

## TEST REPORT

EN ISO 374 1-5



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China

SATRA reference: CHT0305236 /2047/  
Issue 2

Your reference: KS-ST RT021

Date of report: 29 January 2021

Samples received: 20 November 2020

Date(s) work carried out: 23 November 2020 to  
1 December 2020

### TECHNICAL REPORT

(This report replaces the technical report of CHT0305236 /2047 issued on 10 December 2020)

Subject: EN ISO 21420: 2020 size & dexterity & innocuousness test, EN ISO 374-2: 2019 air leak and water leak, EN ISO 374-5: 2016 viruses test on Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Size: S (6), M (7), L (8), XL (9), Reference number: KS-ST RT021.

#### Conditions of Issue:

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The uncertainty of the results (UoM) in this report is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , which provides a coverage probability of approximately 95%.

Report signed by: Adam Zhang  
Position: Technologist  
Department: China Testing

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## TECHNICAL REPORT

### WORK REQUESTED

Samples described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Size: S (6), M (7), L (8), XL (9), Reference number: KS-ST RT021 were received by SATRA on 20 November 2020 for testing in accordance with EN ISO 21420: 2020, EN ISO 374-2: 2019 and EN ISO 374-5: 2016.

### SAMPLE SUBMITTED



Samples described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021

### TESTING REQUESTED

- EN ISO 21420: 2020 Clause 5.1 – Sizing and measurement of gloves
- EN ISO 21420: 2020 Clause 5.2 – Dexterity
- EN ISO 374-2: 2019 Clause 7.2 – Air leak
- EN ISO 374-2: 2019 Clause 7.3 – Water leak
- EN ISO 374-5: 2016 Clause 5.3 – Protection against viruses (ISO 16604: 2004 Procedure B)
- EN ISO 21420: 2020 Clause 4.2 – Innocuousness of protective gloves

### CONCLUSION

The samples described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Size: S (6), M (7), L (8), XL (9), Reference number: KS-ST RT021 were found to achieve the following results:

- EN ISO 21420: 2020 Clause 5.1 – See below table
- EN ISO 21420: 2020 Clause 5.2 – Level 5
- EN ISO 374-2: 2019 Clause 7.2 – Pass
- EN ISO 374-2: 2019 Clause 7.3 – Pass
- EN ISO 374-5: 2016 Clause 5.3 – Pass
- EN ISO 21420: 2020 Clause 4.2 – Pass PAHs, DMFA and pH value

Detailed results are included on the following page(s)



## TECHNICAL REPORT

### Testing

Testing was carried out in accordance with EN ISO 21420:2020, EN ISO 374-2: 2019.

Samples for testing were conditioned for at least 24 hours in a conditioned environment maintained at (23±2) °C and (50±5) % relative humidity.

### Requirements

Table 1 – Requirements for EN ISO 21420: 2020 Clause 5.2 Dexterity

Performance level	1	2	3	4	5
Diameter of dexterity pin /mm	11.0	9.5	8.0	6.5	5.0

Table 2 – Requirements for EN ISO 374-2: 2019

Clause 7.2 Air leak	No leak to be detected
Clause 7.3 Water leak	No leak to be detected

### Test Results

Table 3 – EN ISO 21420:2020 Test Results

Clause / Test	Requirement	Test Results			UoM (See note ♣)	Result	
5.1 Glove length, comfort and fit	N/A	Size	Length /mm			± 1.10 mm	N/A
		6	242	243	245		
		7	250	245	245		
		8	245	240	244		
		9	247	245	240		
		Comfortable on fit					
5.2 Dexterity	See table 1	Size	Minimum pin diameter / mm			N/A	Level 5
		6	5.0				
		7	5.0				
		8	5.0				
		9	5.0				



## TECHNICAL REPORT

Table 4 – EN ISO 374-2: 2019 Test Results

Clause / Test	Test Results		UoM (See note ♣)	Result
7.2 Air leak test	Total air pressure used	3.0 kPa	N/A	Pass
	Sample size	Leaks		
	6	No leaks detected		
	7	No leaks detected		
	8	No leaks detected		
7.3 Water leak test	9	No leaks detected		
	Sample size	Leaks	N/A	Pass
	6	No leaks detected		
	7	No leaks detected		
	8	No leaks detected		
9	No leaks detected			

### Additional Information / Notes

Note ♣ – Estimated uncertainty of measurement applied at point of test (e.g. to applied force or to tolerance limits) to ensure product meets requirements of the standard



## TECHNICAL REPORT

### Protection Against Viruses Test Results

Testing was conducted at a third-party laboratory and reported under their reference 20R006813. The laboratory is CNAS accredited to ISO 17025: 2017 with ISO 16604: 2004 included in their accreditation schedule.

