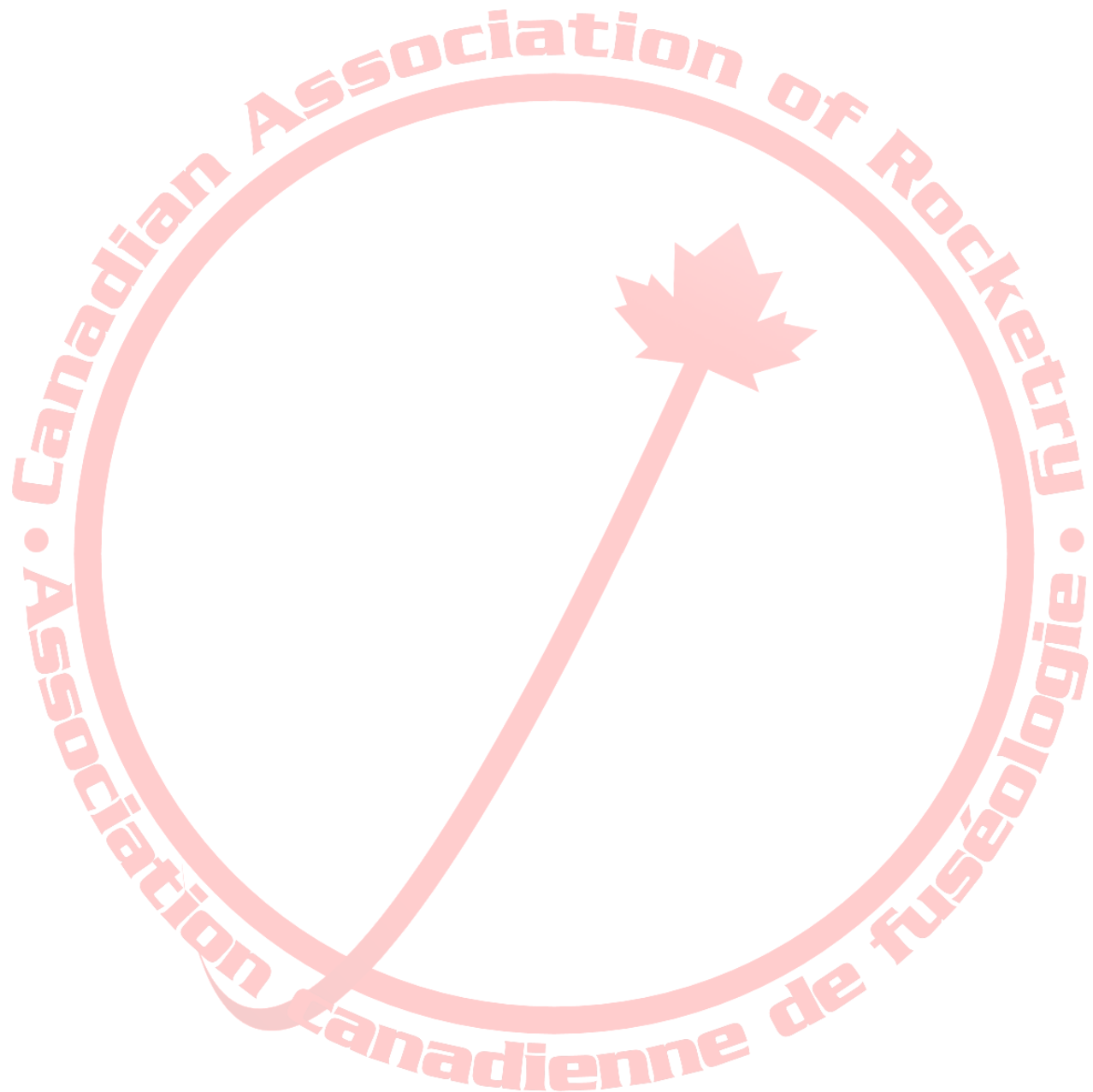


# Canadian Association of Rocketry

## *Rocket Motor Certification*



August 27 + 28, 2009 Session

Submitted to the CAR Executive August 31, 2009

## Introduction

A motor testing session was held at the Cesaroni Technology Incorporated facility in Gormley, Ontario on August 27 and 28<sup>th</sup>, 2009. It was a great session to attend in person!

