

SECTION 9 – ROBOT INSPECTION

9.1 – OVERVIEW

This section describes *Robot* Inspection for the *FIRST* Tech Challenge 2009-2010 competition, *Hot Shot!* It also lists the inspection definitions and inspection rules.

9.2 – DESCRIPTION

The FTC *Robot* will be required to pass hardware and software inspections before being cleared to compete. These inspections will ensure that all FTC *Robot* rules and regulations are met. Initial inspections will take place during team registration/practice time. A copy of the official FTC “Robot Inspection Sheet” is located in this section. The “Robot Inspection Sheet” should be used by the teams as a guide to pre-inspect the *Robot* prior to arriving at the event.

9.3 – DEFINITIONS

Robot – An operator controlled and/or autonomous programmed vehicle designed and built by a *FIRST* Tech Challenge team to perform specific tasks while competing in this year’s competition. The *Robot* may only be constructed from materials and components outlined in Section 4.2.

Robot Initialization Routine – A set of programming instructions inserted immediately prior to the match control loop of the Autonomous Mode program that serves to ready the *Robot* for a match.

Robot Sizing Box – A sturdily constructed cube with the interior dimensions; 18 inch (45.72cm) by 18 inch (45.72cm) by 18 inch (45.72cm) that has one open side with an interior opening size of 18 inch (45.72cm) by 18 inch (45.72cm). The Sizing Box is used for *Robot* Inspection as outlined in Section 9.4.

9.4 – INSPECTION RULES

<I1> FTC teams must submit their *Robot* for inspection prior to participating in practice rounds. At the discretion of the FTC Lead Inspector, the *Robot* may be allowed to participate in practice rounds before passing inspection.

<I2> The team’s *Robot* must pass all inspections before being allowed to compete in Qualification Rounds. Noncompliance with any *Robot* design, construction rule, or programming requirements may result in disqualification of the *Robot* at a FTC event.

<I3> The FTC Official Team Number must be displayed on the *Robot* prior to inspection as defined in Section 4.2 <R10>.

<I4> *Robot* construction is constrained by the number of Official FTC Competition components a team may use as defined in Section 4.2<R5>. There is not a specified FTC *Robot* weight constraint.

<15> The maximum size of the *Robot* for starting a *Qualifying* or *Elimination Match* is 18 inches (45.72cm) wide by 18 inches (45.72cm) long by 18 inches (45.72cm) high. The *Robot Sizing Box* will be used as the official gauge in determining conformance to this rule as follows:

The *Robot* must be self-supporting while in the *Robot Sizing Box* either:

- a. by mechanical means with the *Robot* in a power-OFF condition
- b. by a *Robot Initialization Routine* in the Autonomous mode program that may pre-position the servo motors, with the *Robot* in a power-ON condition, to the desired position by means of a single instruction to the HiTechnic Servo controller for each servo motor effected. If the *Robot Initialization Routine* does move the servos prior to the official start of the match, there must be an indicator on the *Robot* of this fact. A warning label such as the following will suffice:



<16> All *Robots* placed on the field will maintain the size constraints outlined in <105> until the beginning of match play.

<17> When an FTC team makes a modification to improve performance or reliability of their *Robot*, the team may request a re-inspection of their *Robot* by an FTC Inspector.

<18> It is the FTC Inspectors responsibility to evaluate *Robots* to insure each *Robot* has been designed to operate and function safely. Section 2.4.3 <S1> and Section 4 specify the safety rules and limitations that apply to the design and construction of all *Robots*.

<19> *Robot* inspection is a Pass / Fail process. A *Robot* has passed inspection when ALL requirements listed on the official FTC "Robot Inspection Sheet" have been successfully met and recorded as passed by an FTC Inspector.

