fire Performance) validates the current level of fire protection that might be expected as well as a means to measure newly proposed technologies that are proposed for small commercial airport use. The performance fires that are proposed relate to fire sizes developed and tested from previous FAA research efforts. In addition, mathematical calculations of current Theoretical and Practical Critical Fire Areas based on the latest National Fire Protection Association (NFPA) *Standard 403, Aircraft Rescue and Fire-fighting Services at Airports*, 2003 Edition[6], for the several different sized aircraft that would be encountered at smaller FAA index airports were made. Specifically, airport Indexes A and B were chosen based on operations where these classes of trucks might be currently utilized. The report called *FAA ASD-TR-73-13 Firefighting Effectiveness of Aqueous-Film-Forming-Foam (AFFF) Agents,* Dated April 1973, Author George B. Geyer [7]contains additional information on specific performance of	The FAA has for a long time needed some inexpensive method to evaluate new techniques for fire fighting. The FAA currently has no method of evaluating performance claims of manufacturers without a costly research and development effort. With a fire performance standard, they can make rational judgments based on technical information that they are provided. The FAA could ask to look at a minimum of available technical documentation and video events to help make relatively inexpensive determinations for future purchases without entering into costly research and	

AC 150/5220-10 Comment Resolution Matrix

<table>
<tr><th>ID#</th><th>Source</th><th>Location</th><th>Comment</th><th>Justification</th><th>Note</th></tr>
<tr><td></td><td></td><td></td><td>AFFF products on groups of fire in the size and scope of this proposal. The appendix to this report contains a list of documents that were utilized and researched to establish these proposed performance requirements

ADDITION:
APP-C Minimum Fire Performance

<table>
<tr><th>Truck Classification</th><th>Fire Area *</th><th>Application Rate of Agent Foam **</th><th>Time Maximum Application for Total Extinguishment</th></tr>
<tr><td>Class 1</td><td>70 Foot Diameter, 3847 Sq. Ft.</td><td>60 GPM, Hand Line</td><td>60 Seconds</td></tr>
<tr><td>Class 2</td><td>90 Foot Diameter, 6360 Sq. Ft.</td><td>150 GPM, Turret</td><td>60 Seconds</td></tr>
<tr><td>Class 3</td><td>100 Foot Diameter 7853 Sq Ft.</td><td>250 GPM, Turret</td><td>60 Seconds</td></tr>
<tr><td></td><td>125 Foot Diameter 12173 Sq Ft.</td><td>750 GPM Turret</td><td>60 seconds</td></tr>
<tr><td>Class 4</td><td>!00 Foot Diameter *** 7853 Sq. Ft.</td><td>750 GPM Turret</td><td>30 seconds***</td></tr>
<tr><td></td><td>150 Foot Diameter 17,672 Sq Ft.</td><td>1250 GPM Turret</td><td>60 Seconds</td></tr>
<tr><td>Class 5</td><td>100 Foot Diameter *** 7853 Sq Ft.</td><td>1250 Turret</td><td>25 Seconds***</td></tr>
</table>
</td><td>development projects for each and every new piece of equipment proposed for FAA funding.

REJECT: Information provided refers to acceptance criteria and is not applicable to vehicle design document.</td><td></td></tr>
</table>

ID#	Source	Location	Comment	Justification	Note
			* Fuel for this performance fire test should be Aviation Grade Jet A fuel, minimum of 1,000 gallons per fire. * * Application of dry chemical permitted to aid in total extinguishment in dual or encapsulated foam application to meet these performance tests is permitted. * * * Note: There are not many hydrocarbon fuel facilities left in the US that can do a 125 to 150 foot diameter fuel fire demonstration. Therefore the time to extinguish the fire was reduced since the application rate of fire fighting foam on these fires are much higher. Information Rational: Having performance standards for firefighting equipment based on extinguishing capability would provide the FAA an opportunity to perform a cost benefit analysis. It is important to the FAA to determine whether a particular new technology's monetary increase in cost is worth the value of the performance gain provided. Example: The increase cost in providing expanded compressed air foam on a stored pressure vessel system is less than a 10% in the cost of a Class 1 through Class 3 vehicle. Yet the finished foam production of expanded foam at >6 to < 12 to 1 provides approximately three times as much finished foam production as a standard stored pressure vessel system. Airports that have these smaller vehicles may have limited man-power as well as mutual aid backup and re-supply capabilities, thus having three times the finish foam product capability would be a desirable option. The essential elements in the suppression of aircraft fires are: early detection, notification of the fire service, rapid vehicle response to the site of the distressed aircraft, and the effective use of Aircraft Rescue and Fire Fighting (ARFF) equipment and agents to extinguish the fire. Although all of these factors are required for an efficient and successful rescue mission, the element of vehicle response time to the accident is probably the most crucial. These classes of Combined Agent/Rapid Intervention Vehicles (RIV) with their small size and less weight provide quick acceleration, fast maneuverability, and ultimately a quick and hopefully successful knockdown and extinguishment of the smaller aircraft fires expected. Larger airports utilize these same vehicles for their		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			speed and ability to arrive early for intervention in the fire growth. The intent is to prevent a small insipient fire from growing into a large out of control post crash fuel fire. Airports that meet the requirements for an FAA Index A can meet their fire response requirement solely on the basis of the use of one of these smaller vehicles, thus having more finish foam production is an important factor in their fire response options.		
200	JAW-CL[viii] 1	General	It is my judgment and conclusion that this rewrite, while certainly necessary, has not resulted in a valid, supportable or acceptable document. Those individuals who will try to use this document will find it difficult and confusing to follow since they must go back and forth from one document to another.	Historically, the NFPA document is not generally used by the US airports to specify either major or small combined agent vehicles. Adding to the possible future confusion is the large number of references to other NFPA and Society of Automotive Engineering (SAE) documents that may come into play during the bid process. This includes 11 NFPA documents and 20 other reference documents listed in *NFPA 414 Appendix F.* In addition, at least 21 FAA related documents (see our comments NFPA 2.1) related to reference materials which should be added to the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Advisory Circular but were not referenced by the *NFPA 414 Standard*. Specific example: FAA'S Advisory Circulars *A/C 150/5220-10C and 150-5110-19* were always clear and concise documents. The *10 C* document was related to major ARFF vehicles and the *Dash 19* document was related to the smaller, commercially available chassis vehicles used as combined agent or Rapid Intervention Vehicles (RIV) by airports. Each document contained specific information only related to the specified type of vehicle contained within the documents: one for large ARFF vehicles and one for the smaller combined agent vehicles. The FAA's Airport District	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Offices (ADO) was able to easily disseminate information and make fair interpretations from these documents. I fear that the FAA's Certification Inspectors will find it nearly impossible to interpret or counsel airports on what equipment/components are recommended particular to their needs using the multiple NFPA documents. The FAA has permitted the use of small, commercially available chassis vehicles at smaller index airports for many years. These Class 1, 2 and 3 commercial chassis type vehicles are small and maneuverable enough to work in parking garages plus maneuverable in and around terminal areas.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				They easily meet the needs of smaller index airports at a much lower cost than a full ARFF major vehicle. Large, custom chassis major ARFF vehicles do not have the flexibility and maneuverability of these smaller vehicles in tight places. Even larger airports use these smaller vehicles for rapid intervention in areas where it is difficult to get a large truck into quickly. By insisting on tying the A/C document to the NFPA, the FAA is effectively acknowledging that all related NFPA codes will be adopted automatically as supporting documents unless specifically excluded by the FAA. Is this really what the FAA wants to do? The FAA has funded	

ID#	Source	Location	Comment	Justification	Note
				research related the making the ARFF emergency response for over 30 years. NFPA has no such research or testing capability and much of the controversial statements that appear in *NFPA 414* are the results of "opinions" of the NFPA Aviation Committee members, not substantiated by FAA research or testing. There is no informational reference to any supporting documentation or testing to support much of the aviation specific direction that the *NFPA 414* document requires. *It is essential that the FAA continues to use the results of its own testing and other validated conclusions to confirm its own documents.* The Federal Aviation Administration is part of the larger	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Department of Transportation (DOT). This organization is a key role player in the development and implementation of the Federal Motor Vehicle Safety Standards (FMVSS), which regulate numerous components and performance characteristics of commercial cabs and chassis. These include Crash Avoidance, Crashworthiness, Post Crash Standards, and Other Regulations (see attached document). Many of these standards are in conflict with the current *NFPA 414* recommendations and thus would prohibit the use of commercial available chassis in the construction of small fire fighting vehicles. Commercial chassis have been used successfully for many years for Class 1, 2,	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				and 3 vehicles. The federal safety and performance regulations are equal to, or superior to, the limited references to these issues that appear in the *NFPA 414* documents and should take precedence over the NFPA requirements. Comment Only	
201	KG 8	General	I completely agree with the adoption of NFAP 414 where possible and also the combining of 10C and -19 into one document.	Comment only	
202	MA[ix] 1	General	Airports Division, Western-Pacific Region have no comments on above referenced final draft AC.	Comment only	
203	MHu 2	General	It is our concern that if circular is modified and accepted in its proposed form, manufacturers of ARFF vehicles will be saddled with unrealistic developmental costs that will defeat the stated purpose of the FAA to reduce costs and will have the undesired effect of causing more protests on specifications released for competition. It will also make the writing of ARFF vehicle specifications unnecessarily complicated for the entities that will be purchasing vehicles. Some examples of the problems this proposed document will create: In the case of the proposed class 1, 2, and 3 vehicles the standard as proposed all but eliminates a commercial chassis which places manufacturers in the position of having to redesign these vehicles to accommodate a specialized chassis similar to those used on the 1500 gallon and above "heavy" ARFF appliances. In the case of the 1500 gallon and larger vehicles the proposed standard further muddies the water by introducing vague and non performance driven language such as rear tag axles and increases in gallonage in 500 gallon increments.	Comment only	
204	MHu	General	It also appears to us that certain standards have been included to accommodate	Comment only	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	3		certain manufacturers at the expense of other qualified builders of ARFF appliances. This creates a situation where those manufacturers could benefit by being the only ones able to respond to a bid and effectively excluding any legitimate competition. The idea of the FAA circulars as we understand them is to provide for a fair and open procurement process allowing as many qualified manufacturers to participate as possible thereby giving the government the best value for its dollar when airports use federal tax dollars to purchase ARFF equipment.		
205	MHu 4	General	Furthermore, the allowance of the individual ADOs to interpret and approve additional features on ARFF vehicles borders on the ludicrous, as it is our experience that each ADO interprets the circular differently and to this point have not demonstrated the ability to grasp the complexity of ARFF vehicles and provide for fair and open competition. In this instance we want to make it perfectly clear that this is unacceptable and a standard must be set where the ground rules of what is or is not to be placed on these vehicles is driven by upper echelon management within FAA headquarters to assure all ADOs play by the same set of rules.	Comment only	
206	MHu 5	General	It appears on reading the proposed modified standard that the input and suggestions voiced by those in attendance at the rewrite forums have either been modified in way as to make them unrecognizable or wholly ignored by the FAA in favor of a wholesale adoption of the NFPA 414 standard. It is our position that the NFPA document is a flawed document written on emotion rather than fact and that the committee who wrote the current NFPA standard was influenced by individuals and corporate entities using the NFPA Committee in an effort to skew that document in a way that provides advantages to them alone. It's inclusion in the revised circular it lessens the validity of this proposed revision of the circular document and its relevance in setting standards for ARFF vehicles.	Comment only	
207	MHu[x] 1	General	The standing FAA document as currently written although not perfect, is at least written with a certain level of competency and attempts to address the manufacturing of ARFF vehicles in a way that provides for *performance based standards* allowing ARFF manufacturers to pursue their own design answers in the building of these highly complex vehicles. It appears to us that FAA is adopting NFPA 414 in a wholesale fashion with what appears to be not much thought. NFPA has been historically an advisory organization and fire departments have never been bound by the guidelines they have adopted. FAA on the other hand is a governmental agency charged with constructing and upholding standards and has historically been	Comment only	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			competent and even handed in its adoption of standards through out the aviation industry. There are many who would argue that that the NFPA committees are driven more by emotion and lobbying by entities that have agendas to pursue than by solid engineering principals. We question why the FAA has allowed itself to be influenced by the NFPA or corporate entities with their own agendas which appears to be the case in the adoption of the 414 standard.		
208	MM 8	General	Allow the non-primary turret to discharge at non-primary turret rate when doing the simultaneous agent discharge pumping test. Add a definition for non-primary or secondary turret. This is required when a customer truck has a roof and bumper turret that are both capable of primary turret rates but the pump is not rated to supply both and all other discharges at the same time. Suggested wording: Initiate discharge first through the primary turret and then through the ground sweep (**or optional secondary turret at applicable secondary discharge rate)**, primary handlines, and undertruck nozzles until all are discharging simultaneously in a straight stream. As each nozzle is turned on, observe the range along with the system pressure.	**NFPA 414 Reference** 6.4.7.4(3) REJECT: This performance criteria is sufficiently stated in the NFPA 414.0. Sufficiently covered in NFPA 414.0 Table 4.1.1(d) "Bumper turret can be used as the primary turret".	
209	MM9	General	Amendment: NFPA 414 has an error on the top speed - Table 4.1.1.(a) and (b) require >=70 mph and the etxt in 4.3.2.1 requires >= 65 mph. It has to be >= 7 mph per the last revision of NFPA - table was changed and text was not.	**NFPA 414 Reference** Table 4.1.1 (a) & (b) and paragraph 4.3.1.2.1 REJECT: 70 MPH is the standard and the NFPA has been notified of the discrepancy.	
210	PC1[xi] 1	General	Regarding A/C 150/5220-10d we respectfully submit that we feel that the DEVS "vehicle tracking/navigation subsystem" should be a required item versus an option as it presently stands. To support this, we offer the following points for consideration:	- The GPS based location of the ARFF vehicle, coupled with the moving map display and the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				ability to determine routes from the vehicle to the incident/required location, offers the only means of airfield wide navigation to the desired destination during low/no visibility. This is magnified in terms of its importance in very cold weather when the mandatory FLIR camera is challenged in terms of it ability to detect heat signatures en route. - It could be argued that while the mandatory FLIR camera allows one to see what is in front of them, it does not allow one to determine where on an airfield one is and to follow a route to a desired location.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				- The moving map display, when coupled with the ability to determine safe and efficient routes to desired locations, complete with audible and graphical messaging, is essential to supporting appropriate ARFF response times. - The typical cost of a system like this is perhaps 3-6% of the cost of an ARFF vehicle itself, and all of the installations ever to be made would be offset by the timely response and early extinguishing of one aircraft brake, tire or engine fire if it saved an a single commercial aircraft from being destroyed, human life and safety	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				being an unqualifiedly higher dividend. - Systems can be added to any vehicle, regardless of make and or manufacturer. - Modern systems are being constantly updated to include other industry driven features such as the inclusion of aircraft ELT signals, aircraft locations and the location of other airside vehicles, therefore dramatically improving ARFF situational awareness. - Several recent incidents demonstrate ARFF's difficulty in successful navigation to an incident during adverse weather conditions such as	

