

EZ- Coating

表面處理技術說明



Easy on Never off



EZ-Coating

The treatment on the surface of rubber products has several benefits, particularly when the assembly line is highly automated. These benefits include the improvement of non-stick capability, the enhancement of smoothness on the production line, and the decrease in coefficient of friction, etc. All of the advantages mentioned above accelerate the efficiency of the assembly.

With the increasingly higher requirement on the design of components, we provide different kinds of product services according to the demand and purpose of customers, and the working environment. The treatment on the surface we provide is nearly no pollution, while the traditional function, such as silicone oil, molybdenum disulfide (MoS₂), and paraffin wax, will easily cause dirtiness during processing.

橡膠製品的表面處理工藝有許多優點，尤其是在裝配線高度自動化的情況下。這些優點包含改善橡膠製品相互間的沾黏、確保震動盤上送料的順暢、降低橡膠製品的磨擦係數…等，上述優點皆能提高生產線組裝效率。

隨著使用者在零件設計上的要求與日俱增，我們提供根據客戶的需求及工作環境而打造的不同產品服務。我們提供接近零污染的表面處理工藝，不像傳統的Silicone Oil、二硫化鉬或石蠟，容易造成使用過程的汙染。

Easy on Never off

什麼原因要改變橡膠原本的顏色 🍌

方便辨別？易於組裝？外觀好看？

有哪些方法可以使橡膠顏色改變？

從橡膠配方著手

- 橡膠本身物性受影響
- 較沒有辦法達到黑色配方的基本物性

表面處理技術

- 不影響橡膠原有的物性
- 相對提升自動組裝及產品耐磨性



Easy on Never off

EZ-513

- 氟彈性體EZ-513在抗黏及降低摩擦係數的基礎之下，改善傳統塗料EZ-ONE，尤其針對耐化學性的提升，以及降低脫色、脫落，增加附著性的工藝。
- 其實EZ-513是一種已經存在20多年的技術，經由配方不斷改善測試，通過各種試驗，符合標準後，我們會是第一家能夠有效地將其使用在O型圈噴塗上。
- 絕佳耐汽油性、耐柴油性、耐機油性，不脫色不脫落，重複使用可保有不沾+潤滑效果。
- 強調最好的：
1.潤滑性 2.附著性
3.耐熱性 4.抗化學性



EZ-513

極佳耐化學性

極佳耐油性

極佳潤滑性

不破裂不脫落

極佳附著性

傳統EZ-ONE

極佳抗黏性

	潤滑性	顏色	成膜形態	轉移	附著性	抗黏性	抗柴油	自動組裝線使用	膜厚	加工成本
EZ-ONE	○	可選顏色	乾膜	不會	○ ◎	◎	○	◎	< .02 mm	3-5
傳統 PTFE	△	可選顏色	乾膜	些許	△	○	X	△	< .02 mm	5
EZ-513	◎+ 	可選顏色	乾膜	不會	◎+	◎	◎+ 	◎	< .02 mm	4-5

