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LIFE TESTING OF MOLD ALIGNMENT LOCKS

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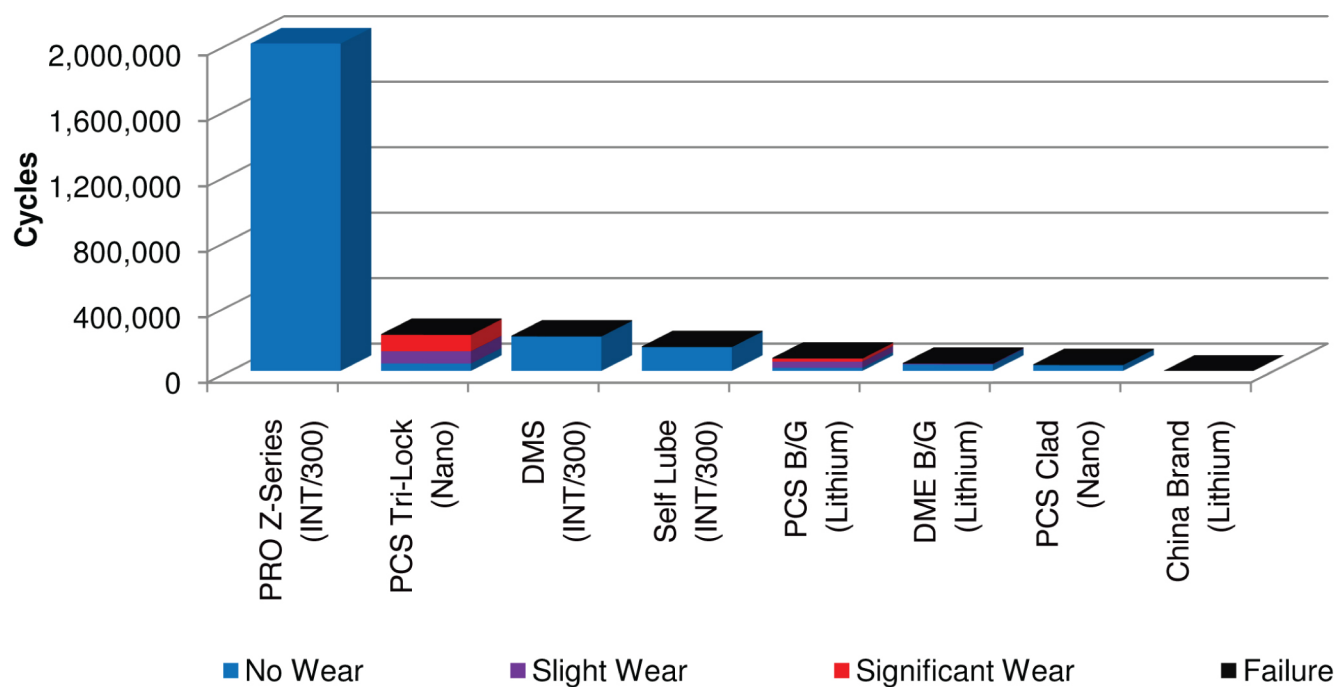
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TESTS AND RESULTS

Sample ID	Female			Male					
	Material	Coating	Core Hardness	Material	Coating	Core Hardness	Lube	Cycles	Figure
PRO Z-Series	D-2	TiN	58-62 HRC	H-13	Nitro Carburized	42-48 HRC	Setral INT/300	2000000	3
PCS Tri-Lock	A-2	Black Oxide	58-60 HRC	A-2	Black Oxide	58-60 HRC	PCS Nano	225000	4
DMS	S-7	TiN	54-56 HRC	O-6	Black Oxide	58-60 HRC	(INT/300)	215000	5
Self Lube	S-7	TiN	50-52 HRC	O-6	Black Oxide	60-62 HRC	Setral INT/300	150000	6
PCS B&G	A-2	TiN	58-62 HRC	H-13	Melonite	40-44 HRC	Lithium	80000	7
DME B&G	8620	TiN	58-62 HRC	H-13	Melonite	40-44 HRC	Lithium	48000	8
PCS Clad	8620	Armorclad	54-56 HRC	O-6	Black Oxide	60-62 HRC	PCS Nano	40000	9
China Brand	D-2	TiN	58-62 HRC	YK30	Black Oxide	50-52 HRC	Lithium	400	10



INTRODUCTION

Element Materials Technology, Saint Paul, has conducted life cycle testing of mold locks since 1999. Sets of side locks have been submitted for wear testing by Progressive Components of Wauconda, Illinois, for side by side comparison. The testing consisted of cycling locks using simulated wear conditions. During the past year, over 21 different tests were conducted for comparison between competitive standard locks and Progressive Components locks for research and development. The following report presents the results from the competitive testing.