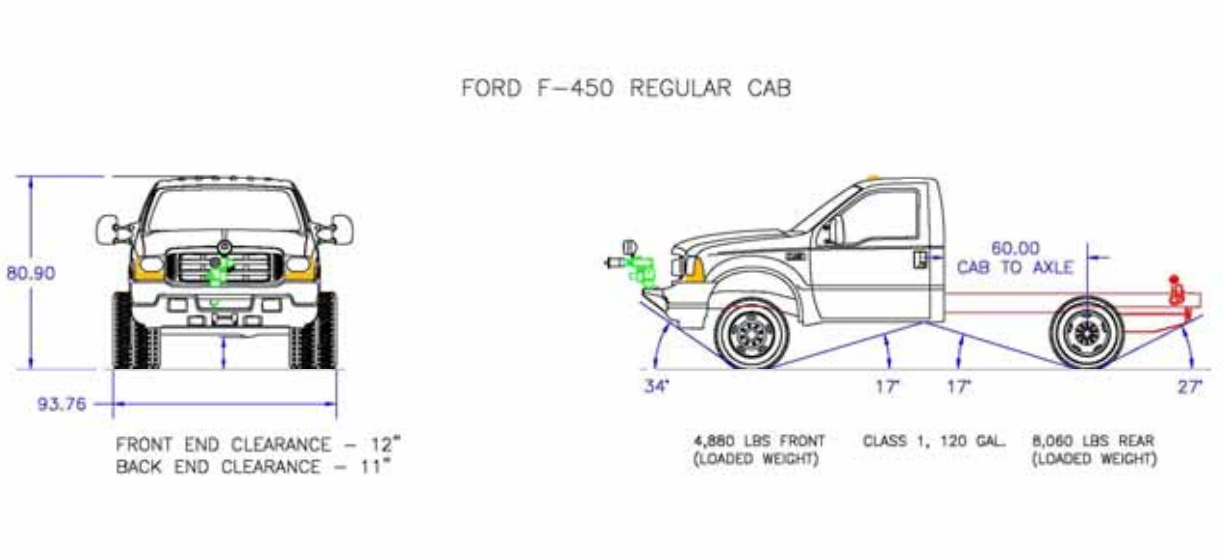
AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				snow, fog, heavy rain etc. - REJECT: Will remain an automatically approved option	
211	PDT 83	General	**Comment Only**	Terminology that does not give clear guidance or is ambiguous in interpretation should be eliminated or defined. Terms or phrases such as "where specified", "jurisdiction having authority" and "may" are discretionary terms that, without definition, leave much to interpretation. Comment Only	
212	PDT-CL 2	General	Instead of a clear and concise document that has been the norm for many years; multiple documents must now be referenced. The FAA's Airport District Offices (ADO) will no longer be able to easily assess the compliance of specifications that are submitted. The FAA's Certification Inspectors will find it nearly impossible to interpret or counsel airports on what equipment/components are recommended particular to their needs.	Comment Only	
213	PDT-CL 3	General	Due to the myriad of possible iterations of specifications and interpretations of standards, the FAA will be faced with an onslaught of formal protests potentially paralyzing the whole procurement process.	Comment Only	
214	PDT-CL 4	General	Manufactures of these trucks will find that they must address far more inconsistency and "customization" rendering any attempt at cost constraint moot. The likelihood that costs for these types of trucks will escalate immediately by 35% or more is a	Comment Only	

