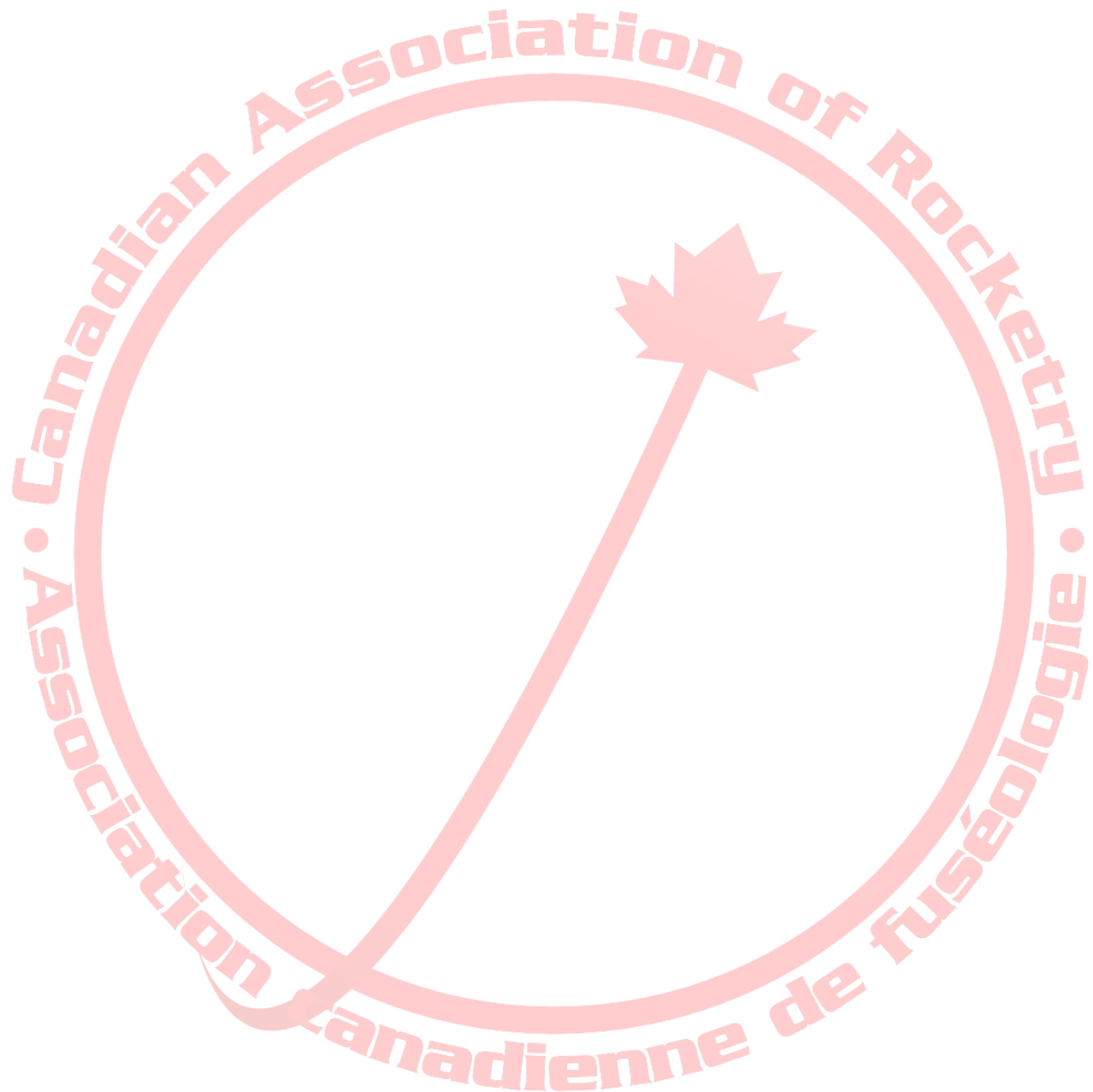


# Canadian Association of Rocketry

## *Rocket Motor Certification*



October 24 + 25, 2009 Session

Submitted to the CAR Executive November 8<sup>th</sup>, 2009

## Introduction

A motor testing session was held at the Cesaroni Technology Incorporated facility in Gormley, Ontario on October 24<sup>th</sup> and 25<sup>th</sup>, 2009.