TEST METHOD

The MTS 810 Material Test System was used to cycle the side lock samples at 1 Hz with the fixture provided by Progressive Components. The fixture engaged the components with 0.008 inches of spring engaged misalignment between the male and female halves of the side lock samples and was verified before and after testing. The springs apply approximately 4400 pounds of pressure to the locks which were lightly greased prior to testing. (See Figures 1 and 2)

Progressive Components requested that the wear be determined as a degree of wear. The degree of wear was determined by rating the mating surface of the side lock on a scale of 1 to 3. Wear determinations were conducted per the criteria below and thickness measurements were conducted on the male halves of the lock sets. The locks were considered to have failed when either the wear reached a degree of 3 or the lock lost 0.0004 inches of material.

The degree of wear scale was defined as follows:

1. Slight wear lines present (Slight Wear)
2. Wear or galling starting (Significant Wear)
3. Heavy wear or galling present (Failure)

SUMMARY OF TEST RESULTS

The results presented are samples from Progressive Components as well as other standard lock distributors in the United States and Asia. These samples included several material and surface treatment combinations for comparison. The data is presented to show the differences amongst the competitive samples tested.

The Progressive Components Z-Series Lock exhibited a much greater life when compared to tested samples manufactured by DMS, Self Lube, PCS and DME. The Progressive Components Z-Series Lock sustained 2 million cycles without failure.

FIXTURE / VISUAL PHOTOS

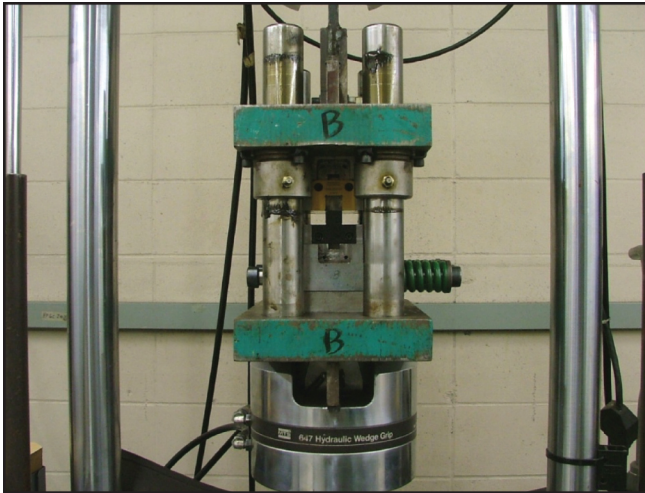


Figure 1:
Test fixture setup.

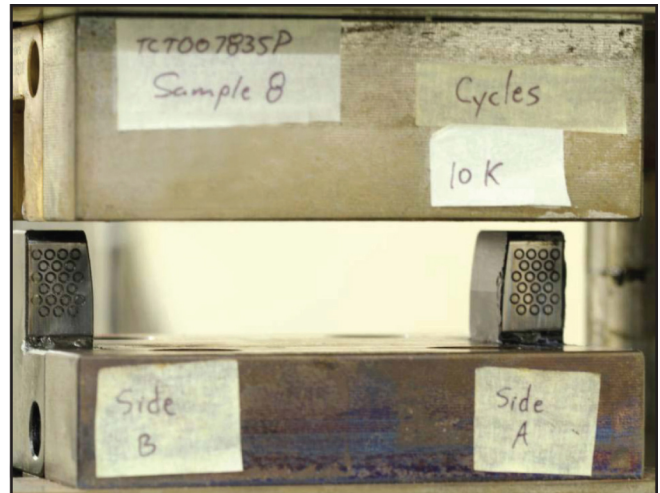


Figure 2:
Locks lightly greased at test startup.



Figure 3:
Z-Series Lock with
INT/300 Grease.

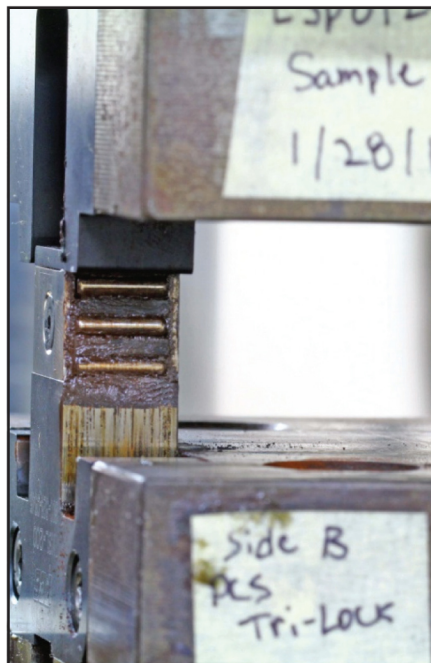


Figure 4:
PCS Tri-Lock with
Nano Grease.