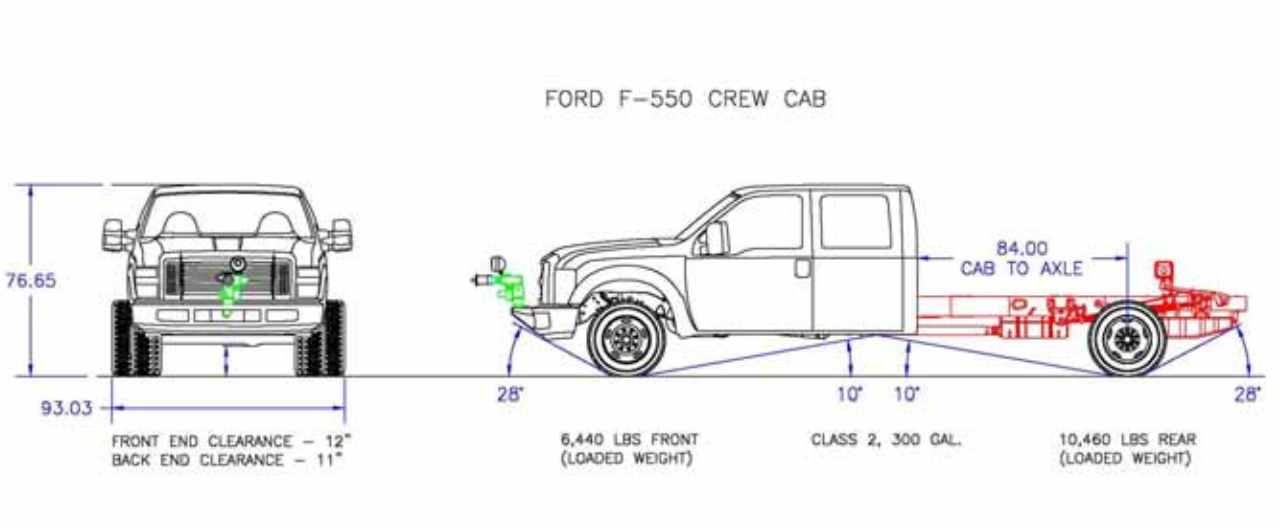
AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			very real possibility due to the fact that many more allowable components have been added through NFPA 414.		
215	PDT-CL 5	General	As this draft currently reads it will cause the complete dissolution of a segment of low cost alternative ARFF apparatus providers to smaller airports. Without significant changes, the use of commercial chassis will disappear with only very expensive and complex custom chassis and components to fill the void. For many years, low cost commercial chassis have been used for FAA Class 1, 2, and 3 vehicles. The cost effectiveness of commercial chassis is further enhanced as operators are inherently familiar with the operation and maintenance of these commonly available cab and chassis. Driver and operator training requirements are reduced as the commercial chassis is similar to many other vehicles operated by airport personnel. At many smaller airports, firefighting is one of several duties performed by personnel. They do not have the resources for dedicated professional fire fighters who can train on the more complex operation and maintenance of custom chassis. Further, Class 1 and 2 commercial chassis are small and maneuverable enough to work in parking garages plus in and around terminal areas. Large custom chassis do not have this flexibility. The flaw with NFPA 414 is that it treats nearly all aspects of vehicle performance the same whether it is carrying 60 gallons of water or 6,000 gallons. The few variances are not significant enough to allow for commercial chassis. Attached is a drawing showing some of the areas that we will be referencing about restrictions imposed on commercial chassis through out the document	Comment Only	
216	PDT-CL 6	General	By insisting on tying the A/C document to the NFPA the FAA is effectively acknowledging that all related NFPA codes will be adopted automatically as supporting documents unless specifically excluded by the FAA. Refer to the discussion below on refurbishing for an example of how this can occur. Further, excepting NFPA standards in whole or in part, defeats the intent of the legislative mandate that has been used to justify this rewrite and undermines the credibility of both the NFPA (by demonstrating their flawed process) and the FAA (by showing how incongruous the two documents are).	Comment Only	
217	PDT-CL 7	General	Finally, this draft effectively throws out in excess of thirty years of FAA funded research and real experience. NFPA has no such research or testing capability and much of the controversial statements that appear in NFPA 414 are the results of "opinions" of the NFPA committee, not substantiated by research or testing. There	Comment Only	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			is no reference to any supporting documentation or testing to support much of the aviation specific direction it requires. If the FAA is not going to use the results its own testing and other validated conclusions, who is left to assure that the content of this A/C is indeed defensible? This oversight calls into question the need (and funding) for an arm of the FAA to conduct fire research. The NFPA is a consensus (which by Webster's definition is defined as "a collective opinion") organization, which means that the process is subject to political pressure to modify those opinions without the requirement of empirical, reproducible and objective evidence.		
218	PDT-CL 8	General	 **Illustration 1. Typical Class 1 Chassis Cab showing loaded weights and dimensions.** REJECT: Proprietary Information and does not add value to the document.		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
219	PDT-CL 9	General	 REJECT: Proprietary Information and does not add value to the document. **Illustration 2. Typical Class 2 Chassis Cab showing loaded weights and dimensions.**		
220	PDT-CL 10	General	Federal Motor Vehicle Safety Standards (FMVSS) regulate numerous components and performance characteristics of commercial cab and chassis. These include Crash Avoidance, Crashworthiness, Post Crash Standards and Other Regulations (see attached document). Many of these standards are in conflict with NFPA 414 recommendations and thus would prohibit use of commercial vehicles. Commercial chassis have been used successfully for many years for Class 1, 2, and 3 vehicles. We feel that federal safety and performance regulations are equal to or superior to the limited references to these issues that appear in the NFPA 414 document and should take president over the NFPA requirements.	Comment Only	
221	PDT-CL[xii] 1	General	It is the opinion and belief of this company and industry as a whole that this rewrite, while arguably necessary, has not resulted in a valid, supportable or acceptable document. For all users of the document it will without question cause confusion, protests (both formal and informal), dramatically increased costs and a substantially greater effort to produce what heretofore was a reasonable and effective bid document. We believe the controversy being expressed by us and other	Comment Only	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			manufacturers stems from the fact that NFPA 414 has seldom been used as a specification document for ARFF vehicles purchased in the United States. To our knowledge, NFPA 414 has never been referenced in any of the 100 gallon to 500 gallon size vehicles purchased since the AC No. 150/5220-19 was published in 1993. The inactivity of this document simply means that it has not been put to the test as a guide for either manufacturers or end users. All of the questions and concerns that would normally be sorted out over the course of many years of use are coming to task at one time. Adding to the confusion are no less than 52 reference documents that may come into play during the bid process. This includes 11 NFPA documents and 20 other reference documents listed in NFPA 414 Appendix F. In addition we count 21 FAA related documents (see our comments NFPA 2.1).		
222	PHe[xiii] 1	General	The class 1, 2 and 3 vehicles traditionally have been manufactured on commercial chassis (Ford F-550, International 7400, etc.). However, the NFPA 414 standard would not allow use of traditional commercial chassis. The standard sets performance standards that cannot be met with current commercial chassis. 1. Weight distribution – The standard calls for a balance of 5% equal weight distribution between tires and a 10% weight distribution between axles. Commercial chassis typically have dual rear tires. While this is allowable by the standard, it does not allow for a corresponding change in weight distribution (typically 1/3 on the front axle and 2/3 on the rear axle). 2. Angle of approach and departure – Commercial vehicles are manufactured to meet Federal Motor Vehicle Safety Standards (FMVSS). The chassis manufacturer must meet these standards and the body builder is not allowed to make modifications to the chassis that would invalidate the FMVSS regulations. The Class 1 and 2 size commercial chassis cannot meet the 30 degree angle of departure and also be in compliance with FMVSS. 3. Braking tests – Commercial chassis are built to meet the braking requirements of FMVSS. There is no NATO evasive maneuver test or "J" turn test that corresponds to FMVSS regulations.	ITEM 1 ACCEPT ITEM 2: REJECT Previous requirement for FAA sponsored vehicles since 1993. ITEM 3: REJECT: No evidence available indicating the vehicle cannot meet the evasive maneuver/ J turn standards and the FMVSS requirements.	
223	TC[xiv] 1	General	We tried to focus our comments on changes (additions, deletions, etc.) to that document and not to AC 150/5220-10C as requested but found that was not possible. The existing -10C document is the result of an evolutionary process based on actual usage. We understand the need to "adopt industry standards to the extent practical", but question whether the decision to adopt NFPA 414 (2007) to the exclusion of the	Comment Only	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			-10C document was the correct one. Based on our review of the current Draft -10D and NFPA 414 (2007), it is possible that sponsors may now be more confused when writing specifications which in turn will result in a more difficult procurement process. The FAA has decided to create a "one size fits all document" by adopting 414 with minor changes. Using 414 will be a new experience for sponsors and we anticipate that when the first set of -10D bid documents is released, many questions will have to be asked by manufacturers when a sponsor requires a new or alternative chassis / body / firefighting component or system which is not on the approved option list for funding. We have suggested that an FAA approval document be attached to bid specifications for each new item requested, and if that is not done we anticipate it will be necessary for manufacturers to contact the sponsor or the FAA for clarification.		
224	MHu 27	NFPA	Another area of concern is the inclusion in NFPA 414 that directly references and states that ALL of NFPA 1901 Chapter 20 concerning aerial devices applies to ARFF vehicles. Of particular concern are 20.13 through 20.25 as these sections govern water towers (high reach extendable turrets). We suggest the following regarding the reference to NFPA water tower requirements in NFPA 1901 20.13 to 20.25 which must exclude the following additional paragraphs in order to meet the HRET requirements of ARFF vehicles: 20.13.5 Specifies that the water tower be rotated 90 degrees from the bedded position. 5220-10C is 30 degrees. 20.15.2 This paragraph implies the water tower can't be raised with the vehicle in motion. Delete from ARFF vehicle requirements. 20.15.3 This paragraph requires continuous rotation. ARFF vehicle booms do not rotate 360 degrees. Delete from ARFF vehicle requirements. 20.17.5 This paragraph requires stabilizer/boom interlock. No stabilizers required. Delete from ARFF vehicle requirements. 20.18.11 This paragraph requires reflective paint or striping on the joint between	**ACCEPT ALL but Last Item in Paragraph.** **Subject Matter covered in NFPA 414.0 Chapter 4.18.6**	

ID#	Source	Location	Comment	Justification	Note
			upper and lower boom (mast) to avoid being hit by traffic or other fire apparatus. Delete from ARFF vehicle requirements. 20.16.5 Requires an external inlet that is a minimum of 4" (100mm). 5220-10C has no requirement. Delete from ARFF vehicle requirements. 20.16.7 Specifies that a flow meter be installed in the waterway delivery system. This is not necessarily bad and not currently being installed on ARFF vehicles but it is not in 5220-10C. Delete from ARFF vehicle requirements. 20.17.3 Requires a neutral interlock preventing use of the elevated waterway unless the park brake is set. Defeats the purpose of the HRET. Delete from ARFF vehicle requirements. 1. A power-operated governed engine speed control shall be provided to limit the operating speed of the aerial device apparatus engine to within the operating parameters as determined by the manufacturer and this standard. – This appears to cause a possible conflict with the required pump & roll feature of the entire vehicle. This is geared entirely towards municipal fire fighting and NOT ARFF fire fighting 2. An interlock shall be provided that allows operation of the engine speed control after the parking brakes have been set and the transmission is in neutral. Defeats the purpose of the HRET. This is geared entirely towards municipal fire fighting and NOT ARFF fire fighting. 3. Where the apparatus is equipped with a fire pump, any high idle speed control shall be automatically disengaged when the fire pump is operating. See comments for 20.17.4 and 20.17.4.1. The bottom line is this: NFPA 1901 Chapter 20 is a standard developed to govern municipal fire fighting which is based upon apparatus remaining stationary during		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			the fire fighting operations. This is diametrically opposed to stated critical mission of the FAA 5220-10C standard concerning ARFF apparatus remaining mobilized throughout the fire fighting operations. All references to NFPA 1901 concerning water towers and extendable turrets must be deleted from the FAA 5220-10D Proposal and bring forward the standard as it is in FAA 5220-10C concerning water towers and high reach extendable turrets.		
225	PDT 17 18	NFPA	**Added documents:** 2.3.22 FAA report, Full-Scale Fire Modeling Tests of a Compact Rapid Response Foam and Dry Chemical Powder Dispensing System, Dated 1978, Author, George B. Geyer, Lawrence M. Neri, and Charles H. Urban 2.3.23 FAA report, DOT/FAAlCT-82/109 Equivalency Evaluation of Fire Fighting Agents and Minimum Requirements at U.S. Air Force Airfields, Dated October 1982, Author George B. Geyer 2.3.24 Analysis of Test Criteria for Specifying Foam Firefighting Agents for Aircraft Rescue and Firefighting DOT/FAAlCT-94/04 Dated 1994, Authors Joseph Scheffey and Joseph A. Wright 2.3.25 FAA DOT/FAAlAR-95/87 Full-Scale Evaluation of Halon 1211 Replacement Agents for Airport Fire Fighting Dated October 1995, Author Joseph A. Wright 2.3.26 USAF report, AFRL-ML-TY-2002-4543, Evaluation of the TRIMAX 280 System, Dated December 2002, Author Jennifer L. Kalberer and Jennifer C. Sapnich 2.3.27 FAA report DOT/FAAIAR-03-45 Test and Evaluation of the Effectiveness of a Small Airport Firefighting System (SAFS) in Extinguishing Two-and Three-Dimensional Hydrocarbon Fuel Fires. Dated May 2003, Author Charles Risinger, Jennifer L. Kalberer, and Keith Bagot 2.3.28 FAA report Comparative Evaluation of the Effectiveness of a High-Performance, Multi-position, Bumper-Mounted Turret to the Performance of a P-19 Roof-Mounted Turret, Dated June 2005, Author Keith Bagot	**NFPA** **2.1** All FAA referenced publications should be placed in this location whether specifically noted under other sections or not. FAA documentation should be included that may be peripheral in nature but nonetheless associated with this A/C. See line #3 *[ID#11]* above. Rejected: Not necessary for the intent of this AC.	
226	PDT 19	NFPA	**Amendment:** All components, materials, equipment and services proposed by the Sponsor for inclusion in the specifications of an ARFF vehicle must meet the FAA's approval listing before submission to the regional FAA Airports District Office.	**NFPA** **3.2.3** This section appears in part to allow the inclusion of specific	

