USCONEC

Applications Engineering Notes

Document Title	**Product Specification and Qualification Test Report: IBC™ Brand Cleaner SC for E2000**
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USCONEC™

1.0 Introduction

1.1 Purpose

Contamination and durability testing was performed on the IBC™ Brand Cleaner SC for E2000 connectors to verify functionality to simulated field conditions.

1.2 Scope

This report covers the contaminant and durability testing performed, including the results of the testing on the IBC™ Brand Cleaner SC for E2000 connectors. Five cleaners were tested for E2000 flat connectors, and five cleaners were tested for E2000 angled connectors using Arizona road dust and vegetable oil contaminants.

1.3 Abstract

The IBC™ Brand Cleaner SC was tested against Arizona road dust and vegetable oil contaminants as well as durability testing for the E2000 flat and angled connectors. All cleaners tested proved to be effective cleaning devices with the necessary durability to withstand the simulated field conditions.

1.4 Product Description

The US Conec IBC™ Brand Cleaner SC, shown in Figure 1, is a dry cloth cleaner designed for use with single fiber connectors in an adapter, faceplate or bulkhead. The dust cap of the cleaner acts as an adapter for unmated connector cleaning.

Figure 1. US Conec IBC™ Brand Cleaner SC

2.0 Test Methods

2.1 Contamination Test

Westover Scientific FiberChek 2™ software was used for photography and analysis of the contaminated endfaces using the Non Removable pass/fail criteria shown in Table 2. Photographs representative of each test are shown in Appendix A.

For each trial, the following photographs were taken:

Initial clean connector endface
Contaminated endface
Cleaned endface

The cleaning process was repeated with a dry only method until the connector passed the inspection, up to three iterations. The first, second and third pass yields were then calculated.

1st Pass Yield = [# of successful cleans on 1st cleaning iteration]/[Total # of contamination cycles]X 100

2nd Pass Yield = [# of successful cleans by the 2nd cleaning iteration]/[Total # of contamination cycles]X 100

3rd Pass Yield = [# of successful cleans by the 3rd cleaning iteration]/[Total # of contamination cycles]X 100

A total of ten cleaners were tested. Five of the cleaners were tested against E2000 flat connectors and five were tested against E2000 angled connectors. Each cleaner was tested for each contaminant in a connector adapter and then with the cleaner cap. All wet contaminants were allowed to dry before cleaning.

2.2 Durability Test

Ten cleaners were cycled through 500 cycles of the cleaning operation on connectors with adapters by four different operators with varying levels of connector cleaning experience. Failures and damages to the cleaner were recorded. A single dust contamination process along with the photograph capture was completed to verify the effectiveness of the cleaner after 500 cycles. As before, 1st, 2nd, and 3rd pass yields were recorded.

SPECIFICATION	PROCEDURE	REQUIREMENT	PERFORMANCE
Contamination	TIA-455-240 See Test Methods in section 2.0 Using the following contaminants: Arizona road dust Vegetable oil	Inspection Criteria: IEC 61300-3- 35 See Table 2.	Acceptable performance for all contaminants See Section 3.1.
Durability	Cycle cleaner through cleaning operation on connectors with adapters repeating 500 cycles. Inspect for damage. Clean road dust contaminated connector after 500 cycles.	No functional damage Successful clean after 500 cycles	No functional damage Successful clean after 500 cycles

Table 1. Testing Summary

			Allowable Visible Contamination	
Zone	**Description**	**Diameter**	**Non-Removables**	**Scratch-Width**
A	Area Near Core (SMF only)	<25 µm	None	None
	Area Near Core (MMF only)	<66 µm	Total of 5 NR's < 5µm None > 5µm	Total of 5 scratches < 3µm None > 3µm
B	Cladding (SMF only)	25 µm to 120 µm	NRs < 2µm are acceptable Total of 5 NRs 2-5 µm None > 5 µm	None > 3µm
	Cladding (MMF only)	66 µm to 120 µm	NRs < 2 µm are acceptable Total of 8 NRs < 5 µm	None > 3 µm
C	Epoxy Ring Zone	120 µm to 130 µm	No Limit	No Limit
D	Contact Diameter	130 µm to 250 µm	None = 10 µm	None > 3 µm
E	Ferrule Diameter[2]	250 µm to 400 µm	None > 30 µm	No Limit

[2]Note IEC 61300-3-35 does not state a requirement for this zone. This zone is a customer specific requirement. Defects outside the contact zone have no influence on performance.

Table 2. Inspection Criteria for Contamination Testing

3.0 Summary of Test Results

3.1 Contamination Test

The IBC™ Brand Cleaner SC proved to be effective for all contaminants. When used only as a dry method, the cleaner adequately removed contaminants on the first pass over 80% for the E2000 and over 70% for the E2000 angled on average in both connector adapter and with the cleaner cap. All contaminants were removed by the third cleaning pass.

