JBS V-BLOCK

V-Block Technology

JBS COUROS

ZENDA

New Normal: COVID-19 pandemic

Contaminated surfaces and materials can be an important route for virus spread

There is also growing demand for next-generation antiviral surfaces able to rapidly inactivate any contaminating virus particles.

JBS has taken one investigation line incorporating antiviral additives into their products

V-Block Development Process

Active substance Research

Microbiological Analysis

Prototype and validation according specification

Launch / Communication

Determination of the durability of antiviral effect after using

V-Block Development Process – Active substance research

In partnership with the Brazilian company Nanox, founded in 2004 with a focus on the development, production and supply of antivirals, antibacterials and antifungals by inorganic synthesis.

We found a technology that can be adapted to our product and process

It is a compatible additive with the water-based products normally used in the production of automotive leather for all applications, seats, steering wheel covers, headrest, control panel, door panels, etc.

This additive is based on micro particles whose active substance is Silver Nitrate

Restricted Substance Verification

ECHA

- Leather is included in the product type 9 (PT09)
- REACH not mentioned as restricted substance
- BPR: Silver Nitrate is included in the active substances list approved in the Regulation

OEHHA

- Not included in the Proposition 65 list

Restricted Substance Verification

EPA

- Applies the regulation for pesticides
- Silver and Compounds are registered as allowed pesticides

GADSL

- The use of Silver Nitrate must be declared

The two most common mechanisms proposed for the antiviral effect of silver:

- The silver particle binds to the outer coating of the virus, inhibiting the virus from attaching to cell receptors.

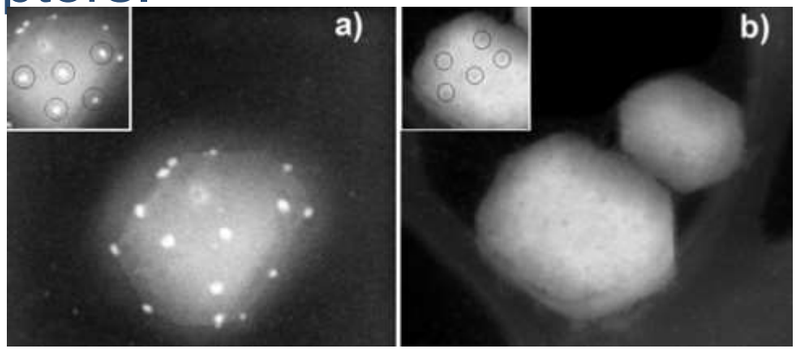

Image obtained by transmission electron microscopy of a treated sample (a) and a control sample (b)

- Silver binds to the DNA or RNA of the virus, thereby inhibiting the replication or spread of the virus within host cells.

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Developed in the Biomedical Sciences laboratory of the University of São Paulo, a Level 3 safety laboratory.

Microbiological tests according to international standards

- Antiviral Test according ISO 21702, Measurement of antiviral activity on plastics and other non-porous surfaces

- Antibacterial test according ISO 22196, Measurement of antibacterial activity on plastics and other non-porous surfacesand and JIS Z 2801, Test for Antimicrobial Activity of Plastics

V-Block Development Process – Microbiological Analysis

ISO 21702 Results:

Copies of Virus per mL at different experiment time

Sample Description	Copies/mL	Viral Inactivation (%)	Incubation time
Positive Control Surface (Viral System without samples)	$2{,}39 \times 10^{6}$	-	15 min
Test Sample (JBS Finished Leather with Nanox additive)	$1{,}04 \times 10^{6}$	56,38	
Positive Control Surface (Viral System without samples)	$4{,}02 \times 10^{6}$	-	30 min
Test Sample (JBS Finished Leather with Nanox additive)	$2{,}80 \times 10^{3}$	99,93	

V-Block Development Process – Microbiological Analysis

ISO 22196 Results:

