

POKETONE FOR PLASTIC TOYS



Non Toxic High Efficiency

- Acrylate Free
- Melamine Free
- Bisphenol A Free
- Formaldehyde Free
- Lead/ Chrome/ Free
- Phthalate Free

Global Warming Potential

* PA6	6.70	
* PA66	6.40	
* PBT	4.88	
* PC	3.40	
* POM	3.20	
** PK	3.08	(kg CO ₂ eq)

* Other ETP data is based upon the Eco-profiles data from www.plasticseurope.org

** PK Data is based upon Korea LCI database and Ecoinvent database.



POKETONE?

HYOSUNG POKETONE is a new class of engineering thermoplastics which are composed of carbon monoxide, ethylene and propylene, it is called as aliphatic polyketone. As a kind of semi-crystalline plastic,

**Why Poketone is used for Toys?

Children feel safe to a characteristic of Poketone's resilience. Poketone is one of the best eco-friendly resins worldwide.

POKETONE SUCCESSFUL STORIES FOR TOYS

- McDonalds RSS Pass : M330F, M630F
- Ferrero Rocher Green List Pass : M410F-S
- HASBRO SRS Pass : M330F-S

POKETONE PROPERTIES FOR TOYS

Properties	Unit	POKETONE M410F(F-S)	POKETONE M330F(F-S)	POKETONE M630F
Density	-	1.24	1.24	1.24
Melt Index	g/10min	35	60	6
Tensile Strength	MPa	45	60	58
Elongation at Break	%	300	> 240	> 240
Flexural Strength	MPa	45	57	53
Flexural Modulus	MPa	1,050	1,500	1,350
Impact Strength	KJ/m ²	9	8	17

CERTIFICATION



All F grades of POKETONE comply with FDA, EN71, PAHS and a variety of certifications. They guarantee chemical safety of POKETONE.

POKETONE is safe material for Toys!

► EN71-3, EN71-9 Toys certification through SGS
(POKETONE is satisfied with a variety of chemical safety requirements)

SGS EN71-3 Certificate



Test Report No. F690101/LF-CTSAYHA22-12416 Issued Date: 2022. 08. 05 Page 1 of 4

HYOSUNG CHEMICAL CORPORATION
235, Banpo-daero
Seocho-gu, Seoul
Korea

The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No. : AYHA22-12416
Sample Description : POKETONE F
Client Reference Data : M330F, M330F-S, M630F, M630F-S, M730F, M930F, M410F, M410F-S, M710F,
M640F
Style no./Item no. : M630F
Order No. : -
Buyer : -
Manufacturer : Hyosung Chemical Corporation
Country of Origin : Korea
Country of Destination : -
Received Date : 2022. 07. 29
Test Period : 2022. 07. 29 to 2022. 08. 05
Test Result(s) : For further details, please refer to following page (s)
Report Comments : The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test report is not related to Korea Laboratory Accreditation Scheme.
The statement of conformity was made on the requested specification or standard. The decision rule would be based on the binary statement (Pass/Fail) according to ILAC-G8-09:2019 guideline 4.2.1 without taking measurement uncertainty into account by applicant's agreement.

Test Requested	Conclusion
Directive 2009/48/EC and its amendment Council Directive (EU) 2017/738, Commission Directive (EU) 2019/1922 - EN71-3:2019 + A1:2021 - Migration of certain elements (All conclusive testing)	PASS

SGS EN71-9 Certificate



Test Report No. F690101/LF-CTSAYHA15-11664 Issued Date: 2015. 12. 24 Page 1 of 4

HYOSUNG R&D BUSINESS LABS
74, Simin-daero, Dongan-gu
Anyang-si, Gyeonggi-do
Korea

The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No. : AYHA15-11664
Sample Description : M630A
Style no./Item no. : -
Order No. : -
Buyer : -
Manufacturer : -
Country of Origin : -
Country of Destination : -
Received Date : 2015. 12. 17
Test Period : 2015. 12. 17 to 2015. 12. 24
Test Method : For further details, please refer to following page (s)
Test Results : For further details, please refer to following page (s)

Test Requested	Conclusion
As specified by client, selected parts of the submitted sample(s) with reference to Safety of Toys, EN 71-9:2005+A1:2007 - Organic Chemical Compounds - Requirements. 1) To determine Monomers (Migration) in the submitted samples. 2) To determine Plasticizers (Migration) in the submitted samples. 3) To determine Solvents (Migration) in the submitted samples.	PASS PASS PASS

► FERRERO Toys certification through TUV, McDonal's Toys certification through Intertek

Intertek McDonal's Toys Certificate (Heavy metal test)



SAMPLE DESCRIPTION: One (1) group of submitted sample said to be Hyosung Corporation Polyketone M630A
Sample received date: December 1, 2017
Date of testing started: December 1, 2017
Date of testing ended: December 7, 2017

TEST CONDUCTED:
AS REQUESTED BY THE APPLICANT, FOR DETAILS REFER TO ATTACHED PAGE(S)

CONCLUSION:		
Tested Samples	Standard	Result
Submitted sample	McDonald's Restricted Substances Standard Revision 9 - Heavy Metal Test	For your information
	McDonald's Restricted Substances Standard Revision 9 for Monomers Requirement - Total Bisphenol - A Content	Pass