Figures 2 and 3 both show the effectiveness of the cleaners against the various contaminants for E2000 and E2000 angled connectors.

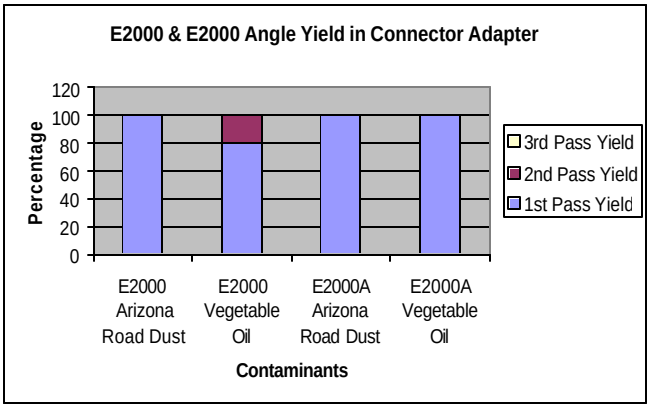


Figure 2. E2000 and E2000 angled yield with connector adapter

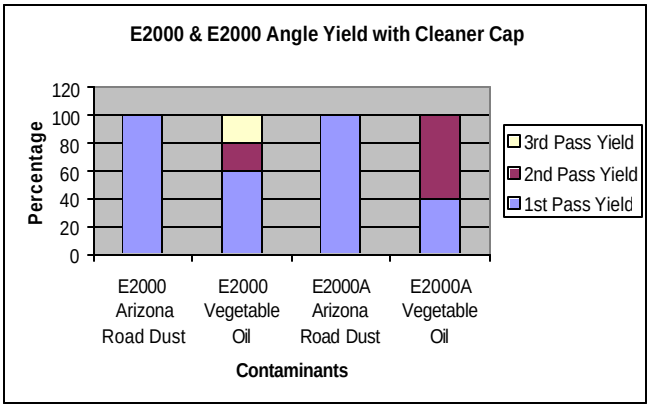


Figure 3. E2000 and E2000 angled yield with cleaner cap

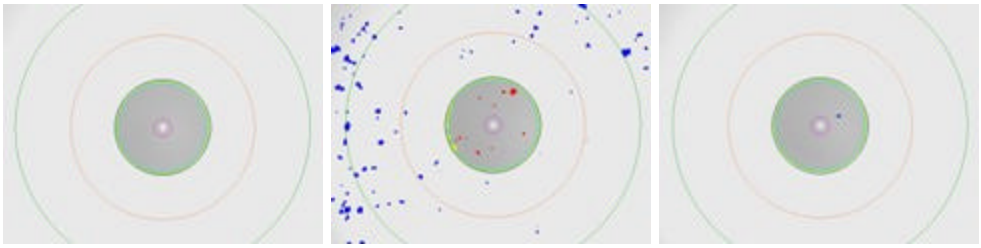
3.2 Durability Test

All ten cleaners completed the 500 cleaning cycles with no evident damage, and all contamination was removed by the second cleaning pass. Sixty percent of the cleaners removed the contamination on the first pass, with the remaining cleaners completing on the 2nd pass. See Figure 4 in Appendix B for durability testing apparatus.