Sample ID	Bacteria at time zero S. aureus ATCC6538P (UFC/cm²)	Bacteria after 24 h S. aureus ATCC6538P (UFC/cm²)	R index (Logarithmic reduction)	% Reduction	Bacteria at time zero E. Coli ATCC 8739 (UFC/cm²)	Bacteria after 24h E. Coli ATCC 8739 (UFC/cm²)	R index (Logarithmic reduction)	% Reduction
OS 103101/01	$1{,}3\times10^{4}$	$1{,}4\times10^{4}$	Not Reduction		$1{,}3\times10^{4}$	$1{,}5\times10^{4}$	Not Reduction	
OS 103101/02	$1{,}3\times10^{4}$	0,8x10	3,25	99,94	$1{,}3\times10^{4}$	1,3x10	3,07	99,9

Sample OS 103101/01 – Leather without additive
Sample OS 103101/02 – Leather with Nanox additive

Conclusion

Antiviral activity of leather surface was demonstrated, with a rapid inactivation of virus

These results can be extrapolated to other encapsulated viruses, which are surface viruses

Also an antibacterial efficacy against Gram+ and Gram- bacteria

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For each tested additive concentration, comparative physical tests were carried out between treated and untreated leathers

Results:

ID Sample	Rubbing (E.G.)			Taber	Coating adhesive strength (N/cm)	Behavior at permanent folding	Taber sewing
	Dry	Wet	pH				
210420-1E	**5**	4/5	4/5	OK	7.25	OK	OK
210420-2E	**5**	5	4/5	OK	5.84	OK	OK
210420-3E	**5**	5	5	OK	10.04	OK	OK
210421-1E	4/5	5	5	OK	9.84	OK	OK
210421-2E	5	5	4/5	OK	6.52	OK	OK
210421-3E	4/5	4/5	4/5	OK	4.87	OK	OK
Requirements	≥ 4/5	≥ 4/5	≥ 4/5	Without damage	≥ 4 N/cm	Without damage	Without damage

V-Block Development Process – Prototype and validation according specification

For the ideal additive concentration found, Automotive Leather was produced and tested according to International TL