TUV FERRERO Toys Certificate (Toy testing Nuremberg)

Auftraggeber: FERRERO TRADING LUX S.A. FINDEL BUSINESS CENTER COMPLEXE B,
Client: RUE DE TRÈVES, L-2632 FINDEL, Luxembourg

Prüfgegenstand: Toy for children
Test item:

Bezeichnung / Typ-Nr.: FERRERO "Green List" - Resin "POK M330F-S"
Identification / Type No.: Supplier: Hyosung Corporation

Wareneingangdatum: 30.07.2019
Date of receipt:
Prüfmuster-Nr.: A000238316
Test sample No.:
Prüfzeitraum: 30.07.2019 - 14.08.2019
Testing period:
Ort der Prüfung: Toy testing Nuremberg
Place of testing:
Prüflaboratorium: TÜV Rheinland LGA Products
Testing laboratory: GmbH
Prüfergebnis: Pass
Test result:



POKETONE is safe material for Toys!

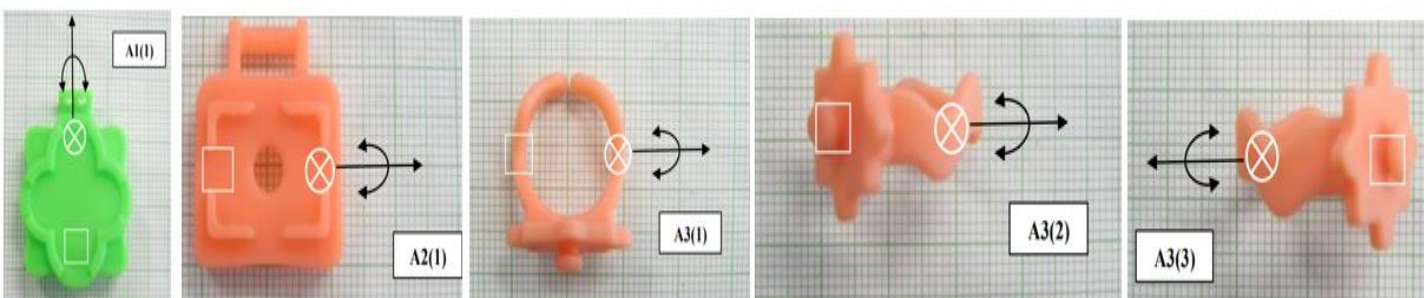
► FERREORO M410F-S Internal Mechanical Test (KJKS CCC Open Up - VT040 Open Up Flower)

Form 6-0-1062-19

INTERNAL MECHANICAL TEST REPORT

Supplier				Test date	31-May-22			
Item name&code	KJKS CCC Open Up - VT040 Open Up Flower			Sample stage	EP			
Test By (Factory QC)				Supervised by (FOD Quality Surprises)				
Sample information								
Mold(pilot/industrial/duplicate)	Pilot Mold							
Part Description	Part	Material used			Number of cavities	Reground material %	Humidification treatment	Mold Number
	RING	POK M410F-S	805 C-Fluo Red	GS10377F	1	30.00%	No water treatment	KSD-1877
	BOX - LOWER PART	PP 3015	805 C-Fluo Red	GX11598F	1	30.00%	No water treatment	KSD-1877
	BOX - UPPER PART	PP 3015	802 C-Fluo Green	GX11599F	1	30.00%	No water treatment	KSD-1877
Adhesion method	N/A							
Assembling method	N/A							
Others	Aging 50°C for 12Hours.							

1. Torque and tension test										
Sample size =5 pieces X testing points										
Testing Point	Torque Tests			Tension Tests						
	Clockwise and Anticlockwise 0.45 Nm	Clockwise and Anticlockwise 180°	Torque to Failure	Axial 70N	Axial to Failure	Perpendicular 70N 0°	Perpendicular 70N 90°	Perpendicular 70N 180°	Perpendicular 70N 270°	Perpendicular to Failure
A1(1)	PASS	NA	0.95Nm Stop	PASS	200N Stop	PASS	PASS	PASS	PASS	200N Stop
A2(1)	PASS	NA	0.95Nm Stop	PASS	200N Stop	PASS	PASS	PASS	PASS	200N Stop
A3(1)	NA	PASS	1080° Stop	PASS	200N Stop	PASS	PASS	PASS	PASS	200N Stop
A3(2)	NA	PASS	Broken at 900°/1080°/900°/1080°/900°	PASS	200N Stop	PASS	PASS	PASS	PASS	200N Stop
A3(3)	NA	PASS	Broken at 900°/1080°/900°/1080°/900°	PASS	200N Stop	PASS	PASS	PASS	PASS	200N Stop



► POKETONE is suitable for toys that have been recognized for excellence in torsion evaluation.

· POKETONE commercial Plant in South Korea, Ul-san City, Production capacity : 50,000 MT/Year



· Excellent Wear Resistance · Low Noise · Low abrasion loss (no particle) · Excellent chemical resistance

H.Q. (Korea)

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Further Information
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POKETONE
HYOSUNG POLYKETONE

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