A total of forty (40) motors were fired to certify fourteen (14) new reloads. The list includes one F, one I, one L, seven M and four N motors. The propellants included four Blue Streaks, two Classics, three Imax, one Red Lightning and four Skidmarks. The total fired impulse was 246,458.92 N-sec (50.4% R).

The new additions include reloads for Pro29, Pro54, Pro75 and Pro98 from Cesaroni Technology Inc as well as one Pro98 reload cross-certified for use in Aerotech RMS hardware and one "Animal by Cesaroni" (ABC) reload.

Earlier this year, Dr. Louwers proposed the introduction of a simple grain spacer for use in CTI hardware. The spacers are the length of a single grain, and are loaded into the case forward of the reload. This means that all of the pressure remains within the reload, but the ejection charge (if present) can freely pass through. In the course of normal testing, 75mm and 98mm spacers were included without incident. Two stacked 1G spacers (38mm) were hydrostatically tested in a 3G case to failure, and the failure point was the nozzle (longitudinal failure mode) as described by NFPA 1125, section 7.4.4. After disassembling the destroyed 3G case, the spacers slid out undamaged, even after exposure to 2,380 PSI (over 3X the working pressure of the reload).

The Pro29 tapered closures have been used in Pro29 testing and have performed normally.

As a result of this testing, 38mm, 75mm and 98mm spacers (alone or stacked) and the Pro29 tapered closure form part of the certified motor systems from CTI. These spacers (38mm, 75mm and 98mm) and optional closures (29mm) will continue to be included in upcoming tests to observe the effect of 'accelerated' usage.

While these motors were certified in Canada, a reciprocal agreement between the Canadian Association of Rocketry, the Tripoli Rocketry Association and the National Association of Rocketry means they may be flown in many jurisdictions.

I am very pleased to announce the certification of these fourteen (14) new reloads from Cesaroni Technology, Inc. Individual certification letters follow for each motor. These letters and the accompanying thrust curves will be available on the official CAR website soon.

Respectfully submitted,

Thomas Raithby  
Chair of CAR Motor Certification

[www.CanadianRocketry.org](http://www.CanadianRocketry.org)

## Contents

Introduction.....	2
Certified Motors.....	4
CTI 55-F29-IM-12A (CTI Pro29-1G) .....	4
CTI 381-I224-CL-15A (CTI Pro29-6GXL).....	5
CTI 3147-L935-IM-P (CTI Pro54-6GXL) .....	6
CTI 8,088-M1790-SK-P (CTI Pro98-4G / AT-98/10240) .....	7
CTI 11,077-N2600-SK-P (CTI Pro98-6G).....	8
CTI-14,263-N3400-SK-P (CTI Pro98-6GXL) .....	9
CTI 7,579-M1520-BS-P (CTI Pro98-3G) .....	10
CTI 9,870-M1800-BS-P (CTI Pro98-4G) .....	11
CTI 13,767-N2850-BS-P (CTI Pro98-6G) .....	12
CTI 17,613-N2900-CL-P (CTI Pro98-6GXL).....	13
CTI 5506-M1230-IM-P (CTI Pro75-4G).....	14
CTI 7,455-M2150-RL-P (CTI Pro75-6G) .....	15
CTI 7,388-M2045-BS-P (CTI Pro75-6G) .....	16
ABC 6,774-M2050-SK-P (AMW 75-7600).....	17