ID#	Source	Location	Comment	Justification	Note
				products or components on ARFF vehicles without it being proven eligible for funding by the FAA. As the "authority having jurisdiction" the FAA must develop this listing in order to prevent protractive conflicts between manufacturers and establish guidance as to future interpretation. This may require a separate A/C or an Annex to this one in order to provide the comprehensive detail necessary. Prior FAA testing and validation process not referenced in this A/C draft may also support or substitute for some listings. REJECT: Beyond the scope of a performance based document.	
227	PDT 20	NFPA	**Add:** 3.3.14.4 Hydraulic Brakes - Brakes in which the force of a hydraulic master cylinder is applied to the friction surfaces through an intervening hydraulic system.	**NFPA 3.3.14**	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				No mention of hydraulic brakes in this section. Conflicts with section 4.9.1 which allows hydraulic brakes. Air brake systems are not available for typical Class 1 or Class 2 vehicles. REJECT: NFPA 414 provides for hydraulic brakes.	
228	PDT 21	NFPA	**Amend:** Foam Concentrate - Is a concentrated liquid foaming agent as received from the manufacturer. **Add:** Foam Solution- is the solution that results when foam concentrate and water are mixed in designated proportions prior to aeration to form foam	**NFPA 3.3.29** A definition for Foam Concentrate and Foam Solution should replace the definition for Foam-Liquid Concentration to maintain consistency with NFPA 412 - "Standard for Evaluating Aircraft Rescue and Firefighting Foam Equipment" - 2003 Edition. REJECT: NFPA 414 Committee Issue	
229	PDT 22	NFPA	**Amendment:** Table 4.1.1 (a) & (b) appropriately	**NFPA Table 4.1.1 (a) and (b).**	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				The Evasive Maneuver Test shall not apply to Class 1,2 and 3 vehicles. However, these vehicles must meet all applicable Federal safety and performance regulations for the GVW class of vehicle used. For Class 4 and 5 vehicles, the Evasive Maneuver test must be conducted at 35 MPH (56 KPH). REJECT: This is a valid prototype safety test.	
230	PDT 23	NFPA	**Exception:** The side slope stability test shall not apply to Class 1, 2 and 3 vehicles. However, these vehicles must meet all applicable Federal safety and performance regulations for the GVW class of vehicle used.	**NFPA Table 4.1.1 (a) and (b).** Side slope stability. Commercial cab and chassis must comply with Federal Motor Vehicle Safety Standards (FMVSS) with regards to roll-over and stability. REJECT: This is a valid safety test.	
231	PDT 24	NFPA	**Exception:** The angle of approach shall be reduced to 25 degrees for Class 1,2 and 3 vehicles.	**NFPA Table 4.1.1 (a) and (b).**	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Angle of approach. Commercial cab and chassis (usually under 20,000 Ibs. GVWR) have reduced angle of approach and departure compared to 1500 gallon or 3000 gallon vehicles (up to 80,000 Ibs. GVWR or more). However, the standard has the same angle of approach and departure for a small 12,000 lb. vehicle (see our Illustration 1. and 2. *[ID#218 & ID#219]*) REJECT 30 degree standard is a carryover from the 150/5220-19 and has been an established standard.	
232	PDT 26	NFPA	**Exception:** The interaxle clearance shall be reduced to 10 degrees for Class 1, 2 and 3 vehicles.	**NFPA Table 4.1.1 (a) and (b).** Interaxle clearance. Commercial cab and chassis (usually under 20,000 Ibs. GVWR) have reduced interaxle clearance compared to 1500 gallon or 3000 gallon vehicles (up to	

ID#	Source	Location	Comment	Justification	Note
				80,000 lbs. GVWR or more). However, the standard has the same interaxle clearance for a small 12,000 lb. vehicle (see our Illustration 1. and 2. *[ID#218 & ID#219]*) REJECT Interaxle clearance standard is a carryover from the 150/5220-19 and has been an established standard.	
233	PDT 27	NFPA	**Exception:**The Evasive Maneuver Test shall not apply to Class 1, 2 and 3 vehicles. However, these vehicles must meet all applicable Federal safety and performance regulations for the GVW class of vehicle used.	**NFPA Table 4.1.1 (a) and (b).** There is no equivalent Evasive Maneuver Test established for commercial vehicles. Commercial cab and chassis must comply with Federal Motor Vehicle Safety Standards (FMVSS). REJECT: This is a valid prototype safety test.	
234	PDT 28	NFPA	**Exception:** The "J" turn test shall not apply to Class 1, 2 and 3 vehicles. However, these vehicles must meet all applicable Federal safety and performance regulations for the GVW class of vehicle used.	**NFPA Table 4.1.1 (a) and (b).** There is no equivalent "J" turn brake test	

ID#	Source	Location	Comment	Justification	Note
				established for commercial vehicles. Commercial cab and chassis must comply with Federal Motor Vehicle Safety Standards (FMVSS). REJECT: This is a valid prototype safety test.	
235	PDT 25	NFPA Table 4.1.1 (a) and (b).	**Exception:** The angle of departure shall be reduced to 25 degrees for Class 1,2 and 3 vehicles.	**NFPA Table 4.1.1 (a) and (b).** Angle of departure. Commercial cab and chassis (usually under 20,000 Ibs. GVWR) have reduced angle of approach and departure compared to 1500 gallon or 3000 gallon vehicles (up to 80,000 Ibs. GVWR or more). However, the standard has the same angle of approach and departure for a small 12,000 lb. vehicle (see our Illustration 1. and 2. *[ID#218 & ID#219]*) REJECT 30 degree standard is a carryover from the 150/5220-19 and has	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				been an established standard.	
236	PDT 29	NFPA	**Amendment:** Table 4.1.1 (1.c. and d.) 75% water tank capacity supersedes paragraph 4.15.1.2 85% water tank capacity on a 20% side slope and 30% grade.	**NFPA Table 4.1.1 (c) and (d) 1.b. and 1.c.** The table specifies 75% tank capacity on a 20% side slope and 30% grade. However, 4.15.1.2 specifies 85% tank capacity under the same conditions. REJECT Referred to NFPA technical committee for editorial correction	
237	PDT 30	NFPA	**Amendment:** Total combined flow rates for Class 1, 2 and 3 vehicles shall be: Class 1 ~ 60 GPM; Class 2 ~ 150 GPM; Class 3 ~ 250 GPM. Total flow rate can be achieved by hand lines or a combination of hand lines and turret performance.	**NFPA Table 4.1.1 (c) and (d) 2.** It is not clear what the total flow rate should be for the FAA Class 1,2 and 3 vehicles. This NFPA sections says ~ 60 GPM and that this can be accomplished by hand lines only. For a Class 1 vehicle, discharge time would be 2 minutes. For a Class 2 vehicle, discharge time would be 5 minutes. For a Class 3 vehicle	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				discharge time would be 8.33 minutes. Is that the intent of FAA? In the past, Class 2 vehicles had a minimum flow rate of 150 GPM and Class 3 vehicles a flow rate of 250 GPM (defined by bumper turret performance). At the NFPA minimum of 60 GPM, a Class 3 vehicle would have the same application rate (gallons per minute per square foot) as a Class 1 vehicle - there would be no advantage of going to a Class 2 or Class 3 vehicle. REJECT: 60 GPM minimum discharge rate for class 1, 2 and 3 remains.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
238	PDT 31	NFPA	**Exception:** Where specified, the piercing nozzle flow rate shall not exceed the minimum total combined flow rate for the Class 1, 2, or 3 vehicles.	**NFPA Table 4.1.1 (c) and (d) 2f.** This section provides for an optional piercing nozzle. However, the minimum flow rate is 250 GPM. If this is used with a Class 1 vehicle, total discharge time would only be 30 seconds. ACCEPT in Principle. Class 1, 2 and 3 vehicles are not eligible for piercing nozzles.	
239	PDT 32	NFPA	**Exception:** The handline flow rate shall not exceed the minimum total combined flow rate for the Class 1, 2, or 3 vehicles.	**NFPA Table 4.1.1 (c) and (d) 3.a. and 3.b.** This section provides for handline flow rates ~ 95 GPM. For a Class 1 vehicle, discharge time would only be 1.26 minutes. Accept: Noted	
240	PDT 33 34	NFPA	No table should be included in the definition section of the the NFPA414. Table 1 should be included in Section 4.1.2 to remain consistent with NFPA organization. For Class 5 vehicles, allowing for increases over 3000 gallons in 500 increments, manufacturers will be placed in a position of being directed to design/engineer/build multiple tank configurations up to an undefined size of water tank capacity. With no maximum capacity defined the possibility exists for a return	Reject: Previously addressed.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			to 6000 gallon capacity trucks and beyond. In this scenario an airport could effectively meet the Index E requirement with one truck and two RIV's		
241	PDT 62	NFPA	**Amendment:**	**NFPA** Reject	
242	TC 70	NFPA 414 (2007)	**1.3.2** Manuals. Comment: Many sponsors prefer to receive at least one copy of a paper manual for each of the manuals listed. Will a set of paper manuals be an approved option?	Sponsor preference. Reject: Copies can be printed from the electronic media provided	
243	TC 71	NFPA 414 (2007)	**Tables 4.1.1c / d (1b and 1c) & 4.15.1.2** Comment: Items 1b and 1c in Table 4.1.1c require a deliverable water percentage of 75 percent with the vehicle on a 20 percent side slope or ascending/descending a 30 percent grade. 4.15.1.2 requires a deliverable water percentage of 85 percent under identical conditions. Which percentage is correct?	Provides clarification. Reject: Previously addressed (see236)	
244	TC 72	NFPA 414 (2007)	**Table 4.1.1d (3b – a)** Comment: We suggest that a water / foam nozzle discharge rate of 60 gpm be allowed as an alternative allowable option to a 95 gpm discharge rate for a reeled water/foam handline.	Item 3a in Table 3 of the -10C AC noted that a 95 gpm nozzle would require a hose with an inside diameter of 1-1/4 inches while a nozzle with a 60 gpm discharge rate would require a hose with a smaller inside diameter of 1 inch. The 1 inch hosei is the most common hose used today because the majority of sponsors prefer the smaller diameter hose for ease of handling. ACCCEPT: Noted	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
245	TC 73	NFPA 414 (2007)	**4.9.2.2. & 4.9.2.3** Comment: The words "greater" in 4.9.2.2 and "less" in 4.9.2.3 need to be transposed as they are incorrect as placed and do not reflect the braking requirements described in Tables 4.1.1a and 4.1.1b.	To correct an error Deferred: Editorial change for NFPA.	
246	TC 74	NFPA 414 (2007)	**4.24.1 (2)** "In addition to dual taillights and dual stop lights, a minimum of one additional stop light located high up on the rear of the vehicle." Comment: We suggest that this wording be amended to reflect the wording in the -10C AC. The revised sentence would read "At least one taillight and one stoplight or one combination taillight/stoplight one each side of the rear of the vehicle in the lower quadrant and a duplicate set of taillight/stoplight in the upper quadrant."	The upper quadrant taillight/stoplights were added to Para. 39b3 in the -10C AC to provide better vehicle visibility from the rear and to provide an additional level of safety. This type of upper quadrant lighting is being more common, and is now being installed on highway trailers. REJECT: Brake light requirement in NFPA 414.0 already meets requirements.	
247	PDT 51	NFPA 4.11	**Exception:** 4.11.1, 4.11.2, 4.11.3 shall also meet FMVSS for Class 1,2 and 3 vehicles. Where there is a conflict between the standardss FMVSS shall prevail.	**NFPA 4.11** Commercial vehicles may be required to meet FMVSS regulations that have different performance requirements than soecified in NFPA 414 REJECT: Previously addressed	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
248	PDT 52	NFPA 4.11.4.8	**Addition:** Reference to A/C 150/5210-19- Driver's Enhanced Vision System (DEVS) should be noted	**NFPA 4.11.4.8** The requirement for FLIR devices is noted without reference to requirements of A/C 150/5210-19- Driver's Enhanced Vision System (DEVS) REJECT: Previously addressed	
249	PDT 53	NFPA 4.11.4.8.1	**Addition:** Reference to A/C 150/5210-19- Driver's Enhanced Vision System (DEVS) should be noted i	**NFPA 4.11.4.8.1** The requirement for FLIR devices is noted without reference to requirements of A/C 150/5210-19- Driver's Enhanced Vision System CDEVS) REJECT: Previously addressed	
250	PDT 54	NFPA 4.11.5.1	**Exception:** 4.11.5.1, 4.11.5.2, 4.11.6 shall also meet FMVSS for Class 1,2 and 3 vehicles. Where there is a conflict between the standards FMVSS shall prevail.	**NFPA 4.11.5.1** Commercial vehicles may be required to meet FMVSS regulations that have different performance requirements than specified in NFPA 414 ACCEPT in principle	
251	PDT	NFPA	**Addition:** All paint colors and finishes must comply with the requirements of FAA	**NFPA**	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	55	4.12.8	A/C 150/521 0-5-Painting, Marking and Lighting of Vehicles Used on Airports	**4.12.8** All references to FAA NC's should be noted in 2.1 as well as where there is a direct association between the nature or content of an applicable NC and the NFPA section. The A/C 150/5210- 5 on vehicle painting should also be noted in Chapter 2 (see line #6 *[ID#102]* above). REJECT: Previously addressed	
252	PDT 56	NFPA 4.12.8.1	**Addition:** All paint colors and finishes must comply with the requirements of FAA A/C 150/521 0-5-Painting, Marking and Lighting of Vehicles Used on Airports	**NFPA 4.12.8.1** All references to FAA NC's should be noted in 2.1 as well as where there is a direct association between the nature or content of an applicable A/C and the NFPA section. The A/C on vehicle painting should also be noted in Chapter 2 (see line 035#6 *[ID#102]* above) REJECT: Previously	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				addressed	
253	PDT 57	NFPA 4.15.1.2	**Amendment:** Table 4.1.1 (1.c. and d.) 75% water tank capacity supersedes paragraph 4.15.1.2 85% water tank capacity on a 20% side slope and 30% grade.	**NFPA 4.15.1.2** Information listed conflicts with Table 4.1.1 (c and d), 1. b. and c. The table requires 75% tank capacity, 4.15.1.2 requires 85% tank capacity. REJECT: Previously addressed	
254	PDT 58	NFPA 4.15.2.2	**Exception:** Manhole covers shall not be required on Class 1, 2 and 3 vehicles.	**NFPA 4.15.2.2** Manhole covers are not practical on very small tanks and in fact their may not be enough space for both a manhole cover, fill tower and vent. ACCEPT in Principle	
255	PDT 59	NFPA 4.16.1.6	**Exception:** For Class 1,2 and 3 vehicles, the foam tank shall be equipped with at least one top fill opening of not less than 127 mm (5 in.) internal diameter.	**NFPA 4.16.1.6** Class 1, 2 and 3 vehicles require very small foam tanks (as small as 7.5 gallons for a Class 1 vehicle). It is not practical to require a top fill	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				trough and container openers which would be several times larger than the foam tank itself. ACCEPT as Amended	
256	PDT 60	NFPA 4.18.1	**Amendment:** Total combined flow rates for Class 1, 2 and 3 vehicles shall be: Class 1 :: 60 gpm; Class 2 :: 150 gpm; Class 3 :: 250 gpm. Total flow rate can be achieved by hand lines or a combination of hand lines and turret performance.	**NFPA 4.18.1** "Aircraft rescue and fire-fighting vehicles shall have one or two primary turret nozzles." is in conflict with Table 4.1.1 (c and d). 2. Turret(s) discharge on the table states that vehicles under 528 gallons can meet the performance requirements with hand lines only. Also refer to our discussion above regarding flow rates for Class 1, 2 and 3 vehicles. REJECT: 60 GPM minimum discharge rate for class 1, 2 and 3 remains.	
257	PDT 61	NFPA 4.18.4 cont'd	**Exception:** Manual overrides or secondary parallel controls are not required.	**NFPA 4.18.4 cont'd** The need for a manual override or parallel	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				controls for power operated turrets should be removed due to reliability based on a twenty year service history in the industry REJECT: Remains a purchasers option.	
258	PDT 63	NFPA 4.19.1	**Comment Only**	**NFPA 4.19.1** Elements of this section are better located under NFPA 4.19.3 especially with regard to twinned hose lines and nozzles. There is a practical distinction between the terms "preconnect" and "reel line" that prevents twinning of preconnects. NOTED as comment	
259	PDT 43	NFPA 4.2.1.2.2	**Amendment:** for Class 1,2 &3 vehicles the difference in load between front and rear axles shall not exceed 30/70 percent relationship and shall have dual rear wheels to accommodate the increased axle load. No individual chassis component rating shall be exceeded to accommodate the more symmetric weight distribution.	**NFPA 4.2.1.2.2** Although paragraph 4.7.5 allows for dual rear wheels for capacity up to 500 gallons, this is not consistent with the ~ 10% difference for any axle. Commercial chassis cannot meet	