絕佳	優	尚可	劣
◎	○	△	X
1	→	5	
低	→	高	

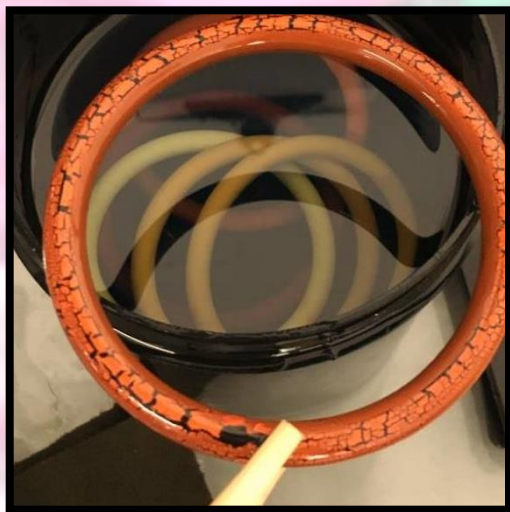
實驗測試

化學性及物理測試

- 耐化學性測試
- 耐磨性測試
- 摩擦係數測試
- 附著性測試

耐化學性測試

將①EZ-ONE、②EZ-513靜置於柴油中48小時



EZ-ONE無法承受柴油
產品產生膨脹、表面破裂



EZ-513能夠承受柴油
雖發生些許膨脹
但強大的皮膜延展力使其不破裂

耐磨性測試

將①EZ-ONE、②EZ-513放入測試設備，
在荷重5kg情況下，
馬達旋轉1000次、2000次、3000次
觀察是否掉色、剝落，測試其耐磨性。



註：馬達轉速為每分鐘27.3轉

(3000次後...)



