

Test Report AAC2223820R1-2024/25

Subject:

Thermal vacuum outgassing
„A thermal vacuum test for the screening of space materials“
acc. to ECSS-Q-70-02
TVT2528

Test performed in behalf of

Prusa Polymers a.s.
Partyzánská 188/7a
170 00 Praha 7
CZECH Republic

Attn:

David Šorm

On:

Prusament PC Space Grade Black	TML: 0,25	RML: 0,12	CVCM: 0,00
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Test Method:

Thermal vacuum outgassing acc. to ECSS-Q-70-02

Test performed by:

Dr. Christian Jogl

Date:

30.07.2025

**Comments:**

The test result refers exclusively to the test subject.
The production or transmission of extracts of the present report is subject to authorization by the testing laboratory.
This report contains pages 1 to 10

" A Thermal Vacuum Test for the Screening of Space Materials"

acc. to ECSS-Q-70-02

Weights



Material	Pos. No.	Weight (before test)					Weight (after test)		
		Empty cups Wc [mg]	Material + cup before test Wo [mg]	Substrate Ws [mg]	Material (net) Wm= Wo-Wc-Ws [mg]	Collector plates before test Wp [mg]	Material + cup after test Wf [mg]	Collector plates after test Wg [mg]	Material + cup after conditionin Wr [mg]
Test Report Nr. TVT2528									
Empty specimen cup	1	79,045	79,045		0,000	1941,896	79,033	1941,895	79,040
Empty specimen cup	6	76,586	76,586		0,000	2009,163	76,575	2009,154	76,581
Empty specimen cup	11	76,936	76,936		0,000	1967,401	76,922	1967,403	76,925
Prusament PC Space Grade Black	2	76,332	321,336		245,004	2065,214	320,717	2065,216	321,025
Prusament PC Space Grade Black	7	74,080	312,632		238,552	2000,206	312,058	2000,199	312,373
Prusament PC Space Grade Black	12	75,673	313,978		238,305	1939,130	313,378	1939,139	313,678

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Outgassing properties



Material		Outgassing properties												
		TML	RML	WVR	CVCM	CVCM (corr.)	TML		RML		WVR		CVCM	
See material identification card	Pos. No.	Wo-Wf [mg]	Wo-Wr [mg]	Wr-Wf [mg]	Wg-Wp [mg]	Wg-Wp [mg]	(Wo-Wf)/Wm [%]		(Wo-Wr)/Wm [%]		(Wr-Wf)/Wm [%]		(Wg-Wp)/Wm [%]	
Empty specimen cup	1	0,012	0,005	0,007	-0,001		Mean StdAbw		Mean StdAbw		Mean StdAbw		Mean StdAbw	
Empty specimen cup	6	0,011	0,005	0,006	-0,009									
Empty specimen cup	11	0,014	0,011	0,003	0,002									
Prusament PC Space Grade Black	2	0,619	0,311	0,308	0,002	0,005	0,25		0,13		0,13		0,00	
Prusament PC Space Grade Black	7	0,574	0,259	0,315	-0,007	-0,004	0,24	0,25	0,11	0,12	0,13	0,13	0,00	0,00
Prusament PC Space Grade Black	12	0,600	0,300	0,300	0,009	0,012	0,25	0,01	0,13	0,01	0,13	0,00	0,00	0,00

Definitions:

TML total mass loss, including water vapor outgassing
RML Recovered mass loss, mass loss without water vapor
WVR water vapor regained
CVCM Collected volatile condensable material , i.e. mass recondensed on a cold collector plate
 Values of material-plates are corrected with mean value of empty-plates.
 units: [%] all properties refer to the percentage of weight change to net material mass

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Test results



Customer:

Prusa

TVT2528

Material (See also material identification cards.)	TML		RML		WVR		CVCN		Acceptance limits achieved:
	Mean [%]	StdDev [%]	Mean [%]	StdDev [%]	Mean [%]	StdDev [%]	Mean [%]	StdDev [%]	
Prusament PC Space Grade Black	0,25	0,01	0,12	0,01	0,13	0,00	0,00	0,00	YES

Nonconformance, failure modes, ... :

Distribution: (copy:)	Prusa AAC Aerospace & Advanced Composites GmbH	Material received: 25-07-24	Test run: Number: TVT2528	Date: 25-07-28	Report:		Ch. Jogl
					Number: 2223820R1-2024/25	Date: 25-07-30	

Acceptance Limits (acc. to ECSS Q-70-02):

Mean value of the material must be: RML < 1.0 % and CVCN < 0.10 %. (For special requirements refer to standard.)

The standard deviation (StdDev) of the TML and RML must be lower than 0.1 times the mean value, with a minimum of 0.05 %.

The standard deviation (StdDev) of the CVCN must be lower than 0.2 times the mean value, with a minimum of 0.03 %.