ID#	Source	Location	Comment	Justification	Note
				the weight distribution requirements as defined in this section. A description of a 30/70 weight distribution should be described for commercial chassis provided that the vehicle rear axle also be fitted with dual a wheels and tires. The exclusion of this allowance eliminates commercial chassis from being utilized (see our Illustrations 1. and 2. *[ID#218 & ID#219]*). Previously addressed	
260	PDT 44	NFPA 4.2.2.1.1	**Exception:** .... reduced under axle bowl clearance is not allowed for active suspension vehicles.	**NFPA 4.2.2.1.1** It is only possible to achieve this by using smaller diameter wheels and tires. When the suspension is elevated for off-road operation, the under axle differential housing bowl is not elevated. It remains at the reduced clearance	

ID#	Source	Location	Comment	Justification	Note
				of 10.5" (less than of a small Ford commercial cab and chassis). If the smaller diameter tires sink into the ground, the axle bowl is more likely to hit something or bulldoze the ground and cause the vehicle to become stuck. The well established standard of 13" is based on military requirements for off-road operation. REJECT: NFPA 414.0 standard remains as written	
261	PDT 45	NFPA 4.2.2.3.1, 4.2.2.3.2, 4.2.2.4, 4.2.2.4.1, 4.2.2.4.2, 4.2.2.4.3	**Amendment:** Field of vision requirements listed in 4.2.2.3.1, 4.2.2.3.2, 4.2.2.4, 4.2.2.4.1, 4.2.2.4.2 and 4.2.2.4.3 shall also meet FMVSS for Class 1,2 and 3 vehicles. Where there is a conflict between the standards FMVSS shall prevail.	**NFPA 4.2.2.3.1, 4.2.2.3.2, 4.2.2.4, 4.2.2.4.1, 4.2.2.4.2, 4.2.2.4.3** Some requirements of this section may conflict with FMVSS requirements of commercial vehicles. Accepted	
262	PDT 46	NFPA 4.2.2.4.4	**Amendment:** Supplemental audiovisual devices are allowed to aid in side and rear visibility. However, audiovisual devices may not replace the rear view mirror requirement.	**NFPA 4.2.2.4.4** Drivers are not accustomed to looking at a TV monitor in	

ID#	Source	Location	Comment	Justification	Note
				place of rear view mirrors. Also, the requirements of this section are completely undefined. If audiovisual devices are used, what is the size and location of the TV monitor? What type of sound output is required for the audio portion? We recommend that audiovisual devices supplement mirrors - not replace them. REJECT: Adequate performance requirements in NFPA 414.0 related to field of view.	
263	PDT 64	NFPA 4.20.1	**Request for Clarification**	**NFPA 4.20.1** The language in this section requires clarification. It is not clearly stated that a bumper turret could also be a primary turret. This section should be consistent with 4.1.1 (c) & (d) items 2 and 2c.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Clarification Deferred to NFPA Technical Committee.	
264	PDT 65	NFPA 4.23.1	**Exception:** Turret discharge of halogenated agents is not allowed until further testing is conducted regarding its efficacy in this circumstance.	**NFPA 4.23.1** There is no specific performance standards identified for halogenated agents relating to turrets. The flow requirements described in Table 4.4.1 relate only to dry chemical. If halogenated agents are to be allowed on turrets, a precise performance level needs to be identified. As there is no validation testing to base this performance on, it should be clearly established that until one is available turrets with halogenated agents are not eligible. REJECTED: Halogenated performance requirements for turrets are provided in	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				table 2.	
265	PDT 47	NFPA 4.3.4	**Exception:** shall apply except where there is conflict with Federally mandated EPA exhaust system requirements. Where there is a conflict between the standards, EPA requirements shall prevail.	**NFPA 4.3.4** Federally mandated engine exhaust emissions prohibit any modification of exhaust systems on commercial vehicles. In addition, the required After-treatment Devices (ATD) and Diesel Particulate Filters (DFP) on all classes of vehicle dictate the design of the exhaust systems (see attached EPA 2007 Overview). REJECT Meeting the performance requirements of the Advisory Circular while complying with EPA standards is a design responsibility of the OEM.	
266	PDT 48	NFPA 4.5.5.1	**Exception:** Class 1, 2 and 3 commercial vehicles are permitted to have a driver selectable 2-wheel or 4-wheel drive position with “Low" and "Hi" ranges for 4-wheel drive.	**NFPA 4.5.5.1** Commercial vehicles have a driver selected	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				4-wheel drive application that includes a "Low" range for off-road operation and a "Hi" range for on-highway application. REJECT Current NFPA standards permits two wheel/four wheel selectable positions.	
267	PDT 49	NFPA 4.5.7.2	**Exception:** For vehicles equipped with dual rear wheels, the track requirement shall be measured at the centerline between the dual tires.	**NFPA 4.5.7.2** Dual rear wheels technically exceed the 20 percent variation requirement - yet are allowed for vehicles of 500 gallons or less (4.5.7)	
268	PDT 50	NFPA 4.9	**Exception:** 4.9.1, 4.9.2, 4.9.2.1,4.9.2.3, 4.9.2.4, 4.9.2.5, 4.9.3, 4.9.5 shall also meet FMVSS for Class 1,2 and 3 vehicles. Where there is a conflict between the standards, FMVSS shall prevail.	**NFPA 4.9** Commercial vehicles may be required to meet FMVSS regulations that have different performance requirements than specified in NFPA 414 ACCEPT	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
269	PDT 66	NFPA 5.1.1	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.1.1** The statement here effectively eliminates any chassis performance criteria. Other sections of NFPA 414 go into detail relating to weights, overall dimensions, field of vision, engine characteristics, engine cooling system, fuel system, fuel capacity, exhaust system, vehicle electrical system, battery chargers, vehicle drive, all-wheel drive, axle capacity, suspension, rims, tires and wheels, brakes, air system, steering, instruments, warning lights, controls, etc. By eliminating vehicle performance criteria, the purchaser has no recommended guidelines to follow. Further, there is no test data to establish any vehicle or system	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				I performance levels. REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
270	PDT 67	NFPA 5.1.2	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.1.2** The terms as used in this section are completely undefined - especially since all other references documents have been omitted from this draft. What off-pavement capabilities? This statement is completely undefined - especially since all other references in NFPA414 have been eliminated. REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
271	PDT 68	NFPA 5.1.3	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.1.3** The terms as used in this section are	

ID#	Source	Location	Comment	Justification	Note
				completely undefined - especially since all other references documents have been omitted from this draft. What is the rational for the 2 ft. lower limit? What test data was used to establish this figure? REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
272	PDT 69	NFPA 5.1.4	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.1.4** The terms as used in this section are completely undefined - especially since all other references documents have been omitted from this draft. What other cab specifications must be met such as field of vision, instruments, controls, etc.? REJECT: FAA will fund IAV's and OEMS are at their own will to develop	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				IAV's as long as it meets the standards.	
273	PDT 70	NFPA 5.2	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.2** The terms as used in this section are completely undefined - especially since all other references documents have been omitted from this draft. What other specification for stairs must be met - step width, step length, number of people who can simultaneously be on the steps, room to move stokes baskets or injured people, step load capacity, step height from ground, individual step heights, etc.? REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
274	PDT 71	NFPA 5.3.1	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.3.1** The terms as used in	