A total of thirty-one (31) motors were fired to certify eleven (11) new reloads. The certified list includes a G, an I, an L, six M's and two N motors. The propellants included **Blue Streak**, **Classic**, **Imax**, **White Thunder**, and **Skidmark**. Two new propellants, "**Pink**" and "**C-Star**" were introduced. The total fired impulse fired this session was 190,005.8 N-sec (16.0% R).

Two of these new motors are in the top of their impulse range:

- 9994-M3400- White Thunder (95.2% M)
- 20146-N5800- C-Star (96.7% N)

The ABC 4701-L1290-SK reload, designed for the AMW 76-6000 case, ships with single-use nozzle and requires the standard Pro75 CTI nozzle carrier to complete the assembly.

Testing of spacers continued this session, including spacers to accommodate Pro38-6GXL cases, the Pro54 family (including the 6GXL case). So there are now two spacers for each of the Pro38 and Pro54 lineups. The products will ship with instructions on proper use. The XL spacers are for use in XL cases only.

As a result of this and previous testing, 38mm, 54mm, 75mm and 98mm spacers (alone or stacked) and the Pro29 tapered closure form part of the certified motor systems from CTI. These spacers (38mm, 54mm, 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 eleven (11) 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. As time permits, photos from some of the firings will be posted as well.