## Certified Motors

### CTI 55-F29-IM-12A (CTI Pro29-1G)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 55-F29-IM-12A** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 55-F29-IM-12A</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 55-F29-12A	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Imax</i>	<b>Hardware</b>	Pro29-1G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	29mm x 98mm
<b>Loaded Weight</b>	105.8 g	<b>Total Impulse</b>	54.8 Ns (12.3 lb-s)
<b>Burnout Weight</b>	68.2 g	<b>Maximum Thrust</b>	36.0 N (8.1 lb)
<b>Propellant Weight</b>	30.9 g	<b>Average Thrust</b>	28.9 N (6.5 lb)
<b>Delays Tested</b>	12-3 seconds, adjustable	<b>Specific Impulse (Isp)</b>	180.85 s
<b>Samples per second</b>	1000	<b>Burn time</b>	1.90 s
<b>Notes</b>	37.0% F		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270901.gra

## CTI 381-I224-CL-15A (CTI Pro29-6GXL)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 381-I224-CL-15A** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 381-I224-CL-15A</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 381-I224-15A	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Classic</i>	<b>Hardware</b>	Pro29-6GXL
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	29mm x 365mm
<b>Loaded Weight</b>	370.0 g	<b>Total Impulse</b>	381.5 Ns (85.8 lb-s)
<b>Burnout Weight</b>	173.3 g	<b>Maximum Thrust</b>	454.4 N (102.1 lb)
<b>Propellant Weight</b>	182.5 g	<b>Average Thrust</b>	223.8 N (50.3 lb)
<b>Delays Tested</b>	15–6 seconds, adjustable	<b>Specific Impulse (Isp)</b>	213.12 s
<b>Samples per second</b>	1000	<b>Burn time</b>	1.70 S
<b>Notes</b>	19.2% I		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270913.gra

**CTI 3147-L935-IM-P (CTI Pro54-6GXL)**

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 3147-L935-IM-P** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 3147-L935-IM-P</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 3147-L935-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Imax</i>	<b>Hardware</b>	Pro54-6GXL
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	54mm x 649mm
<b>Loaded Weight</b>	2542.0 g	<b>Total Impulse</b>	3146.8 Ns (707.4 lb-s)
<b>Burnout Weight</b>	807.3 g	<b>Maximum Thrust</b>	1585.6 N (356.5 lb)
<b>Propellant Weight</b>	1567 g	<b>Average Thrust</b>	933.8 N (209.9 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	204.78 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.371 s
<b>Notes</b>	22.9% L		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270916.gra

## CTI 8,088-M1790-SK-P (CTI Pro98-4G / AT-98/10240)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 8,088-M1790-SK-P** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 8,088-M1790-SK-P</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 8,088-M1790-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Skidmark</i>	<b>Hardware</b>	Pro98-4G / AT-98/10240
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 702mm (98 x 732)
<b>Loaded Weight</b>	8,273 g / 8,298 g	<b>Total Impulse</b>	8,088.9 Ns (1,818.5 lb-s)
<b>Burnout Weight</b>	3,456 g / 3,477 g	<b>Maximum Thrust</b>	2,092.7 N (470.5 lb)
<b>Propellant Weight</b>	4,706 g	<b>Average Thrust</b>	1,786.3 N (401.6 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	175.29 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.53 s
<b>Notes</b>	58.0% M – Cross certified for use in CTI and Aerotech hardware		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270921.gra

## CTI 11,077-N2600-SK-P (CTI Pro98-6G)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 11,077-N2600-SK-P** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 11,077-N2600-SK-P</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 11,077-N2600-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Skidmark</i>	<b>Hardware</b>	CTI Pro98-6G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 1010mm
<b>Loaded Weight</b>	11,482 g	<b>Total Impulse</b>	11,077.3 Ns (2,490.3 lb-s)
<b>Burnout Weight</b>	4,712 g	<b>Maximum Thrust</b>	3,047.7 N (685.1 lb)
<b>Propellant Weight</b>	6,618 g	<b>Average Thrust</b>	2,585.5 N (581.2 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	170.69 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.28 s
<b>Notes</b>	8.2% N		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270924.gra