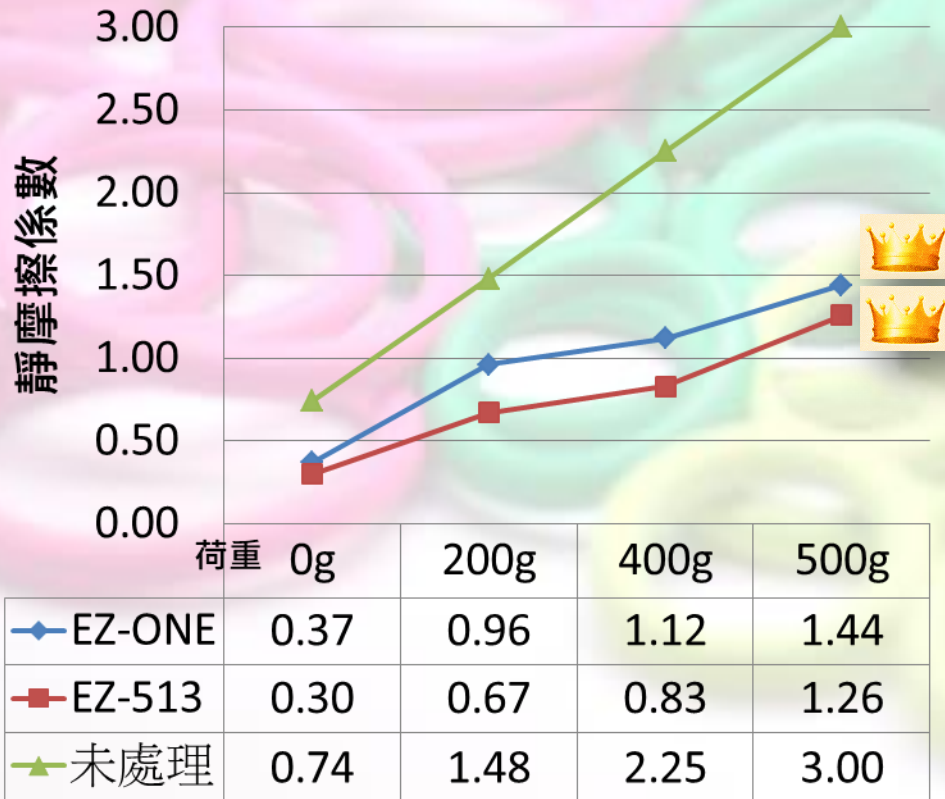
EZ-ONE表面
產生些許掉色、剝落



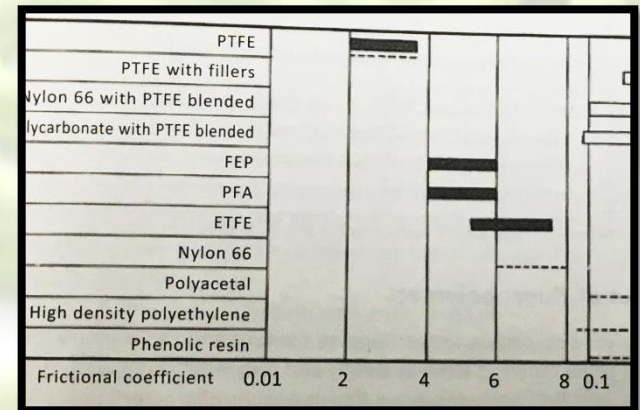
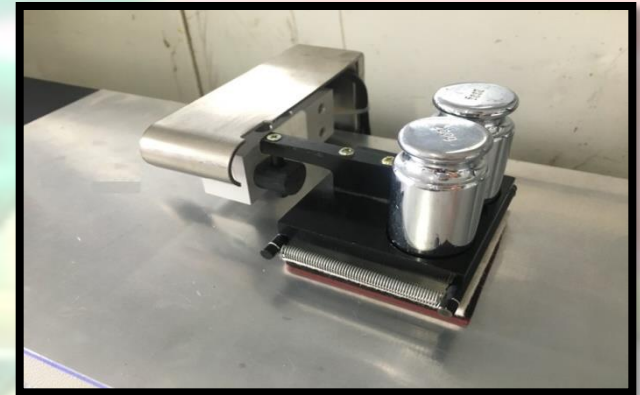
EZ-513無掉色、剝落
產品通過附著性測試

摩擦係數測試

EZ-ONE、EZ-513 之摩擦係數
皆較 未經處理試片 大幅降低



註:底材為鋁板(厚度4mm)



純PTFE聚合物摩擦係數約為0.04(無荷重)
(資料來源: Daikin Fluoropolymer Handbook)

EZ-ONE

INDEPENDENT LAB TESTING



TEST REPORT

No. : GZMR131221330
Date : Dec. 23, 2013
Page: 1 of 4

STAR TEAM INVESTMENT LIMITED
FLAT 1101, 11/F, GOODLUCK IND. CENTER, 808 LAI CHI KOK, KOWLOON, HONG KONG

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

Sample Name : ①HNBR(21707), ②NBR(67027), ③VT(V1164), ④AE(153)
SGS Ref No. : GZRL2013122624
Test Performed : Selected test(s) as requested by applicant
Date of Receipt : Dec. 16, 2013
Test Period : Dec. 16, 2013 to Dec. 20, 2013

Test result(s) : Please refer to the following page(s)

*****To be continued*****

Signed for and on behalf of
SGS-CSTC Standards Technical Services Co.,Ltd
Guangzhou Branch

W: me

Winnie Tan
Engineer

[illegible]

100-201-8215555 100-201-8215555 100-201-8215555 100-201-8215555
 100-201-8215555 100-201-8215555 100-201-8215555 100-201-8215555

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TEST REPORT



No. : GZMR131221330
Date : Dec. 23, 2013
Page: 2 of 4

Test information:

Sample description: See photo

Test item: Adhesion

Test method: With reference to GB/T 9286 -1998 and client's requirement

Test condition:

Tape: 3M 600(Scotch[®])

Space: 2mm

Test result(s):

No	Sample	Classification
1	"HNBR(21707)"	0
2	"NBR(67027)"	0
3	"VT(V1164)"	0
4	"AE(153)"	0

Note: In the GB/T 9286, classification 0 is the best and classification 5 is the worst

***** To be continued*****

[illegible]

Wuhan Huatong Technology Development Co., Ltd. 119903 139-20-62151515 139-20-62151180 www.huatong.com.cn
中国·广州·经济技术开发区科学城岭南路14号 邮编:119903 139-20-62151515 139-20-62151180 e-mail:hua@hwa.com