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Raiffeisenregionalbank Wiener Neustadt Kto.Nr. 000-05.029.145

" A Thermal Vacuum Test for the Screening of Space Materials"

acc. to ECSS-Q-70-02
Test results - Failure analysis



Customer:
Prusa

TVT2528

Material (See also material identification cards.)	TML		RML		WVR		CVCM		Acceptance limits achieved:
	Mean [%]	StdDev [%]	Mean [%]	StdDev [%]	Mean [%]	StdDev [%]	Mean [%]	StdDev [%]	
Prusament PC Space Grade Black	0,25	0,01	0,12	0,01	0,13	0,00	0,00	0,00	YES

Acceptance limits (customer defined; not acc. to ECSS Q-70-02)

Actual value must be lower (<) than limit (not <=).	1,00	0,05	1,00	0,05			0,10	0,03

Acceptance limits achieved:

Prusament PC Space Grade Black	YES	YES	YES	YES			YES	YES	YES

Acceptance Limits (acc. to ECSS Q-70-02):

Mean value of the material must be: $RML < 1.0 \%$ and $CVCM < 0.10 \%$. (For special requirements refer to standard.)

The standard deviation (StdDev) of the TML and RML must be lower than 0.1 times the mean value, with a minimum of 0.05 %.

The standard deviation (StdDev) of the CVCM must be lower than 0.2 times the mean value, with a minimum of 0.03 %.

" A Thermal Vacuum Test for the Screening of Space Materials"

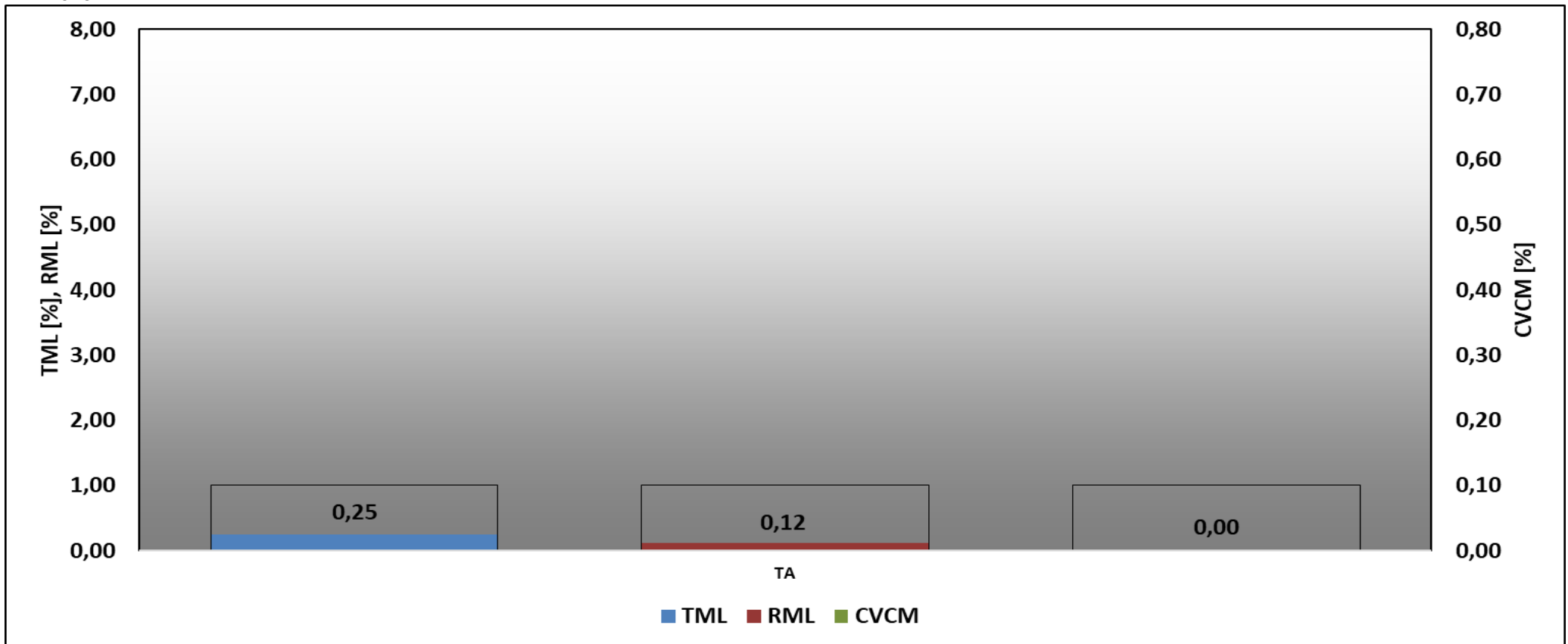
acc. to ECSS-Q-70-02

Test results - Graphic representation

Customer:

Prusa

TVT2528



" A Thermal Vacuum Test for the Screening of Space Materials"

acc. to ECSS-Q-70-02

Test parameters - Graphic representation



Customer:

Prusa

TVT2528