Table 1 – Resistance to penetration by blood-borne pathogens results

Test method		Specimen	Step 1 (0 kPa, 5 min)	Step 2 (14 kPa, 1min)	Step 3 (0kPa, 4min)	Titre of phage Phi-X174 (PFU /mL)	Comment
ISO 16604: 2004 Procedure B		+ control	Penetration	Penetration	Penetration	Penetration	Acceptable
		- control	No penetration	No penetration	No penetration	< 1	Acceptable
Using retaining screen		1	Invisible penetrate	Invisible penetrate	Invisible penetrate	< 1	Pass
		2	Invisible penetrate	Invisible penetrate	Invisible penetrate	< 1	Pass
		3	Invisible penetrate	Invisible penetrate	Invisible penetrate	< 1	Pass



## TECHNICAL REPORT

### Innocuousness Test Results

Testing was conducted at a third-party laboratory and reported under their reference A201123020001. The laboratory is CNAS accredited to ISO 17025: 2017.

Sample Item	Sample Description	Location	Style
I001	KS-ST RT021 Blue Disposable Powder Free Nitrile Examination Gloves	Gloves	-

#### pH Value - EN ISO 21420:2020

Test Method I : With reference to EN ISO 4045:2018, analyzed by pH meter.

Test Method II: With reference to ISO 3071:2020, analyzed by pH meter.

Requirement:	3.5-9.5
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-	Unit	Result
Test Item(s)	-	I001
Test Method	-	II
Parameter	-	-
pH Value of Extracting Solution	-	5.50
Temp. of Aqueous Extract	deg. C	25.1
pH Value of Aqueous Extract	-	6.7
Difference Figure	-	-
Conclusion	-	PASS

Note / Key : deg. C = degree Celsius (°C) Temp. = Temperature

Remark: Result(s) was (were) reported the average value from two trials.

Tested part(s) was/were specified by client.



## TECHNICAL REPORT

### Polycyclic Aromatic Hydrocarbons (PAHs) Content - EN ISO 21420:2020

Test Method : With reference to test method PD CEN ISO/TS 16190:2013

Maximum Allowable Limit:	Each of all listed PAHs: 1.0 mg/kg
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Tested Item(s)	Result			Conclusion
	Detected Analyte(s)	Conc.	Unit	
I001	ND	ND	mg/kg	PASS

Note / Key : ND = Not detected(<Detection Limit)      Detection Limit (mg/kg) : Each : 0.2;  
mg/kg = milligram per kilogram = ppm = part per million

Remark: The list of polycyclic aromatic hydrocarbons is summarized in table of Appendix.  
Tested part(s) was/were specified by client.

#### APPENDIX

##### List of Polynuclear Aromatic Hydrocarbons:

No.	Name of Analytes	CAS-No.	No.	Name of Analytes	CAS-No.
1	Chrysene	218-01-9	5	Dibenzo (a,h) anthracene	53-70-3
2	Benzo (a) pyrene	50-32-8	6	Benzo (b) fluoranthene	205-99-2
3	Benzo (e) pyrene	192-97-2	7	Benzo (j) fluoranthene	205-82-3
4	Benzo (a) anthracene	56-55-3	8	Benzo (k) fluoranthene	207-08-9

### Dimethylformamide(DMFA) Content - EN ISO 21420:2020

Test Method : With reference to EN 16778:2016, and then analyzed by Gas Chromatograph Mass Spectrometer.

Analyte	Unit	Result	Client's Requirement
		Test Item(s)	
		I001	
Dimethylformamide(DMFA)	mg/kg	ND	1000
Conclusion	-	PASS	-

Note / Key : ND = Not detected (<Detection Limit)      Detection Limit (mg/kg) : 5  
mg/kg = milligram per kilogram = ppm = part per million

\*\*\* End of Report \*\*\*



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Xiping, Nancheng District  
DONGGUAN CITY Date of report: 21<sup>st</sup> December 2020  
Guangdong Province Samples received: 23<sup>rd</sup> November 2020  
China Date(s) work carried out: 16<sup>th</sup> to 21<sup>st</sup> December 2020  
523079

## TECHNICAL REPORT

SATRA Technology Services (Dongguan) Ltd:

Customer: GUANGDONG KINGFA SCI.&TECH. CO., LTD  
NO.28 Delong Avenue, Shijiao Town  
Qingcheng District  
Qingyuan  
Guangdong  
China

Subject: EN ISO 374-4:2019 determination of resistance to degradation by dangerous chemicals on gloves described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021.

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Report signed by: Lucy Cove  
Position: Technologist  
Department: Chemical & Analytical Technology

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## TECHNICAL REPORT



### WORK REQUESTED:

Samples of gloves described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021 were received on the 23<sup>rd</sup> November 2020 for testing in accordance with EN ISO 374-4:2019.

### SAMPLE SUBMITTED:



Sample described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021.

### CONCLUSION:

When assessed in accordance with EN ISO 374-4:2019 the samples of gloves described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021 achieved the following degradation results:

Chemical	Mean degradation / %
40% Sodium hydroxide (CAS: 1310-73-2)	-65.6

### TESTING REQUIRED:

- EN ISO 374-4:2019. Protective gloves against dangerous chemicals and micro-organisms. Part 4: Determination of resistance to degradation by chemicals.



