

## Break Detection of Glass Coated with 3M SH14CLARL Film by Intellisense Glassbreak Detectors

### Purpose

This report documents a test of Intellisense brand acoustic glassbreak detector performance for glass coated with 3M security film. The test was conducted November 20, 2003, at Honeywell engineering facilities in Folsom, CA.

### 3M SH14CLARL Security Film

The tested film is an clear, adhesive-backed security coating which is applied to the inner surface of existing windows. The film thickness is 14 mil.

### Intellisense Glassbreak Detectors

In a previous test of 3M film conducted on March 7, 2001, three models of glassbreak detectors were tested, with good results: the FG-730, the FG-1025, and the FG-1525. The FG-10xx and FG-15xx families have been superseded by the FG-16xx family. In this latest test, the following models were evaluated:

FG-730	Legacy surface mount detector, 30' range
5853	Ademco wireless detector, 25' range
FG-1625/T	Standard surface mount detector, 25' range
FG-1615	Surface-mount detector, 15' fixed range
FG-1625SN	Ademco polling-loop detector, 25' range
FG-1625F	Rectangular flush mount detector, 25' range
FG-1625RFM	Round flush mount detector, 25' range

### Test Facility

The test was carried out in the Intellisense "large-soft" glassbreak test room. This room is 30' x 30' with a 10' ceiling. The flooring is a commercial low-pile carpet and pad over concrete, the ceiling is acoustical tile, and the walls are painted drywall. The test break frame is constructed of steel and mounted in a sand-filled concrete block wall. The overall dimensions of the frame are approximately 24" x 36". A heavy-gauge steel insert allows testing of 12" x 12" glass.

### Glass Preparation

Fifteen samples of glass were used in this test. The samples included the four major glass types specified for Intellisense detectors: plate, laminated, wired, and tempered. For sealed-insulating glass, results for the glass type used for the inner lite will apply. The 12" x 12" size is the smallest specified for the tested detector models and generally represents the worst case for break detection.

Quantity	Thickness	Size	Type
3	1/8"	12" x 12"	Plate
3	1/8"	12" x 12"	Laminated
3	1/8"	12" x 12"	Tempered
3	1/4"	12" x 12"	Wired
1	1/8"	23-1/4" x 35-3/8"	Plate
1	1/4"	23-1/4" x 35-3/8"	Laminated
1	1/4"	23-1/4" x 35-3/8"	Tempered

The film was applied to the glass samples with a 1" wide uncoated margin on all sides. The uncoated area ensured that the film was not trapped under the mounting clamp of the test break frame, thus simulating an actual installation on existing window glass.

### Detector Setup

A total of 84 Intellisense detectors were used in the test, including 72 surface mount units and 12 flush mount units. In some cases, different design versions of the same model were in test, for performance verification. The surface mount detectors were in seven groups mounted on both the wall and ceiling at different ranges to the glass. The flush mount detectors were all set directly into the ceiling in three groups at different ranges. In the table below, "adjacent wall" and "opposite wall" are with reference to the wall in which the break test frame is mounted.

Group	Range to Glass	Mounting	Quantity						
			FG-730	5853	FG-1625	FG-1615	FG-1625SN	FG-1625F	FG-1625RFM
1	1'	Break frame		2	1				
2	7'	Adjacent wall	1	2	6	3	1		
3	7'	Ceiling	1	2	6	3	1		
4	15'	Adjacent wall	1	2	6	3	1		
5	25'	Ceiling	1	2	6		1		
6	30'	Opposite wall	1	2	6		1		
7	27'	Adjacent wall	1	2	6		1		
8	7'	Ceiling						3	2
9	25'	Ceiling						3	
10	25'	Ceiling						2	2

All units were adjusted according to the installation instructions. The FG-730 "flex" control was at maximum in all groups. The FG-16xx / 5853 sensitivity control was at "lowest" for group 1, "low" for group 2, at "medium" for groups 3 and 4 and 8, and at "maximum" for all other groups.

### Test Procedure

The break test followed the usual procedure of Underwriters Laboratories for verification of compliance to UL Standard 639, which covers acoustic glassbreak detector performance. Two tools were used to break the 12" x 12" glass:

1. A 16-oz. ball-peen hammer, swung by hand with the rounded end striking the glass
2. A 5-lb. steel ball thrown through the glass without touching the frame.

The large glass was broken with the steel ball and a sledge hammer.

All samples were installed in the frame for breaking with the film side toward the interior of the room, and the glass was attacked from outside the room. Detection results were checked immediately after the first blow to the glass, whether the film was penetrated or not.

### Test Results

Detection results are shown in the table below. Note that the number of detection opportunities is the number of detectors multiplied by the number of trials.

<b>Detector Mounting</b>	<b>Glass Size</b>	<b>No. of Detectors</b>	<b>No. of Trials</b>	<b>Detection Opportunities</b>	<b>Missed Detections</b>	<b>% Detect Performance</b>
Surface	12"x12"	72	12	864	3	99.7
Surface	23"x35"	72	3	216	3	98.6
Flush	12"x12"	12	12	144	0	100
Flush	23"x35"	12	3	36	0	100
<b>All</b>		<b>84</b>	<b>15</b>	<b>1260</b>	<b>6</b>	<b>99.5</b>

These results are consistent with the results for uncoated glass.

### **Conclusion**

Unlike earlier models, the FG-16xx / 5853 family of Intellisense glassbreak detectors is specified for film-coated glass without any restrictions on range. This test showed that detection performance of glass coated with 3M SH14CLARL film is typically 99.5% under varied conditions, including worst case range and mounting orientation. This detection performance is indistinguishable from the performance for uncoated glass.

*Special note on the FG-730:* This model is not specified for film-coated glass, and based on earlier tests it has been recommended that maximum range be reduced to 15' when the glass is coated. In the present test this restriction was not observed because it conflicted with other test objectives. However, in actual applications the FG-730 should not be mounted farther than 15' from the glass when it is film coated.

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