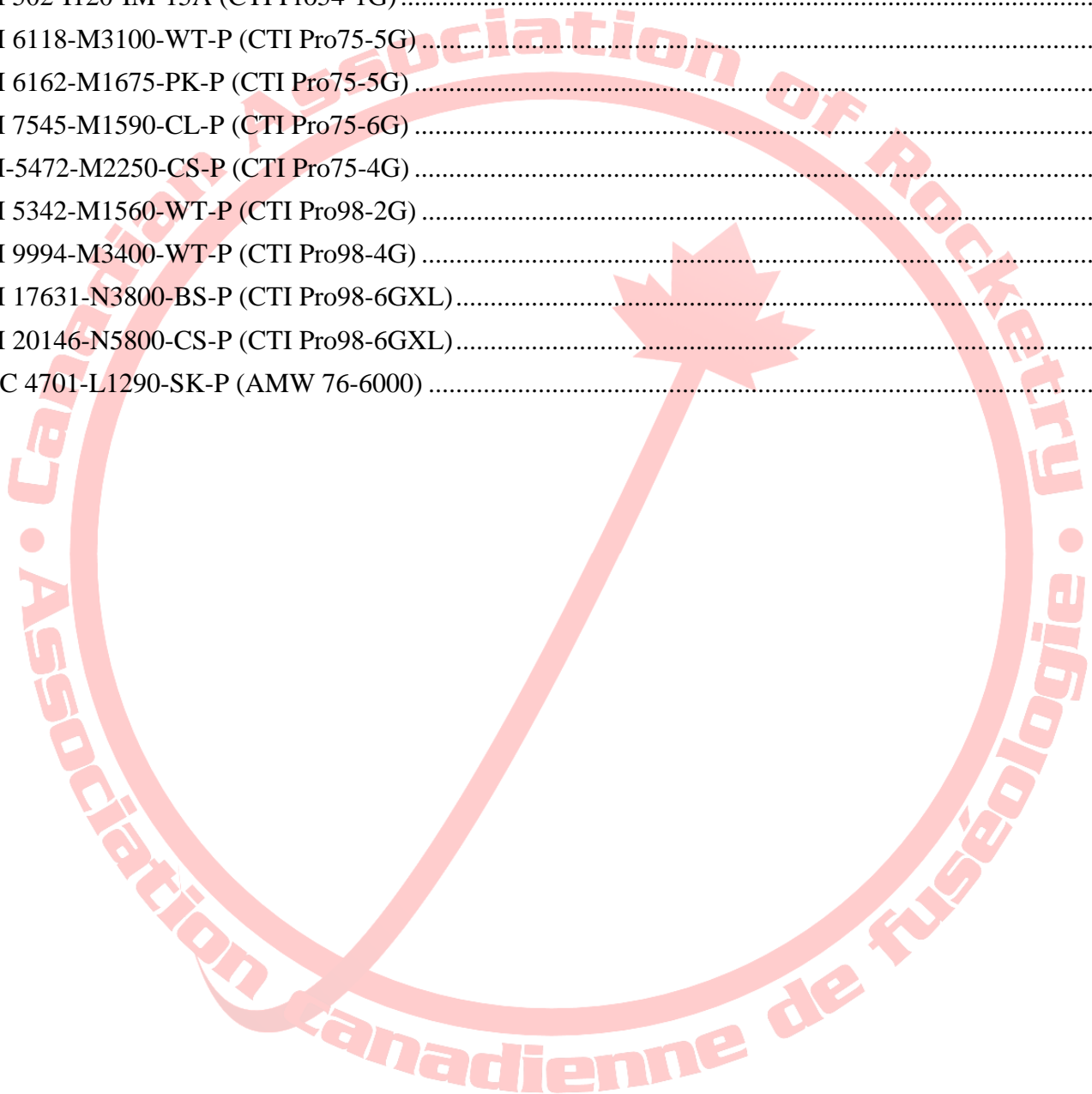
Respectfully submitted,

Thomas Raithby  
Chair of CAR Motor Certification

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

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## Certified Motors

### CTI 93-G80-SK-14A (CTI Pro29-2G)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 93-G80-SK-14A** rocket motor was tested October 25<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 93-G80-SK-14A</b>	<b>Test Date</b>	October 25, 2009
<b>Manufacturer Designation</b>	CTI 93-G80-14A	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Skidmark</i>	<b>Hardware</b>	Pro29-2G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	29mm x 142mm
<b>Loaded Weight</b>	143.2 g	<b>Total Impulse</b>	92.9 Ns (20.9 lb-s)
<b>Burnout Weight</b>	86.8 g	<b>Maximum Thrust</b>	112.2 N (25.2 lb)
<b>Propellant Weight</b>	50.0 g	<b>Average Thrust</b>	80.5 N (18.1 lb)
<b>Delays Tested</b>	14-5 seconds, adjustable	<b>Specific Impulse (Isp)</b>	189.40 s
<b>Samples per second</b>	1000	<b>Burn time</b>	1.15 s
<b>Notes</b>	17.3% G – Considered HP under NFPA due to high average thrust		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10250909.gra

## CTI 502-I120-IM-15A (CTI Pro54-1G)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 502-I120-IM-15A** rocket motor was tested October 24<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 502-I120-IM-15A</b>	<b>Test Date</b>	October 24, 2009
<b>Manufacturer Designation</b>	CTI 502-I120-15A	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Imax</i>	<b>Hardware</b>	Pro54-1G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	54mm x 143mm
<b>Loaded Weight</b>	623.2 g	<b>Total Impulse</b>	501.8 Ns (112.8 lb-s)
<b>Burnout Weight</b>	323.2 g	<b>Maximum Thrust</b>	152.0 N (34.2 lb)
<b>Propellant Weight</b>	263.1 g	<b>Average Thrust</b>	122.2 N (27.5 lb)
<b>Delays Tested</b>	15–5 seconds, adjustable	<b>Specific Impulse (Isp)</b>	194.49 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.12 S
<b>Notes</b>	56.8% I		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10240903.gra