ID#	Source	Location	Comment	Justification	Note
				this section are completely undefined - especially since all other references documents have been omitted from this draft. How big an aircraft door, how many fire fighters, what equipment? REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
275	PDT 72	NFPA 5.4.1	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.4.1** The terms as used in this section are completely undefined - especially since all other references documents have been omitted from this draft. What is the rational for the turning diameter to be tow times the vehicle length? Other sections of NFPA 414 require a turning diameter of three times the vehicle length.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
276	PDT 73	NFPA 5.4.2	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.4.2** The terms as used in this section are completely undefined - especially since all other references documents have been omitted from this draft. What is the rational for the 15 degree tilt test? Does the represent some type of off-pavement condition? If so, should there be indicators or lock-out to prevent use of the IAV if the terrain is more than a 15 degree angle? Other stair platforms must meet wind resistance and other specified requirements. REJECT: FAA will fund IAV's and OEMS are at their	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				own will to develop IAV's as long as it meets the standards.	
277	PDT 74	NFPA 5.5.2	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.5.2** The terms as used in this section are completely undefined - especially since all other references documents have been omitted from this draft. What is the requirement for "gap control"? How much gap? REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
278	PDT 75	NFPA 5.5.3, 5.5.3.1 and 5.5.3.2	**Exception:** CHAPTER 5 The FAA does not authorize the use of Airport Improvement Program (AlP) funds to purchase Interior Access Vehicles (IAV) until sufficient test evaluation and design criteria are developed.	**NFPA 5.5.3, 5.5.3.1 and 5.5.3.2** The terms as used in this section are completely undefined - especially since all other references documents have been omitted from this draft. Since the	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				amount of equipment and number of personnel required for platform space is not defined, where do the material design load capacity numbers come from? REJECT: FAA will fund IAV's and OEMS are at their own will to develop IAV's as long as it meets the standards.	
279	PDT 76	NFPA 6.1.5	**Comment Only**	**NFPA 6.1.5** This appears to be a general clause that would be better suited to be included under NFPA section 1.3.2.3.8. and 1.3.2.3.9. Inclusion under this section does not allow clear guidance to the end user. Noted:	
280	PDT 78	NFPA Annex A 4.1.5, 3,h	**Amendment:** 3,h: Stainless steel exhaust systems and mufflers unless prohibited by EPA regulations.	**NFPA Annex A 4.1.5, 3,h** The EPA now dictates exhaust system After-	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				Treatment Devices (ATD) and Diesel Particulate Filter (DPF) traps for exhaust systems. End-user requirements may be superseded by EPA standards Accept	
281	PDT 79	NFPA Annex A 4.1.5, 5,a	**Amend 5,a:** reduced under axle bowl clearance is not allowed for active suspension vehicles.	**NFPA** **Annex A 4.1.5, 5,a** It is only possible to achieve this by using smaller diameter wheels and tires. When the suspension is elevated for off-road operation, the under axle differential housing bowl is not elevated. It remains at the reduced clearance of 10.5" (less than of a small Ford commercial cab and chassis). If the smaller diameter tires sink into the ground, the axle bowl is more likely to hit something or bulldoze the ground and cause the vehicle to become stuck. The well established standard of	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				13" is based on military requirements for off-road operation. REJECT: Previously Addressed	
282	PDT 80	NFPA Annex A 4.1.5, 5,b	**Amendment: 5,b:** Tag or other non-powered axle(s) to assist weight distribution and/or stability requirements is not allowed.	**NFPA Annex A 4.1.5, 5,b** Tag or other non-powered axle(s) to assist weight distribution and/or stability requirements is in conflict with 4.5.5 all-wheel drive which requires all axles be drive axles. This would allow a vehicle with more than two axles to have multiple non-drive axles which would cause deterioration to off road performance. REJECT: NFPA 414.0 standard remains as written	
283	PDT 82	NFPA Annex F	**Comment Only**	**NFPA Annex F** Informational References - not a single FAA document is referenced in NFPA 414 and only one is	

ID#	Source	Location	Comment	Justification	Note
				referenced in the draft A/C. Consideration should be given to the list of historical references identified in #9 *[ID#226]* above to either be included in that section or at least in this Annex. Further, there is a whole body of validation testing by the United States Air Force and Navy regarding specific aspects of aviation firefighting that is not referenced that carries an overwhelming amount of information. NOTED	
284	TC 62	OTHER OPTION AVAILABILITY	**The following items have been previously provided on federally funded ARFF vehicles. We request confirmation as to whether any or all of these items are considered approved options for funding under the -10D.** • PVC or rubber matting on bottom of each storage compartment • height adjustable shelf • Height adjustable roll-out trays • SCBA storage tubes recessed in the vehicle body • SCBA storage racks in a side compartment • Siren foot switches for driver and crewperson • Air horn foot switches for driver and crewperson • Two cab defroster fans – one on each side of the instrument panel • Clothes hooks on the back cab wall – one for each seat • Engine throttle on the instrument panel	DEFERRED	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			• Digital clock • Compass • Back-up warning system • Air outlet receptacle • Glad hand air connection • Mudflaps • Daylight running lights • Wig-wag headlights • Ground lighting (when parking brake is on) • License plate bracket(s) • Cab mounted hand adjustable spotlights – one in each corner (Class 1, 2 3 Only) • Two scene lights on each side (Whelen / Speaker HID) • Telescoping light towers • Two cab mounted widelights (110v or 12 volt HID) • One or two 110v / 220v telescoping widelights on each side • 110v receptacles on side of cab • Two front mounted LED / strobe emergency lights • Two rear mounted LED / strobe emergency lights • Three side mounted LED / strobe emergency lights (per side) • Two amber non-emergency rotating beacons / strobes / LED's on top of vehicle • One amber non-emergency rotating beacon / strobe / LED light on top center rear of engine cover • Two red rotating emergency beacons / strobes / LED's on top corners of engine cover • One red strobe / LED lightbar on top center rear of engine cover • Enhaust engine brake (ex. Jake Brake) • Emergency engine shutdown (air intake shutoff) • Vehicle mounted exhaust extraction system (ex. Ward Diesel "No-Smoke") • Vehicle mounted foam transfer pump • Mechanical steering system on rear axle of a rear tandem axle • Bleeder valves for water tank fills • Air hose reel		