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Color: BLACK

Nº de desarrollo: 210419-1E

Automotive Leather

Fecha: 19/04/2021

Nº Ref.	Norma	ENSAYO	Tamaño muestra	Nº de muestras	En ensayo	RESULTADO	Observaciones	REQUERIMIENTO
5.1.1	DIN EN ISO 2589	**Thickness / Espesor**	100 x 100 mm (A=100cm²)	3 5 medidas c/u		1,35		1.2 - 1.5 mm
5.1.2	DIN EN ISO 2420	**Gross Density / Densidad**		-		0,7		0.6 - 0.8 g/cm³
5	DIN EN ISO 2420	**Weight per unit area / Masa por unidad de área**		3		931		800 - 1000 g/m²
5.1.4	DIN EN ISO 4048	**Grease content / Contenido de grasa**	(10 ± 0.1)g	2		Muestra 1: 9,1 Muestra 2: 9,5		8 - 13%
5.1.5	DIN EN ISO 4045	**pH Value / Valor de pH**	(5 ± 0.1)g	2		Muestra 1: 3,76 Muestra 2: 3,73		≥ 3.5
5.1.5	DIN EN ISO 4045	**Difference figure / Índice de diferencia**				Muestra 1: 0,5 Muestra 2: 0,4		≤ 0.7
5.1.6	DIN EN ISO 5398-2, -3, -4	**Chromium content / Contenido de cromo**		2		Muestra 1: 3,5 Muestra 2: 3,6		3 - 5 %
5.1.7	DIN EN ISO 17186	**Layer thickness of finish / Espesor de la terminación**	50 x 50 mm	3		Muestra 1: 39 Muestra 2: 38 Muestra 3: 38		25 - 45 µm
5.2.1	DIN EN ISO 3376 Standard Specimen	**Maximum tensile strength / Tracción**	110 x 25 mm (ver figura 1)	3x / 3y		X Y 151 163		≥ 130 N valores individuales ≥ 80 N
5.2.2		Elongación a la rotura				X Y 41 47		35 - 60 %
5.2.3		Gráfico fuerza- desplazamiento						Adjuntar gráfica
5.2.4	DIN EN ISO 23910	**Stitch Tear Resistance / Resistencia del desgarro en un punto**	50 x 20 mm (ver figura 3)	3x / 3y		X Y 71,5 65,3		≥ 60 N (indicar máximo y mínimo)
5.2.5	DIN EN ISO 3377-1	**Tear propagation force / Fuerza de desgarro**	70 x 40 mm (ver figura 1)	3x / 3y		X Y 35,3 37,4		valores individuales≥ 25 N
5.2.6	TL	**Elongation behavior and return behavior / Elongación estática y remanente**	50 x 200 mm	3x / 3y		X Y		Reportar valor
5.2.6.1		Elongación estática F = 50 N, 30 min.				12,4 11,7		≤ 15 %
5.2.6.2		Elongación remanente (medir despues de 30 min)				3,2		≤ 5 %
5.2.7	VDA 230-209	**Bending force / Blandura con bending**	30 x 50 mm	6x / 6y		X Y 3,2 3,7 3,8 3,6	Top (lado flor) Bottom (lado carne)	2 - 5 N
		Condición A						
5.2.8	TL	**Water resistance / Penetración** Poner 1mL de agua destilada en el lado carne. Evaluar luego de 4hs	100 x 100	2		OK		Sin cambio de color ni deformación del lado flor
5.2.9	DIN EN ISO 105-E04 DIN EN ISO 105-X12	**Sweat resistance of the grain side / Migración alcalina** 5Kg / (37 ± 2)ºC / 4h	40 x 100 mm	2		Muestra 1: 5 Muestra 2: 5		≥ 4/5 (escala de grises)
5.2.10	DIN EN ISO 5402	**Behavior at permanent folding / Flexiones**				X Y		
5.2.10.1		Normal - 100 000 ciclos	70 x 45 mm	1x / 1y		OK OK		
5.2.10.2	VDA 230-206	Luego de hidrólisis: 168h a 70ºC y 75% HR, secar durante 24h - 5000 ciclos	cortar mas grandes	1x / 1y		OK OK		
5.2.10.3	DIN EN ISO 5402	Enfrio -10ºC - 30 000 ciclos	70 x 45 mm	1x / 1y		OK OK		Sin quiebre ni Blanqueo utilizando aumento 6X
5.2.10.4	DIN EN ISO 105-B06 VDA 230-216, Appendix 1	Luego de un ciclo de solidez a la luz - 10 000 ciclos	140 x 65 mm	1x / 1y		OK OK		
5.2.11	DIN EN ISO 14268	**Water vapor transmission / Permeabilidad al vapor** Sin tratamiento previo	ø 38 mm	3		Muestra 1: 1,1 Muestra 2: 1,2 Muestra 3: 1,1		≥ 1.0 mg/cm².h
5.2.12	DIN EN 20105-A02	**Heat Resistance / Amarilleo** 144h a 100ºC	50 X 50 mm	1		4/5		≥ 4 (escala de grises)