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Adhesion test

EZ-ONE

INDEPENDENT LAB TESTING – AEM – NBR – HNBR - FKM

SGS

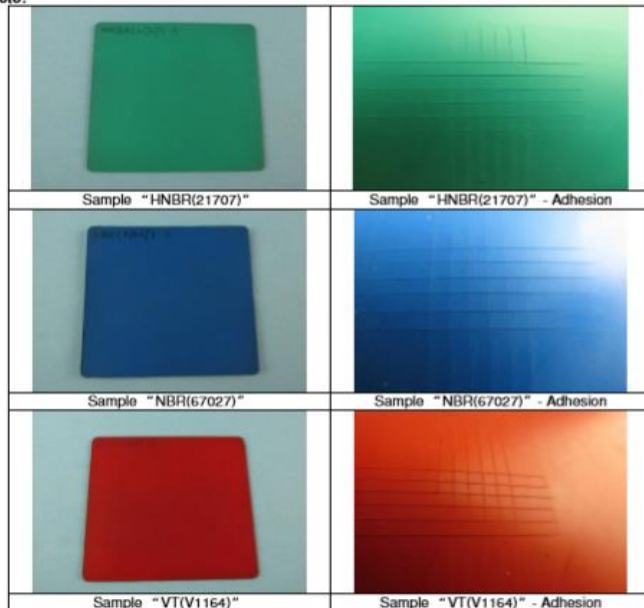
TEST REPORT

No. : GZMR131221330

Date : Dec. 23, 2013

Page: 3 of 4

Photo:



***** To be continued *****

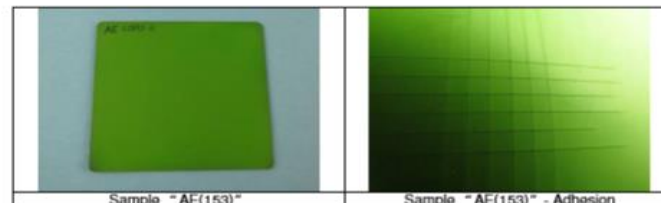
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TEST REPORT

No. : GZMR131221330

Date : Dec. 23, 2013

Page: 4 of 4



*****End of report*****

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Adhesion test

EZ-513

SGS

TEST REPORT

No. : GZIN1809051585MR

Date : Oct 09, 2018

Page: 1 of 4

CUSTOMER NAME: EZ-KOTE ASIA

ADDRESS: FLAT 803, 8/F. GOOD LUCK INDUSTRIAL CENTER, 808 LAI CHI KOK ROAD, HONG KONG

Sample Name : EZ-513(EPDM)

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

SGS Ref. No. : CP18-053349

Date of Receipt : Sep 27, 2018

Testing Start Date : Sep 27, 2018

Testing End Date : Oct 09, 2018

Test result(s) : For further details, please refer to the following page(s)
(Unless otherwise stated the results shown in this test report refer only to the sample(s) tested)

Signed for
SGS-CSTC Standards Technical
Services Co., Ltd. GZ Branch Testing
Center



Winnie Tan

Authorized signatory



SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch Testing Center (Guangzhou)

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中国·广州·经济技术开发区科学城科韵路180号 邮编: 510663 186-201-82155555 186-201-8207988 e: sgs.china@sgs.com

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Adhesion test

EZ-513

SGS

TEST REPORT

No. : GZIN1809051585MR

Date : Oct 09, 2018

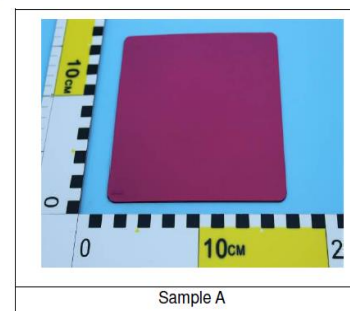
Page: 2 of 4

Summary of Results:

No.	Test Item	Test Method	Result	Conclusion
1	Cross-cut Test of Coatings	GB/T 9286-1998	Adhesion classification: 0	/

Note: Pass : Meet the requirements;
Fail : Does not meet the requirements;
/: Not Apply to the judgment.