COMPETITION INSPECTION CHECKLIST

Team Number: _____

Time of Inspection: _____

Pass/Fail: _____

Inspection Type: ___ Initial ___ Mandated ___ Random

	Size Inspection	
	Robot fits within the Sizing Box (18" x 18" x 18") without exerting force on box sides or top	R4a
	Beginning at 10" above the tile surface, Robot may not extend more than 10" horizontally.	R4b
	Overall Inspection	
	Team Number is visible from 2 sides, is written in 3" tall, 1/2" stroke on a contrasting background	R10
	Robot does NOT contain any components which will be intentionally detached on the playing field	R3/G7
	Robot does NOT contain any components that could damage the playing field or other robots	R3
	Robot does NOT contain any sharp edges or corners	R3
	Robot poses NO obvious unnecessary risk of entanglement	R3
	NXT battery can be easily removed without disassembly	R11a
	USB port is easily accessible for rapid registration	R11b
	NXT Controller LCD display is readily visible	R11c
	Robot Flag Holder is present and adequately holds the flag during normal robot operation	R12
	TETRIX Power Switch is positioned to be readily visible to competition personnel and installed properly	R13
	ALL Decorating Components on the Robot NOT meeting FTC Inspection Criteria are NON FUNCTIONAL	R5f
	Game elements launched by Robots do not reach a maximum of four (4) feet above the field surface, nor travel a horizontal distance greater than ten (10) feet	R16
	Parts Inspection - Official TETRIX and LEGO Components	
	ALL Robot components are OFFICIAL TETRIX or LEGO Products	R5
	FTC Robot does not utilize any of the Packaging materials	R5c
	Robot has only (1) NXT controller	R5b
	Robot uses maximum of three (3) NXT Motors	R5b
	Robot uses maximum of eight (8) 12V DC drive motors	R5a
	Robot uses a maximum of twelve (12) servos (Hi Tec, HS-475HB)	R5a
	Robot uses a maximum of four (4) HiTechnic DC Motor or Servo Controllers (in any combination)	R5a
	Robot uses one (1) official NXT rechargeable battery pack or six (6) AA batteries (not both)	R5b
	Robot uses one (1) official FTC 12 V DC NiMH battery	R5a
	Additional Parts Inspection	
	Robot contains no more than 24"x24"x0.10" thick polycarbonate	R5c
	Robot contains no more than 24"x24"x0.0625" thick aluminum	R5c
	Robot contains no more than 24"x24"x0.040" thick Kydex	R5c
	Robot contains no more than 24"x24"x0.0625" thick ABS plastic	R5c

	Robot contains no more than 24"x24" of Non-Slip Pad	R5c
	Robot contains rope or cord not thicker than 0.125" diameter	R5c
	Robot contains plastic coated wire rope not thicker than 0.03125" diameter	R5c
	Robot contains no more than 36" length of PVC piping not thicker than 3" inside diameter	R5c
	Robot contains any number of rubber bands not larger than #32 (0.125" thick & 3" in circumference)	R5c
	Robot contains no more than 24" length of surgical tubing 0.25" outside diameter or smaller	R5c
	Robot contains electrical tape or heat shrink tubing only if used as electrical insulation	R5c
	Robot contains any number of cable ties not to exceed 11" in length	R5c
	LEDs (if used) must be visible light and only used as a signaling device or for decoration	R5c
	Robot contains no more than 24"x24"x 0.080" thick PETG	R5c
	Construction Inspection	
	NO electrical components have been modified from their original state except the HiTechnic Prototype Board	R9
	NO method of attachment NOT provided by the Tetrax except as specified as allowable per rule R5 and R9 (i.e. PVC cement on PVC, etc.)	R5/R9
	If thread locker is used, it is used for securing screws & fasteners ONLY	R5c
	Software Functionality Check	
	Robot has passed Software Inspection	R14
	Robot has the correct name based on the team's FTC number	R8
	If Robot uses an Initialization Routine to move servos prior to start of match, a warning sticker is in plain sight on the robot.	I5
	Team is using the latest published version of the Field Control System (FCS) on their own computer	R17
	Team has demonstrated that they are using the correct version of the programming template	R14

Reason for Failure (if any):

I hereby state that all of the above is true, and to the best of my knowledge all rules and regulations of the 2009-2010 FIRST Tech Challenge have been abided by.

Inspector

Team Student Representative