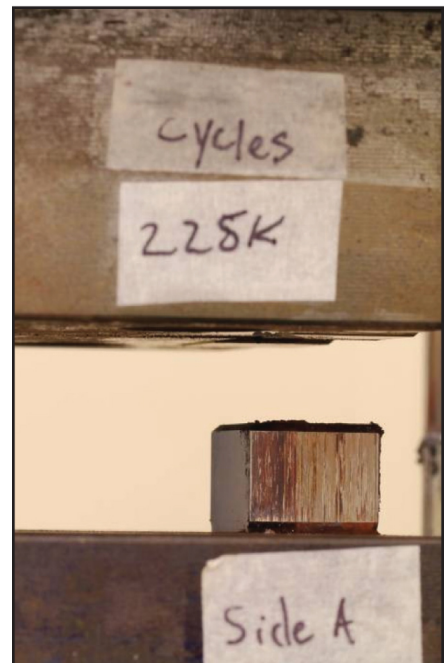


Figure 5:
DMS lock with
INT/300 Grease.



Figure 6:
Self Lube lock with
INT/300 Grease.

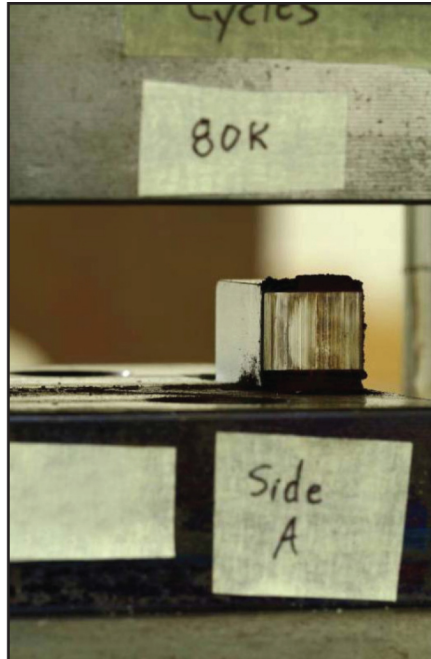


Figure 7:
PCS black and gold lock
with Lithium Grease

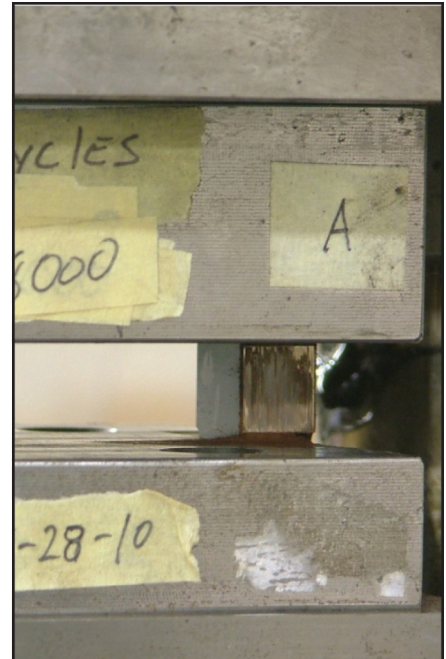


Figure 8:
DME black and gold lock
with Lithium Grease.



Figure 9:
PCS Clad lock with
Nano Grease.

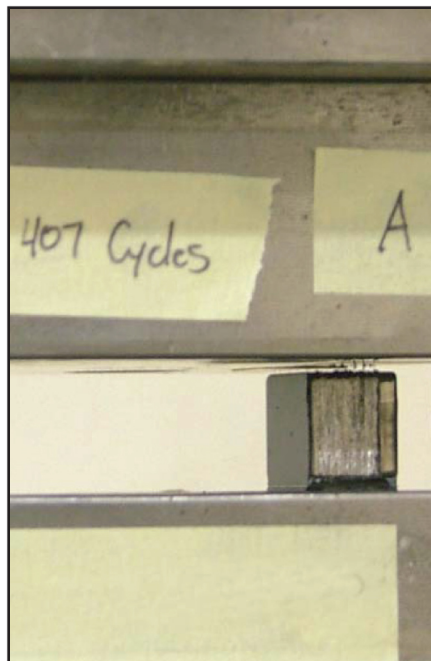


Figure 10:
China Brand lock with
Lithium Grease