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			• Electric cord reel with junction box • Safety interlock system for pre-connect soft jacket hose providing cab activation for each pre-connected soft jacket handline as well as preventing the hose from being charged in a compartment • Swing-out hose reels when mounted in lower side compartment		
285	MHa 6	Supporting document		AFJ Presentation Paper May 2006.PDF Noted	
286	MHa 7	Supporting document		BACKUP MATERIAL 10D.PDF Noted	
287	MHa 8	Supporting document	I ask both you gentlemen for your indulgence in this matter as I feel that it is of great consequence to events currently unfolding within the FAA, more specifically the rewrite of 150-5520-10C & -19 into 10D. The draft has been published, as I am sure you are aware, and if it goes as currently proposed there are several unintended consequences that will fall from it. They are all driven by the final report that was recently release by the FAA Technical group. As we all know this was the 3rd rewrite attempt, the first being Tyndall's, second being FAA Technical's first attempt and their latest being the third. Both of you are probably tired of hearing my comments on the Tyndall testing with the hope that the recently published report would put the matter to bed. I was also hoping that this would occur! And even though the report was full of omissions and misleading implications, I was willing to forget it and go on. But now it appears that this report has reared its ugly head and is having even greater impact than imaginable, and this, I cannot let stand without voicing my concerns.	Castilano Marinelli FAA Response to 10D 1 May 07.PDF Noted	
288	MHa 9	Supporting document	What has happened is that this FAA Technical report (having been published) with its serious omission of facts and observances is having significant impact on events that are now in process, mainly the finalization of 150-5220-10D. These concerns are evidence in the Draft 10D table 2. This draft document and specifically Table 2 is 180 degrees from what was agreed in the Industry Committee meetings (and E.B. #71 which is the current governing document) whose purpose was to assist the FAA in drafting 10D through Industry expert input.	Castilano Marinelli FAA Response to 10D 1 May 07.PDF Noted	
289	MHa 10	Supporting document	While the report has errors in math (which in themselves are misleading) my main concerns are the following:	Castilano Marinelli FAA Response to 10D	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			1. There is NO mention in this report that the technology is a high pressure Multi-Agent Delivery technology that is based on the parallel delivery of the primary agents. Both QuadAgent® and Pulse Delivery® (as are any derivatives of these names) are trademarked which was not evident in the released document. **2.** The report is selective in its observations, tests and tests results -- the most important of which are as follows: a. No mention of the PKP (Purple K dry chemical powder) ONLY testing done on the 3D engine Nacelle? Both authors witnessed these tests. This was the FIRST and ONLY time a dry chemical delivery system had successfully completely extinguished a 3D fire (knock down and put out!). This is a major differentiator of this delivery technology from all the other delivery technologies tested by the FAA and Tyndall. This demonstrated one of the technically significant achievements of the Pulse Delivery Technology! The other being is throw distance which will be addressed later. The report fails to note the protocol for the PKP dry chemical powder and clean agent (Halotron) throw distance testing. The report implies to the reader that the agents were tested in a very favorable environment of winds equal to or less than 5 mph (tail wind), where as the facts are that both were tested in the more confining environment of NO WIND CONDITIONS and at 10 degrees elevation (tested inside a hanger). While the report states that they tested the dry chemical throw range at 20 degrees, they only state that it could not be effectively measured, while the facts are, that the distance could be measured but the width could not. The 20 degree throw distance was not reported while in previous testing done by the FAA this data was reported (SEE SAFS Report 03/45). The report further fails to specify the dry chemical powder delivery method and rate which are technological advances of the new delivery technology.	1 May 07.PDF Noted	
290	MHa 11	Supporting document	These simple omissions from this report alone will have significant impact on how document 10D is finalized. What these two simple omissions do is ELIMINATE the protocol testing of all future high pressure multi-agent systems as stated in E.B. #71 which was put in place as a result of AFCT's high pressure Pulse Delivery® and QuadAgent® delivery system technology testing at Tyndall Air Force Base. This elimination of protocol used in the development of E.B. #71 will allow any systems claiming to be a multi-agent or equivalent to meet a now different standard which is	Castilano Marinelli FAA Response to 10D 1 May 07.PDF Noted	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			neither specific nor defining to any delivery technology. All other testing to this new delivery technology will be done in easier and more advantageous conditions allowing any means to deliver dry chemical powder to over 90 feet. These omissions negate any benefit that EB #71 had on introducing a higher performance criteria for a new delivery technology that exhibited (now published) extinguishment times and safety performances that are far superior to ALL others in its class- thus the reasons for the creation of a NEW DELIVERY TECHNOLOGY PERFORMANCE CRITERIA (E.B. #71). 10D as drafted will eliminate the technology that lead to the creation of E.B. #71 on which FAA customers are currently buying apparatus from the market place. This New delivery technology is both high pressure and high performance and cost more than the less performing low cost delivery technologies currently on the market. 10D as drafted will allow all underperforming (compared to E.B. #71) technologies to qualify as bidders. The results are obvious, in that, the E.B. #71 performance criteria will never be the qualified low bidder and this NEW delivery technology will be lost to the FAA. And with it the FAA will lose not only its fire suppression performance gains but it's more important SAFETY gains.		
291	MHa 12	Supporting document	In order to highlight this issue to you, here is a brief (relative term) summary of the unreported facts, tests and observances that, while very important, and outside the E.B. #71 standards, are part and partial to the problem stated above. And they are: 1. There is no mention anywhere in the report of the increased firefighter standoff (distance a firefighter can stand from the fire and effectively deploy and suppress the fire) that was very evident in the 100 foot diameter pit fires. For comparison the current handline technologies (which include those already tested by the FAA) require a 70-80 foot advanced of the hose lines into the pit for extinguishment, while the E.B. #71 technology in the QuadAgent® presentation only required 20 feet and the twin agent presentation with the Pulse Delivery® technology only required 50 feet. These are important SAFETY parameters that were not reported in this document and are only achieved with the E.B. #71 performance standards and protocols. 2. The authors of the final report continuously report (throughout the document) that adding additional agents to the suppression stream added little to the results? The above facts do not match up to this pronouncement. This is where observable facts, when omitted, can change the whole interpretation of a performance document.	Castilano Marinelli FAA Response to 10D 1 May 07.PDF Noted	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			3. No mention of the significantly lower percentage of FOAM CONTAMINATION by the PKP dry powder stream with this NEW delivery technology -- which by the way-- determines how well the foam blanket will perform - another major SAFETY issue with twin agent systems using entrainment technology. Current twin/triagent systems (entrained) are 100% contaminated with PKP. The E.B. #71 technology is at worst 20% contaminated with PKP dry powder. 4. No mention anywhere in this report that the ARFF firefighters were instructed to use this NEW delivery technology exactly as they would the OLD technologies disregarding AFCT's recommended 'Best Practices' for the best results with this technology. 5. No mention in this report of the steep learning curve these ARFF firefighters were asked to accomplish. 6. No mention anywhere of the order of testing which in a steep learning curve environment can greatly impact results. 7. 3 of the 4 averages printed in Figure 16 are mathematically incorrect based on their own data and in one case uses data from a test that was not counted and failed to use the data from the redo? 8. Figure 11 does not state the order of testing of the various agent combinations. The QuadAgent delivery system was first to be tested which caused longer extinguishment times due to inexperience with technology delivery? The easiest of the scenarios, the ones the ARFF firefighters would have been most familiar were run last? Go figure that? In fact the chart as shown is in reverse order of testing. The testing order had more influence on the results that this reports implies? No mention that the times posted were RECORD fire suppression times on these scenarios, even with all this inexperience and out of order testing sequence? 9. No mention as to why the CAF testing was not done at the time while the authors were present? Of interest, though, is that AFCT was told by Tyndall that since water/foam could not extinguish the 3D engine Nacelle that we would not try and therefore save time and agent! The technology came back and extinguished a more difficult 3D engine nacelle! No other handline technology had done this according to Tyndall?		
292	MHa 13	Supporting document	Now all this may seem to be just more complaining from Hancock! I am not one to complain without both cause and facts on my side. I write this to both of you,	Castilano Marinelli FAA Response to 10D	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			knowing full well that neither of you have a full understanding of the technology nor would you be expected too! Also, that you depend of lower levels to provide you with the right information and advice. I only raise these issues to your level because David may be leaving the program before 10D is finalized and Marc is new to the territory, and I am concerned that FAA Technical has a misunderstanding of our technology and the science of it, I do not know? But what I do know is, that if the 10D goes forward without E.B. #71 in its current form and protocol or as it is currently drafted, the ability of high pressure multi-agent technology in its current form will no long exist for the ARFF Industry as everyone could claim performance capability that they do not have. Performance that was demonstrated at Tyndall and encapsulated in E.B #71 and defined as high pressure parallel multi-agent delivery (DRY (not entrained) delivery of dry chemical powder to over 90 feet and clean agent to over 90 feet as well). The performance standards of E.B. #71 were established by the FAA through it's testing at Tyndall using AFCT's Pulse Delivery® and QuadAgent® technology, which by any measure (FAA Techs or ours), was superior to all others in its class in both fire suppression performance and safety.	1 May 07.PDF Noted	
293	MHa 14	Supporting document	What is currently in Draft form for 150-5220-10D is a result of these omissions of fact and their resulting incorrect and/or overlooked conclusions and will result in the loss of this New Delivery Technology to the ARFF industry. This is something I do not believe is what either of you want to happen. Because of my passion on this subject and the fact that this letter is further substantiation for my 10D Draft recommendations, I will be attaching this letter along with other substantiation data and material with my final 10D Draft recommendations.	Castilano Marinelli FAA Response to 10D 1 May 07.PDF Noted	
294	MHa 15	Supporting document		DELIVERY TECHNOLOGY COMPARISON only 2007.PDF Noted	
295	MHa 16	Supporting document		FAA Draft Report Ex Sum of feb 2004 Tyndall.PDF Noted	
296	MHa	Supporting document		FAA TYNDALL	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
	17			GRAPHICAL RESULTS Final18 Sept 06.PDF Noted	
297	MHa 18	Supporting document		High Pressure Multi-Agent Delivery Technology.PDF Noted	
298	MHa 19	Supporting document		TYNDALL AF ARFF TESTING BY TEST Final18 Sept 06.PDF Noted	
299	PC[xv] 2	Supporting document		LittleRock[1].PDF Noted	
300	TC 63	Version 10C	Items deleted from the -10C AC**:** **Para. 24a**. "All compartments shall be provided with weatherproof lights that are switched to automatically light when compartment doors are opened and the vehicle master switch is in the 'on' position." Comment: We suggest that 4.12.3 be amended to include this sentence	The sentence was included in Para. 24a of the -10C document to prevent a vehicle's battery charge to be depleted if a compartment door were to be inadvertently left open with the compartment light on and the master switch was in the 'off' position. ACCEPTED	
301	TC 64	Version 10C	Items deleted from the -10C AC**:** **Para. 37.g**. "A beadlock press shall also be provided for any quantity of vehicles purchased."	Providing the tool would result in faster tire replacement with bead locks.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
			Comment: We suggest that option 5f be amended to read "Bead locks on tires and rims with a bead lock tool to be provided if one is not available on the airport."	REJECTED Not standard tool for vehicle	
302	TC 65	Version 10C	Items deleted from the -10C AC**:** **Para. 39a3**. "At least one taillight and one stoplight or one combination taillight/stoplight one each side of the rear of the vehicle in the lower quadrant and a duplicate set of taillight/stoplight in the upper quadrant." Comment: Reference suggested change to 4.24.1 (2)	The upper quadrant taillight/stoplights were added to Para. 39b3 in the -10C AC to provide better vehicle visibility from the rear and to provide an additional level of safety. This type of upper quadrant lighting is being more common, and is now being installed on highway trailers. REJECT light requirement in NFPA 414.0 already meets requirements.	
303	MM[xvi] 1	Version 10C Page 10 Paragraph 35.d	Transfer case with front axle disconnect is allowed in current FAA 10C. NFPA 414 does not allow this option and required interaxle differentials. Is the intent of FAA to required and fund this for all trucks as well ?	**NFPA 414 Reference** 4.5.5.2 REJECT NFPA 4.5.5.2 Current NFPA standards permits two wheel/four wheel selectable positions.	
304	MM 2	Version 10C Page 20 Paragraph 72.f	Add "**without climbing on top of the truck**". We believe the intent is to minimze need for fire fighters to climb on top of the truck.	**NFPA 414 Reference** 4.17.2.2.3 - Amend for safety.	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
				REJECT: FAA is funding hoist system for cylinder removal	
305	MM 3	Version 10C Page 40 Paragraph 107.e (3)	Current FAA 10C wording: When discharged simultaneously, the average discharge rate from either nozzle shall be within ± 10 percent of either nozzle discharging alone. Current NFPA 414 wording: When discharged simultaneously, the flows form nozzle 1 and nozzle 2 shall be within 10 percent of each other. Proposed wording: **When discharged simultaneously, the combined discharge rate will be within ±10 percent of the sum of all of the nozzles when discharged individually.** Current wording requires for the material discharges to be collected and the procedure is to weigh the vessel and material left in the tank. The proposed wording would clear the way to follow the procedure without any need for interpretation.	**NFPA 414 Reference** 6.3.32.5 - Item 3 REJECT: NFPA 414.0 Standard is acceptable.	
306	MM 5	Version 10C Page 56 Paragraph 122.b	Add GPS as an option to conduct acceleration test. Technolgy has evolved and we should have the option to use it.	**NFPA 414 Reference** 6.4.3.2 ACCEPT	
307	MM 4	Version 10C Table 3	FAA 10C has performance specifications for "primary" and"secondary" turrets. This can be roof or bumper mounted. NFPA 414 has performance specifications for "roof" and "bumper" turrets with a minimum for "roof turret" if used in combination to meet the total flow rate. Is the intent to make roof turret "primary" all the time ? With the table numbers strictly followd, a truck with 1200 gpm bumper turret would require a minimum of 1000 gpm roof turret as well. We do not think that is the intent. Some work needs to be done to align all references and requirements for turrets to match in all places.	**NFPA 414 Reference** Table 4.1.1 (d) REJECT: Sufficiently covered in NFPA 414.0 Table 4.1.1(d) "Bumper turret can be used as the primary turret".	
308	TC 69	Version 10C Table A-4.1. Worksheet for	**58.b.** A central tire inflation / deflation system was an allowable option.	REJECT: No longer a fundable option	

AC 150/5220-10 Comment Resolution Matrix

ID#	Source	Location	Comment	Justification	Note
		Subsystem Component Selection (B.)	Comment: Will a central tire inflation / deflation system be an option approved for funding?		
309	TC 66	Version 10C Table A-4.1. Worksheet for Subsystem Component Selection (A.)	**43.a.** Headsets were allowed to be selected as an option. Comment: Will headsets be an option approved for funding?	REJECT: No longer a fundable option	
310	TC 67	Version 10C Table A-4.1. Worksheet for Subsystem Component Selection (A.)	**45.b.** Either a curved exhaust stack or a straight exhaust pipe was allowed to be selected. Comment: Either type of exhaust may be required depending on whether a sponsor is using a track system in the fire station for exhaust removal.	The option of selecting either type of exhaust allowed a manufacturer to provide the system required by the sponsor. REJECT: Not restricted under current standard. Airport specific requirement that should be included in the vehicle specification	
311	TC 68	Version 10C Table A-4.1. Worksheet for Subsystem Component Selection (A.)	**80a(8)** Special thread connections were allowed to be selected. Comment: Will special thread connections be an option approved for funding?	Different airports use different style (NSFHT / Storz) and size (4" / 4.5" / 5"). REJECT: Already stated in NFPA 414 4.14.4 & 4.15.3.2. Airport specific requirement that should be included in the vehicle specification.	