Original Sample Photo:

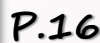


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EZ-513



EZ-513



Page: 4 of 4



Equipment Information:

Equipment	Model	Equipment No.	Calibration date	Next Calibration date
Cross Rules	BGD503	GZMR-AG-E036-05	2018-04-22	2019-04-21
Ultrasonic Coating Thickness Gauge	PostTector 200	GZMR-AG-E110	2018-03-30	2019-03-31

Appendix information: The test report shall only be used for clients' scientific research, teaching, internal quality control, product research and development, etc., and just for internal reference.

***** End of report*****



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EZ-513 MSDS

EZ-513

Coating Type - **Fluoroelastomer in water dispersion**

Volatile Organic Compounds - **None**

Cure Method - **Intellectual Property**

Number of Components - **Three**

Suitable Substrates - **Metal, Concrete, Plastic, Rubber, Fabric**

Potential Service Environment - **Corrosive Chemicals**

In-Service Conditions - **Immersion, splashing, vapors, or condensate**

Colors Available? **Yes and Custom Colors**

Continuous Operating Temp, - ° F -40 to +400 possible

Tensile Strength; PSI - **1500+**

Tabor Abrasion - **Excellent**

Adhesion; PSI - **3M 600 Scotch Tape - V0-V2 Grade**

Heat Aging at 400° F - **Outstanding**

Flame Resistance - **Excellent**

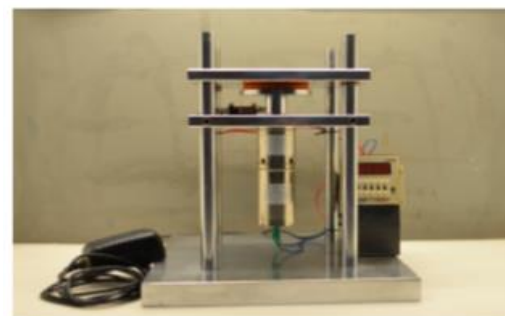
Weather & U.V. Resistance - **Excellent**

Ozone and Oxidation Resistance - **Outstanding**

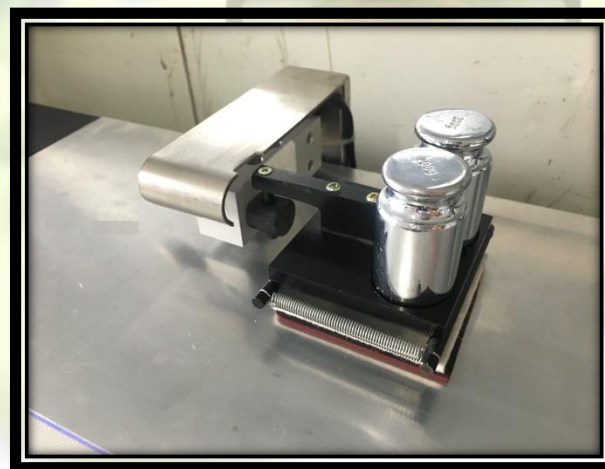
General Chemical Resistance - **Excellent**

Permeability Extremely - **Low**

Abrasion Resistance - **2500 cycles - 2500gr wheel load - 2-329**



測試設備SOP



耐化學性測試



- 分別將**傳統PTFE**及**EZ-513**產品，靜置於室溫下裝有酒精、柴油、機油、汽油之容器中。

註:機油之溫度為120°C

- 48 / 72小時過後，將產品取出並自然風乾。
- 放入模具檢查產品是否發生膨脹或收縮情況。
- 以放大倍率為50倍之放大鏡觀察產品表面是否破裂。
- 以紙巾擦拭，測試其是否產生掉色、剝落情況。