## TECHNICAL REPORT



**RESULTS:**

<b>Sample description:</b>	Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021		
<b>Challenge chemical:</b>	40% Sodium hydroxide (CAS: 1310-73-2)		
<b>Test temperature / °C:</b>	(23 ± 1)		
<b>Degradation / %:</b>	<b>Glove 1</b>	<b>Glove 2</b>	<b>Glove 3</b>
	-56.0	-61.2	-79.5
<b>Mean degradation (DR) / %:</b>	-65.6		
<b>Standard deviation (<math>\sigma_{DR}</math>) / %:</b>	12.4		
<b>UoM / ± %:</b>	9.1		
<b>Appearance of samples after testing:</b>	No change		

**NOTE:** Lining materials were removed from the specimen in order to perform the test.



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Xiping, Nancheng District  
DONGGUAN CITY Date of report: 21<sup>st</sup> December 2020  
Guangdong Province Samples received: 23<sup>rd</sup> November 2020  
China Date(s) work carried out: 4<sup>th</sup> to 8<sup>th</sup> December 2020  
523079

## TECHNICAL REPORT

SATRA Technology Services (Dongguan) Ltd:  
Customer: GUANGDONG KINGFA SCI.&TECH. CO., LTD  
NO.28 Delong Avenue, Shijiao Town  
Qingcheng District  
Qingyuan  
Guangdong  
China

Subject: EN 16523-1:2015+A1:2018 resistance to permeation by chemicals on gloves described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021.

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Report signed by: Lucy Cove  
Position: Technologist  
Department: Chemical & Analytical Technology

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## TECHNICAL REPORT



### WORK REQUESTED:

Samples of gloves described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021 were received on the 23<sup>rd</sup> November 2020 for testing in accordance with EN 16523-1:2015+A1:2018 and assessment in accordance with the requirements of EN ISO 374-1:2016+A1:2018.

### SAMPLES SUBMITTED:



Samples described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021

### CONCLUSION:

When assessed in accordance with the requirements of EN ISO 374-1:2016+A1:2018 the samples of gloves described as Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021 achieved the following performance levels:

Chemical	Performance level
40% Sodium hydroxide (CAS: 1310-73-2)	6

Full results are reported in the following tables.

### TESTING REQUIRED:

- EN 16523-1:2015+A1:2018 - Determination of material resistance to permeation by chemicals - Part 1: Permeation by liquid chemical under conditions of continuous contact

SATRA Technology Services (Dongguan) Ltd  
SATRA Reference: CHM0305368/2048/LC/A  
Date: 21<sup>st</sup> December 2020

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Signed:



## TECHNICAL REPORT



### RESULTS AND REQUIREMENTS:

EN ISO 374-1:2016+A1:2018 - Protective gloves against dangerous chemicals and micro-organisms - Part 1: Terminology and performance requirements for chemical risks. Table 1: Permeation performance levels.

Permeation performance level	Measured breakthrough time (minutes)
1	>10
2	>30
3	>60
4	>120
5	>240
6	>480

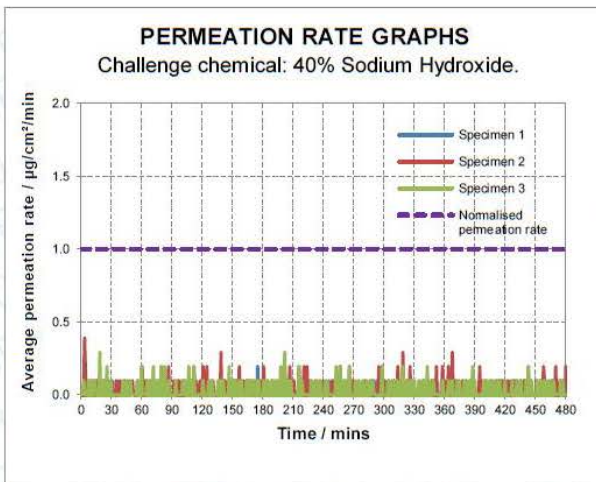
Performance levels are based on the lowest individual result achieved per chemical.



**TECHNICAL REPORT**



Test/Property	Sample reference:	Disposable Powder Free Nitrile Examination Gloves, Color: Blue, Reference number: KS-ST RT021		Performance
EN 16523-1:2015 +A1:2018 in accordance with SATRA SOP CAT-009  Using PTFE permeation cells with standardised dimensions	<b>Test information:</b>	Chemical: 40% Sodium hydroxide		<b>Level 6</b>
		Normalised permeation rate (NPR): 1 µg/cm <sup>2</sup> /min		
		Detection technique: Conductimetry (continuous measurement)		
		Collection medium: Deionised water (closed loop)		
		Collection medium stirring rate: 45 – 65 ml/min (each cell constant to within ± 10%)		
		Test temperature: (23 ± 1) °C		
	<b>Specimen</b>	<b>Thickness (mm)<sup>Δ</sup></b>	<b>Breakthrough time (mins)</b>	
1	0.09	>480		
2	0.09	>480		
3	0.09	>480		
	<b>Test result:</b>	<b>&gt;480</b>		
	<b>UoM:</b>	<b>&lt;1</b>		
Visual appearance of specimens after testing:		Discoloured		



Δ EN 16523-1:2015+A1:2018 does not require the test specimen thicknesses to be reported, this information is indicative only.