## CTI 6118-M3100-WT-P (CTI Pro75-5G)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 6118-M3100-WT-P** rocket motor was tested October 24<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 6118-M3100-WT-P</b>	<b>Test Date</b>	October 24, 2009
<b>Manufacturer Designation</b>	CTI 6118-M3100-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>White Thunder</i>	<b>Hardware</b>	Pro75-5G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	75mm x 757mm
<b>Loaded Weight</b>	5018 g	<b>Total Impulse</b>	6117.8 Ns (1375.3 lb-s)
<b>Burnout Weight</b>	2068 g	<b>Maximum Thrust</b>	3709.2 N (833.9 lb)
<b>Propellant Weight</b>	2903 g	<b>Average Thrust</b>	3075.0 N (691.3 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	214.93 s
<b>Samples per second</b>	1000	<b>Burn time</b>	1.99 s
<b>Notes</b>	19.5% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10240907.gra

## CTI 6162-M1675-PK-P (CTI Pro75-5G)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 6162-M1675-PK-P** rocket motor was tested October 24<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 6162-M1675-PK-P</b>	<b>Test Date</b>	October 24, 2009
<b>Manufacturer Designation</b>	CTI 6162-M1675-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Pink</i>	<b>Hardware</b>	Pro75-5G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	75x757mm
<b>Loaded Weight</b>	5223 g	<b>Total Impulse</b>	6162.0 Ns (1385.3 lb-s)
<b>Burnout Weight</b>	2064 g	<b>Maximum Thrust</b>	2499.2 N (561.8 lb)
<b>Propellant Weight</b>	3019 g	<b>Average Thrust</b>	1674.1 N (376.4 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	208.16 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.68 s
<b>Notes</b>	20.4% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10240909.gra

## CTI 7545-M1590-CL-P (CTI Pro75-6G)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 7545-M1590-CL-P** rocket motor was tested October 24<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 7545-M1590-CL-P</b>	<b>Test Date</b>	October 24, 2009
<b>Manufacturer Designation</b>	CTI 7545-M1590-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Classic</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>	6076 g	<b>Total Impulse</b>	7544.6 Ns (1696.1 lb-s)
<b>Burnout Weight</b>	2316 g	<b>Maximum Thrust</b>	2499.2 N (561.8 lb)
<b>Propellant Weight</b>	3590 g	<b>Average Thrust</b>	1592.4 N (358.0 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	214.28 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.74 s
<b>Notes</b>	47.4% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10240905.gra

**CTI-5472-M2250-CS-P (CTI Pro75-4G)**

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI-5472-M2250-CS-P** rocket motor was tested October 24<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-5472-M2250-CS-P</b>	<b>Test Date</b>	October 24, 2009
<b>Manufacturer Designation</b>	CTI-5472-M2250-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<b>C-Star</b>	<b>Hardware</b>	CTI Pro75-4G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	75mm x 621mm
<b>Loaded Weight</b>	4415 g	<b>Total Impulse</b>	5472.2 Ns (1230.2 lb-s)
<b>Burnout Weight</b>	1787 g	<b>Maximum Thrust</b>	2960.2 N (665.5 lb)
<b>Propellant Weight</b>	2489 g	<b>Average Thrust</b>	2267.5 N (509.8 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	224.17 s
<b>Samples per second</b>	1000	<b>Burn time</b>	2.41 s
<b>Notes</b>	6.9% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10240912.gra

## CTI 5342-M1560-WT-P (CTI Pro98-2G)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 5342-M1560-WT-P** rocket motor was tested October 24<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 5342-M1560-WT-P</b>	<b>Test Date</b>	October 24, 2009
<b>Manufacturer Designation</b>	CTI 5342-M1560-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>White Thunder</i>	<b>Hardware</b>	CTI Pro98-2G
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 394mm
<b>Loaded Weight</b>	4977 g	<b>Total Impulse</b>	5342.0 Ns (1200.9 lb-s)
<b>Burnout Weight</b>	2394 g	<b>Maximum Thrust</b>	1805.2 N (405.8 lb)
<b>Propellant Weight</b>	2452 g	<b>Average Thrust</b>	1562.0 N (351.2 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	222.15 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.42 s
<b>Notes</b>	4.3% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10240914.gra