AC 150/5220-10 Comment Resolution Matrix

AC 150/5220-10 Comment Resolution Matrix

PERFORMANCE CHART COMPARISON:

Performance Parameters	NFPA 414 ≥ 60 to ≤ 528 gallons	FAA A/C 150/5220-19 Class 1 (100 gallons)	Class 2 (300 gallons)	Class 3 (500 gallons)
Side slope stability	30 degrees	30 degrees	30 degrees	30 degrees
Dynamic balance minimum speed on 100 ft. radius circle	25 mph	25 mph	25 mph	25 mph
Angle of approach	30 degrees	30 degrees	30 degrees	30 degrees
Angle of departure	30 degrees	30 degrees	30 degrees	30 degrees
Interaxle clearance	12 degrees	12 degrees	12 degrees	12 degrees
Underbody clearance	13 inches	13 inches	13 inches	18 inches
Under-axle clearance at differential housing bowl	10.5 inches*1[8]	8 inches*2[9]	8 inches*3	10.5 inches*4[10]
Diagonal opposite wheel motion	10 inches	NA	NA	NA
Wall to wall turning diameter	3 times the vehicle's overall length	3 times the vehicle's overall length	3 times the vehicle's overall length	3 times the vehicle's overall length
Maximum acceleration time from 0 to 50 mph	30 seconds	25 seconds	30 seconds	30 seconds
Top speed	≥ 65 mph	≥ 65 mph	≥ 65 mph	≥ 65 mph
Service Brake:	-	-	-	-
Stopping distance				
from 20 mph	≤ 35 ft.	≤ 35 ft.	≤ 35 ft.	≤ 35 ft.
from 40 mph	≤ 131 ft.	≤ 131 ft.	≤ 131 ft.	≤ 131 ft.
Percent grade holding of fully loaded vehicle:				
Ascending	≥ 50 percent	≥ 50 percent	≥ 50 percent	≥ 50 percent
Descending	≥ 50 percent	≥ 50 percent	≥ 50 percent	≥ 50 percent
Emergency brake stopping distance at 40 mph	≤ 288 ft.	NA	NA	NA[11]
Parking Brake:		NA	NA	NA

AC 150/5220-10 Comment Resolution Matrix

Performance Parameters	NFPA 414 ≥ 60 to ≤ 528 gallons	FAA A/C 150/5220-19 Class 1 (100 gallons)	Class 2 (300 gallons)	Class 3 (500 gallons)
Percent grade holding for the parking brake:				
Ascending	≥ 20 percent	≥ 20 percent	≥ 20 percent	≥ 20 percent
Descending	≥ 20 percent	≥ 20 percent	≥ 20 percent	≥ 20 percent
Evasive maneuver test, NATO Document AVTP 03-16W	25 mph	NA	NA	NA
"J" Turn test at 150 Radius turn (MPH)	30 mph	N/A	N/A	N/A
Water tank percent of deliverable water				
a. On ground level	100%	100%	100%	100%
b. On 20% side slope	75%	85%	85%	85%
c. 30% ascending/ descending grade	75%	85%	85%	85%
Roof Turret Discharge	Total flow rate can be achieved with handlines			
a. Total minim flow rate	≥ 250 gpm	NA[12]	NA[13]	NA[14]
b. Stream pattern/ distances				
i. Straight/ far point	≥ 150 ft.	NA	NA	NA
ii. Dispersed/ far point	≥ 50 ft.	NA	NA	NA
iii. Dispersed/ width	≥ 30 ft.	NA	NA	NA
Bumper Turret	Can be used as the primary turret			
a. Flow rate	≥ 60 gpm[15]	NA	≥ 150 gpm	≥ 250 gpm
b. Straight stream distance	≥ 150 ft.[16]	≥ 125 ft.	≥ 125 ft.	≥ 125 ft.
c. Dispersed pattern distances				
ii. Width	≥ 50 ft.	≥ 25 ft.	≥ 25 ft.	≥ 25 ft.
iii. Near point	≥ 30 ft.	≥ 20 ft.	≥ 20 ft.	≥ 25 ft.
	Within 30 ft. of front	NA	NA	NA

Performance Parameters	NFPA 414 ≥ 60 to ≤ 528 gallons	FAA A/C 150/5220-19 Class 1 (100 gallons)	Class 2 (300 gallons)	Class 3 (500 gallons)
	bumper			
Compressed Air Foam				
a. Flow Rate		60gpm	60gpm	60gpm
b. Straight Stream distance		≥ 125 ft.	≥ 125 ft.	≥ 125 ft.
c. Width		> 15 ft.Avg.	>15 ft.Avg.	>15 ft. Avg.
b. Expansion Ration		15-20 to 1	15-20 to 1	15-20 to 1
Number of water/ foam handlines required per vehicle (select from below)	1	1	1	1
Woven jacket water/foam handline: a. Nozzle flow rate b. Straight stream distance c. Dispersed stream pattern: i. Range ii. Width d. Hose length	≥ 95 gpm ≥ 65 ft. ≥ 20 ft. ≥ 15 ft. ≥ 150 ft (≥ 100 ft for dual agent lines)	≥ 95 gpm ≥ 65 ft. ≥ 20 ft. ≥ 15 ft. ≥ 150 ft (≥ 100 ft for dual agent lines)	≥ 95 gpm ≥ 65 ft. ≥ 20 ft. ≥ 15 ft. ≥ 150 ft (≥ 100 ft for dual agent lines)	≥ 95 gpm ≥ 65 ft. ≥ 20 ft. ≥ 15 ft. ≥ 150 ft (≥ 100 ft for dual agent lines)
Woven jacket water/foam Handline: Compressed Air Foam				
a. Nozzle flow rate		≥ 30 gpm	≥ 30 gpm	≥ 30 gpm[17]
b. Straight stream distance		≥ 100 ft.	≥ 100 ft.	≥ 100 ft.
c. Width		> 15 ft.Avg.	>15 ft.Avg.	>15 ft. Avg.
d. Expansion Ratio		15-20 to 1	15-20 to 1	15-20 to 1
Compressed Air Foam				
Booster Hose				
a. Flow Rate		30gpm	30gpm	30gpm
		≥ 65 ft.	≥ 65 ft.	≥ 65 ft.
b. Expansion Ration		15-20 to 1	15-20 to 1	15-20 to 1

AC 150/5220-10 Comment Resolution Matrix

Performance Parameters	NFPA 414 ≥ 60 to ≤ 528 gallons	FAA A/C 150/5220-19 Class 1 (100 gallons)	Class 2 (300 gallons)	Class 3 (500 gallons)
c. Hose length	≥ 150 ft (≥ 100 ft for dual agent lines)	≥ 150 ft (≥ 100 ft for dual agent lines)	≥ 150 ft (≥ 100 ft for dual agent lines)	≥ 150 ft (≥ 100 ft for dual agent lines)
a. Capacity	≥ 100 lbs.	≥ 500 lbs.[18] ≥200 lbs	≥ 500 lbs.[19] ≥200 lbs	≥ 500 lbs.[20] ≥500 lbs
Dry Chemical Handline	Where specified	Where Specified	Where Specified	Where Specified
a. Discharge rate	≥ 5 lbs/ second	≥ 5 to ≤ 7 lbs/ second	≥ 5 to ≤ 7 lbs/ second	≥ 5 to ≤ 7 lbs/ second
b. Range	≥ 25 ft.	≥ 25 ft.	≥ 25 ft.	≥ 25 ft.
c. Hose length	≥ 100 ft.	≥ 100 ft.	≥ 100 ft.	≥ 100 ft.
Dry Chemical Turret	-	-	-	-
a. Discharge rate	≥ 16 to ≤ 22 lbs/ second	≥ 16 lbs/ second	≥ 16 lbs/ second	≥ 16 lbs/ second
b. Range	≥ 100 ft.	≥ 100 ft.	≥ 100 ft.	≥ 100 ft.
c. Width	≥ 17 ft.	≥ 17 ft.	≥ 17 ft.	≥ 17 ft.
Encapsulated Dry Chemical Dry Chemical Handline				
a. Discharge Rate[21]		5-7 lbs/second	5-7 lbs/second	5-7 lbs/second
b. Range[22]		65 ft.	65 ft.	65 ft.
c. Width[23]		> 15 ft.Avg.	>15 ft.Avg.	>15 ft. Avg.
Turret				
a. Discharge Rate[24]		≥12 lbs/second	≥12 lbs/second	≥12 lbs/second
b. Range[25]		125 ft.	125 ft.	125 ft.
Halogenated Agent Handline	Where specified	Where specified	Where specified	Where specified

AC 150/5220-10 Comment Resolution Matrix

Performance Parameters	NFPA 414 ≥ 60 to ≤ 528 gallons	FAA A/C 150/5220-19 Class 1 (100 gallons)	Class 2 (300 gallons)	Class 3 (500 gallons)
a. Discharge rate	≥ 5 to ≤ 7 lbs/ second	≥ 5 to ≤ 7 lbs/ second	≥ 5 to ≤ 7 lbs/ second	≥ 5 to ≤ 7 lbs/ second
b. Range	≥ 25 ft.	≥ 25 ft.	≥ 25 ft.	≥ 25 ft.
c. Hose inside diameter	≥ 1.00 inch	≥ 1.00 inch	≥ 1.00 inch	≥ 1.00 inch
d. Hose length	≥ 100 ft	≥ 100 ft	≥ 100 ft	≥ 100 ft

[i] Source: Joseph A. Wright
ARFF Technical Services, Inc.
717-244-2488
717-817-2022 Cell
ARFFTECSRVINC@aol.com

[ii] Source: Mike Hancock
President/CEO, AFCT, Inc.
13685 E. Davies Place
Centennial, CO 80122 USA
afctinc@aol.com
www.afctinc.com
ph 303-883-2671
fax 303-224-9824
cell 303-815-5253

[iii] Source: Ken Gilliam
1407 Lone Oak Road
Johnson City, TN 27604
Phone: 423.926.8057
Cell: 423.741.2656
kengilliam@gmail.com

[iv] Source: Bradford Colton
Research Engineer, Halotron Division
American Pacific Corporation
3770 Howard Hughes Parkway, Suite 300
Las Vegas, NV 89169
Tel: 702-699-4131
Bradford Colton [bcolton@apfc.com]

[v] Source: Keith Bagot
FAA Technical Center, AAR-411
ARFF Research Program
609-485-6383
http://www.airporttech.tc.faa.gov/Safety/resfire.asp
keith.bagot@faa.gov

[vi] Source: Pierre Huggins
ALPA Senior Staff Engineer
Engineering & Air Safety
703-689-4211
Pierre.Huggins@alpa.org

[vii] Source: Dan Pierce
Airport Safety Officer
Los Angeles World Airports
LA/Ontario International Airport
909-975-5570
dpierce@lawa.org

[viii] Source: Joseph A. Wright
ARFF Technical Services, Inc.
717-244-2488
717-817-2022 Cell

ARFFTECSRVINC@aol.com

[ix] Source: Mike Agaibi
AWP/FAA AWP-611, Planning Section
310-725-3632

[x] Source: Marty Huffman
ARFF Program Manager
Rosenbauer General Division
5181 260th Street
Wyoming, MN 55092
MN Office: 651-462-1000
Direct: 651-755-7358
FAX: 651-408-1304
email: mhuffman@rosenbaueramerica.com

[xi] Source: Paul Cudmore
General Manager, Team Eagle
866-241-3264
paul@eagleintegrated.net

[xii] Source: Paul D. Totton
Crash Rescue Equipment Service, Inc.
Phone: 972/243-3307
Fax: 972/243-6504
ptotton@crashrescue.com

[xiii] Source: Pat Hester
Co-Chair, FAMA Technical Committee
Fire Apparatus Manufacturers' Association
P.O. Box 397
Lynnfield, MA 01940-0397
Tel/Fax: 781-334-2911

Email: info@fama.org
Web Site: www.fama.org

[xiv] Source: Tom Cihowiak
Product Manager - ARFF Vehicles
Ph: (920) 233-9400
Fax: (920) 233-9670
Cell: (920) 420-0775
TCihowiak@oshtruck.com

[xv] Source: Paul Cudmore
General Manager, Team Eagle
866-241-3264
paul@eagleintegrated.net

[xvi] Source: Madhu Manikkam
(352) 861-5904
mmanikkam@e-one.com