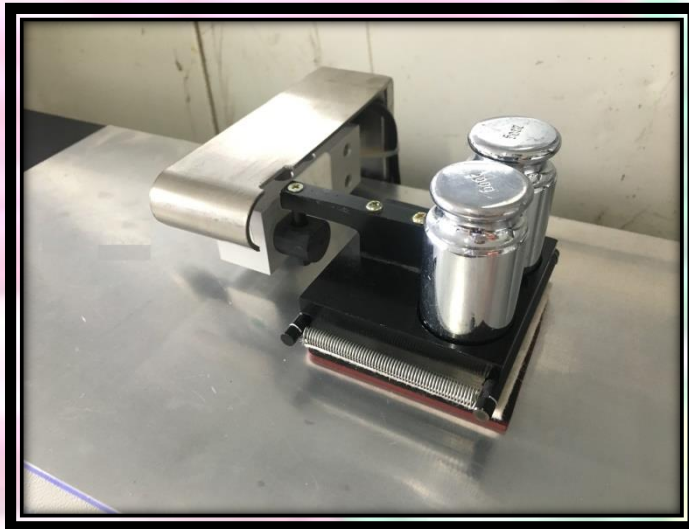
耐磨性測試



- 施予外力於產品，使其彎曲，測試其是否產生掉色、剝落情形。
- 將產品放置於鋁製模具上，並施予壓力(荷重2kg及5kg之鋁板)。
- 馬達使模具轉動，帶動產品旋轉，與鋁板產生500次及1000次摩擦，模擬產品使用情形。
- 分別記錄荷重2kg及荷重5kg、旋轉500次及1000次，產品是否產生掉色、剝落情形。

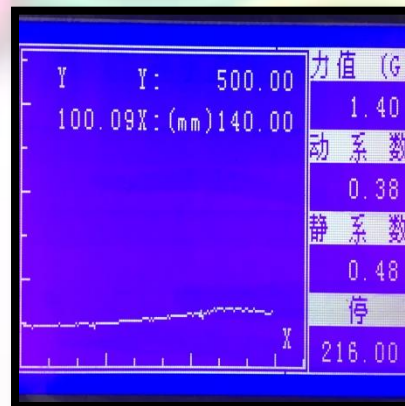
註: 馬達轉速為每分鐘27.3轉

摩擦係數測試



- 將欲測試之產品放置於測試儀器底部，與底材完整貼合。
- 按下試驗鍵，靜摩擦係數、動摩擦係數將測出。
- 分別記錄無荷重、荷重200g、荷重400g時，產品在不同底材上的摩擦係數。

ASTM D1894 試驗日期: 2018-09-25 12:06 動係數: 0.35 靜係數: 0.90 荷重: 216.00 G FKM, 荷重, 橡膠	ASTM D1894 試驗日期: 2018-09-25 12:13 動係數: 0.70 靜係數: 1.36 荷重: 216.00 G FKM, 200g, 橡膠
ASTM D1894 試驗日期: 2018-09-25 12:15 動係數: 0.98 靜係數: 1.83 荷重: 216.00 G FKM, 400g, 橡膠	ASTM D1894 試驗日期: 2018-09-25 12:19 動係數: 0.57 靜係數: 1.06 荷重: 216.00 G FKM, 400g, 鋁板
ASTM D1894 試驗日期: 2018-09-25 12:17 動係數: 1.08 靜係數: 1.83 荷重: 216.00 G FKM, 500g, 橡膠	ASTM D1894 試驗日期: 2018-09-25 12:21 動係數: 0.77 靜係數: 1.54 荷重: 216.00 G FKM, 500g, 鋁板