## CTI-14,263-N3400-SK-P (CTI Pro98-6GXL)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI-14,263-N3400-SK-P** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI-14,263-N3400-SK-P</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI-14,263-N3400-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Skidmark</i>	<b>Hardware</b>	CTI Pro98-6GXL
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 1239mm
<b>Loaded Weight</b>	13,972 g	<b>Total Impulse</b>	14,263.3 Ns (3,206.5 lb-s)
<b>Burnout Weight</b>	5,501 g	<b>Maximum Thrust</b>	3,741.6 N (841.2 lb)
<b>Propellant Weight</b>	8,282 g	<b>Average Thrust</b>	3,403.1 N (765.0 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	175.62 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.19 s
<b>Notes</b>	39.3% N		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270928.gra

## CTI 7,579-M1520-BS-P (CTI Pro98-3G)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 7,579-M1520-BS-P** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 7,579-M1520-BS-P</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 7,579-M1520-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Blue Streak</i>	<b>Hardware</b>	CTI Pro98-3G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 548mm
<b>Loaded Weight</b>	6,718 g	<b>Total Impulse</b>	7,579.0 Ns (1,703.8 lb-s)
<b>Burnout Weight</b>	2,981 g	<b>Maximum Thrust</b>	1,824.9 N (410.3 lb)
<b>Propellant Weight</b>	3,602 g	<b>Average Thrust</b>	1526.0 N (343.1 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	214.59 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.97 s
<b>Notes</b>	48.0% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270919.gra

## CTI 9,870-M1800-BS-P (CTI Pro98-4G)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 9,870-M1800-BS-P** rocket motor was tested August 28<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 9,870-M1800-BS-P</b>	<b>Test Date</b>	August 28, 2009
<b>Manufacturer Designation</b>	CTI 9,870-M1800-BS-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Blue Streak</i>	<b>Hardware</b>	CTI Pro98-4G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 702mm
<b>Loaded Weight</b>	8,342 g	<b>Total Impulse</b>	9,869.7 Ns (2,218.8 lb-s)
<b>Burnout Weight</b>	3,383 g	<b>Maximum Thrust</b>	2,240.6 N (503.7 lb)
<b>Propellant Weight</b>	4,802 g	<b>Average Thrust</b>	1,797.1 N (404.0 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	209.58 s
<b>Samples per second</b>	1000	<b>Burn time</b>	5.49 s
<b>Notes</b>	92.8% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08280901.gra

## CTI 13,767-N2850-BS-P (CTI Pro98-6G)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 13,767-N2850-BS-P** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 13,767-N2850-BS-P</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 13,767-N2850-BS-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Blue Streak</i>	<b>Hardware</b>	CTI Pro98-6G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 1010mm
<b>Loaded Weight</b>	11,688 g	<b>Total Impulse</b>	13,766.9 Ns (3,094.9 lb-s)
<b>Burnout Weight</b>	4,723 g	<b>Maximum Thrust</b>	3,377.2 N (759.2 lb)
<b>Propellant Weight</b>	6,759 g	<b>Average Thrust</b>	2,835.9 N (637.5 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	207.69 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.85 s
<b>Notes</b>	34.4% N		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270826.gra

## CTI 17,613-N2900-CL-P (CTI Pro98-6GXL)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 17,613-N2868-CL-P** rocket motor was tested August 27<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 17,613-N2900-CL-P</b>	<b>Test Date</b>	August 27, 2009
<b>Manufacturer Designation</b>	CTI 17,613-N2900-CL-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Classic</i>	<b>Hardware</b>	CTI Pro98-6GXL
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 1239mm
<b>Loaded Weight</b>	14,166 g	<b>Total Impulse</b>	17,613.7 Ns (3,959.7 lb-s)
<b>Burnout Weight</b>	5,378 g	<b>Maximum Thrust</b>	4,164.5 N (936.2 lb)
<b>Propellant Weight</b>	8,449 g	<b>Average Thrust</b>	2,867.5 N (644.6 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	212.59 s
<b>Samples per second</b>	1000	<b>Burn time</b>	6.14 s
<b>Notes</b>	72.0% N		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08270930.gra