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5.2.13	DIN EN ISO 105-B06 VDA 230-216, Appendix 1	**High -temperature light exposure / Solidez a la luz**	140 x 65 mm	2	Muestra 1: 4/5 Muestra 2: 4/5		Sin cambio de color
5.2.13.1		3 ciclos					≥ 4 (escala de grises)
5.2.14	DIN EN ISO 11644	**Coating adhesive strength of the finish / Adherencia de la terminación**			X Y		
5.2.14.1.1		Seco	140 x 20 mm	1x / 1y	6,53 7,7		≥ 4.0 N/cm
5.2.14.1.2		Húmedo - una hora en agua destilada	140 x 20 mm	1x / 1y	3,15 3,3		≥ 1.2 N/cm
5.2.14.2		Luego de 100 000 flexiones	70 x 45 mm	1x / 1y	5,82 5,93		≥ 3.5 N/cm
5.2.14.3	DIN EN ISO 105-B06 VDA 230-216, Appendix 1	Luego de 3 ciclos de solidez a la luz	140 x 65 mm	1x / 1y			≥ 3.5 N/cm
5.2.15	DIN EN ISO 11640	**Fastness to rubbing / Frotes veslic**	120 x 30 mm	6 (1 para c/ensayo)			Sin daño en la terminación
5.2.15.1		Seco - 2000 ciclos			4/5		≥ 4/5
5.2.15.2		Húmedo - 500 ciclos			5		≥ 4/5
5.2.15.3		Solución alcalina - 100 ciclos			5		≥ 4/5
5.2.15.4	DIN 51631-2	Special boiling point spirit - 20 ciclos			5		≥ 4/5
5.2.15.6		Etanol - 5 ciclos			4/5		≥ 4
5.2.16	ISO 17076	**Wear characteristics / Abrasión Taber**					Evaluación con lupa 6X
5.2.16.1.1		Sin costura - 500 ciclos	ø 106 mm	2 s/c 4c/c	Muestra 1: OK Muestra 2: OK		Sin exposición del semi.
5.2.16.1.2		Con doble costura- 400 ciclos	100 x 100 mm		Muestra 1: OK Muestra 2: OK		Sin exposición del semi.
5.2.16.2	DIN EN ISO 17076-2	**Wear characteristics / Abrasión Martindale**	ø 160 mm	1	3		Número de daños<4
		Martindale ball plate - 1500 ciclos					
5.2.17	TL	**Shrinkage behavior / Encogimiento**	250 x 250 mm marcar en la muestra un cuadrado de 200 x 200 mm	6 (2 para c/ensayo)			
5.2.17.1	TL	Ciclo climático de envegecimeinto- 96h a 70ºC y 75%HR			5,5		≤ 7%
5.2.17.2	TL	Ciclo climático de envegecimiento (simulación de de climas de humedad y temperatura)			5,3		≤ 7%
5.2.17.3	TL	Luego de 168h a 120ºC (Encogimiento y Amarilleo)			5,7 4		≤ 7% ≥ 3 (E.G.)

Dirt repellency / Repelencia a la suciedad						
Repelencia al aceite: prueba de hidrocarburos	200 x 200 mm	2	5			≥ 4
Prueba de la gota de Alcohol/agua	200 x 200 mm	2	5			≥ 4
Repelencia al aceite luego de abrasión (abrasión Taber)	ø 106 mm	2	5			≥ 4
Loose-grain effect / Flojedad	300 x 55	1x /1y	X 1	Y 1		valores individuales ≤ 2
Soiling behavior / Limpiabilidad EMPA 170-7-1172 - 1000 ciclos	ø 140 mm	1				≥ 4 (escala de grises)
Stick slip behavior	65 x 100 mm 25 x 50 mm	1c/u	4			≤ 5 Para RPN ≥ 4 se debe adjuntar curva de ensayo
Color adaptation crust / finish	A4	1	4			> 3 escala de grises

5.2.24	TL 1010	**Burning Behaviour / Flamabilidad**	356 x 100 mm	2x / 2y (1 par para c/ensayo)	X	Y	
		Normal			0	0	< 100 mm/min
		7 días a 60ºC- 48hs a 23±2ºC Y 50% RH			0	0	< 100 mm/min
5.2.25.2	PV 3015	**Fogging (gravimetric) / Fogging gravimétrico** Muestras 7 días en desecador Baño termostatizado (100 ± 0,3) ºC Agua de enfriamiento (21 ± 1) ºC Tiempo de ensayo 16 h ± 10 min. Papel aluminio 3½ - 4h en desecador	ø 80 mm	3	Muestra 1: 3,5 Muestra 2: 3,2 Muestra 3: 3,4		≤ 5 mg
5.2.25.3	PV 3900	**Odor / Olor** 2h at 80ºC	200 x 200 mm	3	Muestra 1: 3 Muestra 2: 3 Muestra 3: 3		≤ 3.5 Evaluar según tabla 1
5.2..26	PV 3970	**Potential for mold growth / Crecimiento de hongos**	ø 90 mm	3	OK		Condicionalmente OK
SKD	ISO 17234	**BLC Softness / Blandura BLC** Ø 25 mm	Se evalua en el cuero		3,6		≥ 3.5 mm
5.3.3	TL 52064	**Resistance to Hot Air / Resistencia al Aire Caliente**	200x200 mm	3	OK		Sin cambio de color, endurecimiento o daño en la terminación

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Conclusion

Incorporation of V-Block technology does not affect the organoleptic or physicochemical properties of the leather

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Gracias
Thank you
Merci
Obrigado

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