- 曲線越平穩，表示摩擦係數越為精準。

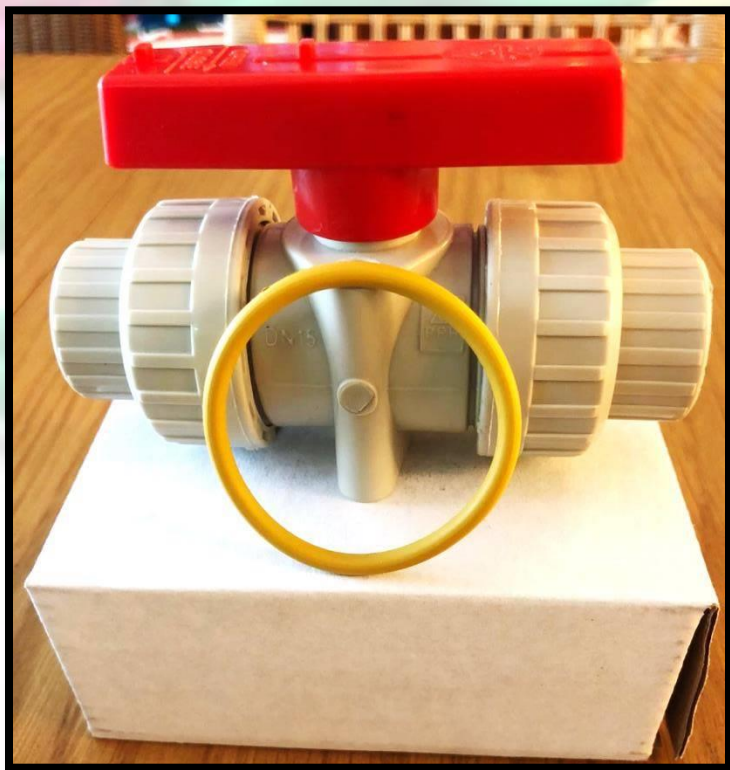
註:1.測試橡膠試片材質為HBR、FKM。
 2.試片大小為 60mm*60mm。
 3.底材為鋁板(4mm)、橡膠板(6mm)。

附件1

客戶將○型圈裝在閥門上，
硝酸(70%)環境中使用 (○型圈材質為FKM)

表面處理前

○型圈能在硝酸中
使用約三個月



表面處理後

○型圈能在硝酸中，
正常使用半年以上，
較處理前延長兩倍

附件 II

EZ-ONE / EZ-513

Coating Type - **Fluoroelastomer in water dispersion**

Volatile Organic Compounds - **None**

Cure Method - **Intellectual Property**

Number of Components - **Three**

Suitable Substrates - **Metal, Concrete, Plastic, Rubber, Fabric**

Potential Service Environment - **Corrosive Chemicals**

In-Service Conditions - **Immersion, splashing, vapors, or condensate**

Colors Available? **Yes and Custom Colors**

Continuous Operating Temp, - ° F -40 to +400 possible

Tensile Strength; PSI - **1500+**

Tabor Abrasion - **Excellent**

Adhesion; PSI - **3M 600 Scotch Tape - V0-V2 Grade**

Heat Aging at 400° F - **Outstanding**

Flame Resistance - **Excellent**

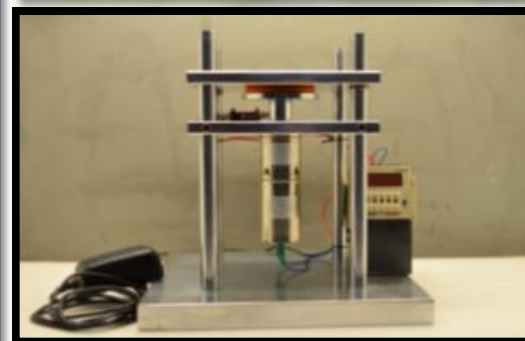
Weather & U.V. Resistance - **Excellent**