**CTI 5506-M1230-IM-P (CTI Pro75-4G)**

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 5506-M1230-IM-P** rocket motor was tested August 28<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 5506-M1230-IM-P</b>	<b>Test Date</b>	August 28, 2009
<b>Manufacturer Designation</b>	CTI 5506-M1230-IM-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Imax</i>	<b>Hardware</b>	CTI Pro75-4G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	75mm x 621mm
<b>Loaded Weight</b>	4,844 g	<b>Total Impulse</b>	5,506.5 Ns (1,237.9 lb-s)
<b>Burnout Weight</b>	1,852 g	<b>Maximum Thrust</b>	1,586.6 N (356.7 lb)
<b>Propellant Weight</b>	2900 g	<b>Average Thrust</b>	1,229.6 N (276.4 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	193.66 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.48 s
<b>Notes</b>	7.5% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08280903.gra

**CTI 7,455-M2150-RL-P (CTI Pro75-6G)**

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 7,455-M2150-RL-P** rocket motor was tested August 28<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 7,455-M2150-RL-P</b>	<b>Test Date</b>	August 28, 2009
<b>Manufacturer Designation</b>	CTI 7,455-M2150-RL-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Red Lightning</i>	<b>Hardware</b>	CTI Pro75-6G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	75mm x 893mm
<b>Loaded Weight</b>	6,324 g	<b>Total Impulse</b>	7,455.4 Ns (1,676.0 lb-s)
<b>Burnout Weight</b>	2,355 g	<b>Maximum Thrust</b>	2,614.1 N (587.7 lb)
<b>Propellant Weight</b>	3,835 g	<b>Average Thrust</b>	2,147.0 N (482.7 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	198.23 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.47 s
<b>Notes</b>	45.6% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08280907.gra

## CTI 7,388-M2045-BS-P (CTI Pro75-6G)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **CTI 7,388-M2045-BS-P** rocket motor was tested August 28<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>CTI 7,388-M2045-BS-P</b>	<b>Test Date</b>	August 28, 2009
<b>Manufacturer Designation</b>	CTI 7,388-M2045-BS-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Blue Streak</i>	<b>Hardware</b>	CTI Pro75-6G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	75mm x 893mm
<b>Loaded Weight</b>	6,071 g	<b>Total Impulse</b>	7,388.0 Ns (1,660.9 lb-s)
<b>Burnout Weight</b>	2,332 g	<b>Maximum Thrust</b>	2,951.8 N (663.6 lb)
<b>Propellant Weight</b>	3,547 g	<b>Average Thrust</b>	2,046.6 N (460.1 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	212.38 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.61 s
<b>Notes</b>	44.3% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08280910.gra



## ABC 6,774-M2050-SK-P (AMW 75-7600)

Canadian Association of Rocketry  
 CAR Motor Certification  
 c/o 1518-3<sup>rd</sup> Ave. S.  
 Lethbridge, AB  
 T1J 0K8

August 30<sup>th</sup>, 2009

Cesaroni Technology Incorporated  
 2561 Stouffville Road  
 Gormley, Ontario  
 L0H 1G0

Dear Dr. Jeroen Louwers,

The **ABC 6,774-M2050-SK-P** rocket motor was tested August 28<sup>th</sup>, 2009 and is in compliance with the certification requirements and standards of the Canadian Association of Rocketry (CAR). The motor is hereby certified for hobby rocketry use by the members of CAR and any other rocketry associations with current reciprocal motor certification agreements in place with CAR.

<b>CAR Designation</b>	<b>ABC 6,774-M2050-SK-P</b>	<b>Test Date</b>	August 28, 2009
<b>Manufacturer Designation</b>	ABC 6,774-M2050-SK-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Skidmark</i>	<b>Hardware</b>	AMW 75-7600
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	76mm x 1039mm
<b>Loaded Weight</b>	7,129 g	<b>Total Impulse</b>	6,774.6 Ns (1,523.0 lb-s)
<b>Burnout Weight</b>	2,957 g	<b>Maximum Thrust</b>	2,554.4 N (574.2 lb)
<b>Propellant Weight</b>	3,870 g	<b>Average Thrust</b>	2,049.8 N (460.8 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	178.52 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.31 s
<b>Notes</b>	32.3% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

08280905.gra