## CTI 9994-M3400-WT-P (CTI Pro98-4G)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 9994-M3400-WT-P** rocket motor was tested October 24<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 9994-M3400-WT-P</b>	<b>Test Date</b>	October 24, 2009
<b>Manufacturer Designation</b>	CTI 9994-M3400-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>White Thunder</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>	8108 g	<b>Total Impulse</b>	9994.5 Ns (2246.8 lb-s)
<b>Burnout Weight</b>	3342 g	<b>Maximum Thrust</b>	3983.0 N (895.4 lb)
<b>Propellant Weight</b>	4452 g	<b>Average Thrust</b>	3421.1 N (769.1 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	228.92 s
<b>Samples per second</b>	1000	<b>Burn time</b>	2.92 s
<b>Notes</b>	95.2% M		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10240915.gra

## CTI 17631-N3800-BS-P (CTI Pro98-6GXL)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 17631-N3787-BS-P** rocket motor was tested October 24 and 25<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 17631-N3800-BS-P</b>	<b>Test Date</b>	October 24/25, 2009
<b>Manufacturer Designation</b>	CTI 17631-N3800-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Blue Streak</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>	14261 g	<b>Total Impulse</b>	17631.7 Ns (3963.8 lb-s)
<b>Burnout Weight</b>	5551 g	<b>Maximum Thrust</b>	5097.2 N (1145.9 lb)
<b>Propellant Weight</b>	8449 g	<b>Average Thrust</b>	3786.9 N (851.3 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	212.80 s
<b>Samples per second</b>	1000	<b>Burn time</b>	4.65 s
<b>Notes</b>	72.2% N		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10250901.gra

## CTI 20146-N5800-CS-P (CTI Pro98-6GXL)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **CTI 20146-N5800-CS-P** rocket motor was tested October 24<sup>th</sup> and 25<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 20146-N5800-CS-P</b>	<b>Test Date</b>	October 24/25, 2009
<b>Manufacturer Designation</b>	CTI 20146-N5800-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<b>C-Star</b>	<b>Hardware</b>	CTI Pro98-6GXL
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	98mm x 1239mm
<b>Loaded Weight</b>	14826 g	<b>Total Impulse</b>	20145.7 Ns (4528.9 lb-s)
<b>Burnout Weight</b>	5401 g	<b>Maximum Thrust</b>	8034.6 N (1806.2 lb)
<b>Propellant Weight</b>	9021 g	<b>Average Thrust</b>	5774.1 N (1298.1 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	227.73 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.49 s
<b>Notes</b>	96.7% N		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10250903.gra

## ABC 4701-L1290-SK-P (AMW 76-6000)

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

November 8<sup>th</sup>, 2009

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

Dear Dr. Jeroen Louwers,

The **ABC 4701-L1290-SK-P** rocket motor was tested October 25<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 4701-L1290-SK-P</b>	<b>Test Date</b>	October 25, 2009
<b>Manufacturer Designation</b>	ABC 4701-L1290-P	<b>Manufacturer</b>	Cesaroni Technology Inc.
<b>Propellant</b>	<i>Skidmark</i>	<b>Hardware</b>	AMW 76-6000
<b>Single-Use/Reload/Hybrid</b>	Reloadable	<b>Motor Dimensions</b>	76mm x785mm
<b>Loaded Weight</b>	5399 g	<b>Total Impulse</b>	4701.1 Ns (1056.8 lb-s)
<b>Burnout Weight</b>	2352 g	<b>Maximum Thrust</b>	1587.9 N (357.0 lb)
<b>Propellant Weight</b>	2705 g	<b>Average Thrust</b>	1291.4 N (290.3 lb)
<b>Delays Tested</b>	plugged	<b>Specific Impulse (Isp)</b>	177.20 s
<b>Samples per second</b>	1000	<b>Burn time</b>	3.64 s
<b>Notes</b>	83.6% L		

Respectfully submitted,

Thomas Raithby  
 Chairman, CAR Motor Certification

10250913.gra