Ozone and Oxidation Resistance - **Outstanding**

General Chemical Resistance - **Excellent**

Permeability Extremely - **Low**

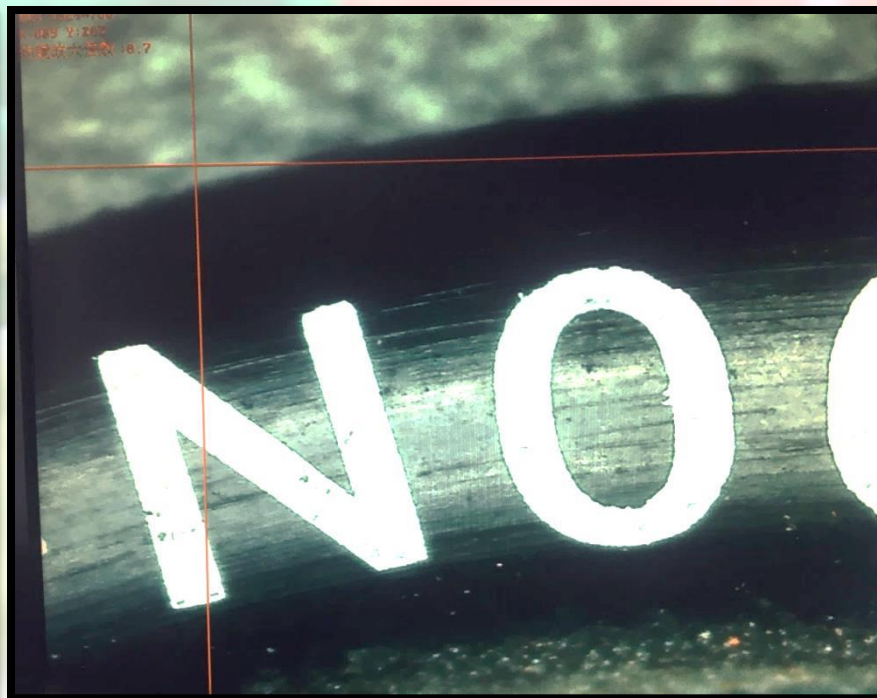
Abrasion Resistance - **2500 cycles - 2500gr wheel load - 2-329**



附件 III

Customized Marking Available

- ★ Water-based
- ★ Excellent adhesion
- ★ Environmental friendly



Marking service is available when adopting **EZ-ONE /EZ-513**

or

Any rubber part without lubricant treatment



Marking on O-ring
outside diameter



Marking on double-sides along
with shapes apart from O-ring



Marking on the
surface of O-rings



O-ring kit available

customers
logo can be
printed as well

附件 IV

All surface treatment

- EZ-513
- EZ-ONE
- EZ-PFO
- EZ-LMW
- EZ-NPS
- EZ-DFA

Upgraded version
of EZ-One.
Reduce heat generation
during motion state

EZ-ONE

Fluoropolymer with
color

Similar to
Parker T-Series
and Parker slick

EZ-513

High molecular
fluoro resin

Similar
to Osixo
OS 05

EZ-LMW

PTFE Emulsion grade
Lubrication grade

Similar to
VP5204
and
McLube
MAC419

All surface treatment

EZ-PFO

Perfluoro oil grade

NEW

Can be bonded
to any rubber
material

0 Pollution

EZ-NPS

Non-PTFE, Non-
Silicone
Lubrication grade

Replaced
silicone
and wax

EZ-DFA

Non-Silicone
Anti-Stick agent

EZ-ONE									
Lubricity	Color	Molded form	Transfer	Adhesion	Non-Stick	Treatment Cost	Auto assembly line application	Thickness of film	
EZ-PFO	◎	Clear	Dry Film	None	○	◎	5	◎	< .001 mm
EZ-ONE	○	Multi-colors	Dry Film	None	○ ◎	◎	3-4	◎	< .02 mm
EZ-513	◎+👑	Multi-colors	Dry Film	None	◎+👑	◎	4-5	◎+👑	< .02 mm
EZ-LMW	◎	Clear	80% Dry 20% Wet	<10%	△	◎	3	○	< .001 mm
EZ-NPS	◎	Clear	50% Dry 50% Wet	<20%	△	◎	2	○	< .001 mm
EZ-DFA	X	Clear	Dry Film	None	◎	◎	1	X (Non-Lubricious)	< .001 mm

Excellent	Good	Acceptable	Bad
◎	○	△	X
1	→	5	
Low	→	High	

EZ-Coating

Easy on Never off



Excellence is not a skill,
it's an attitude



The end

Thanks for reading