Appendix A - Contamination Photographs

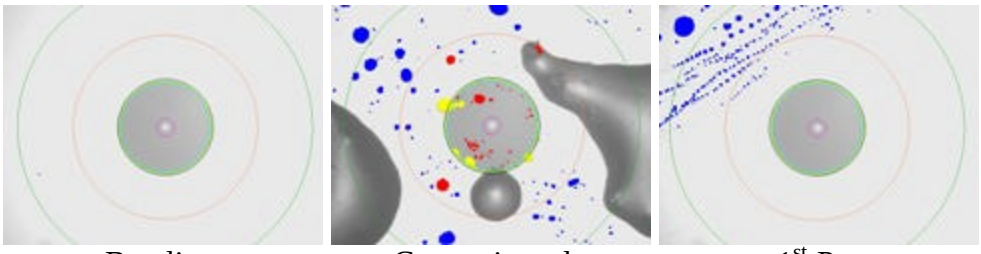
E2000 in Cleaner Cap

Arizona Road Dust
Cleaner 1



Baseline | Contaminated | 1st Pass

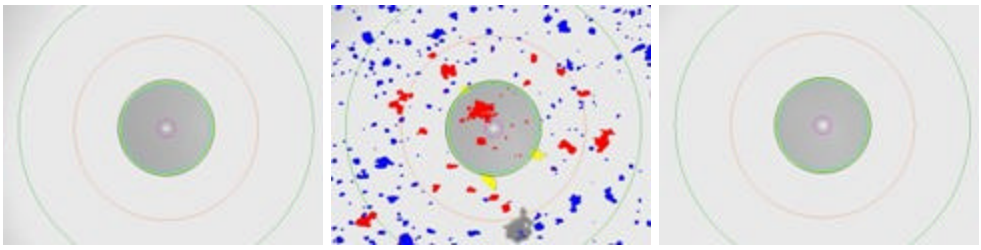
Vegetable Oil
Cleaner 2



Baseline | Contaminated | 1st Pass

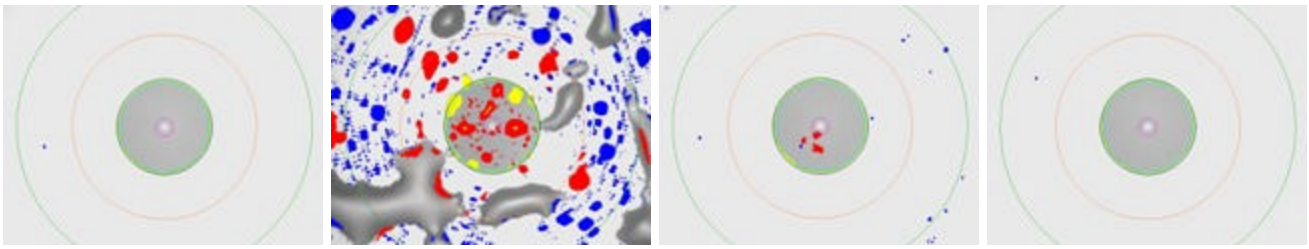
E2000 in Connector Adapter

Arizona Road Dust
Cleaner 3



Baseline | Contaminated | 1st Pass

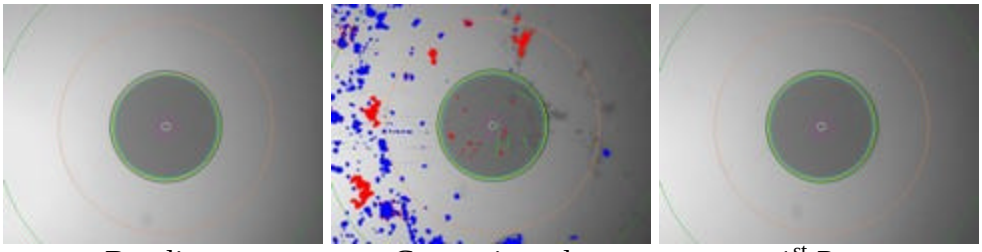
Vegetable Oil
Cleaner 4



Baseline Contaminated 1st Pass 2nd Pass

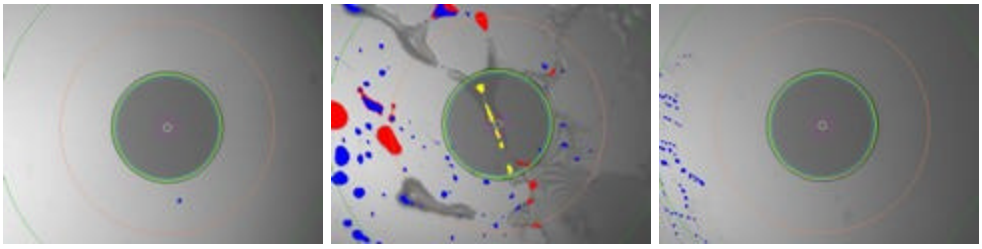
E2000 Angle in Cleaner Cap

Arizona Road Dust
Cleaner 1



Baseline Contaminated 1st Pass

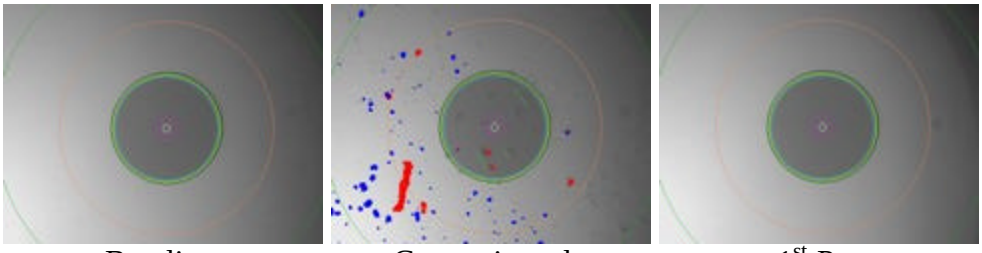
Vegetable Oil
Cleaner 2



Baseline Contaminated 1st Pass

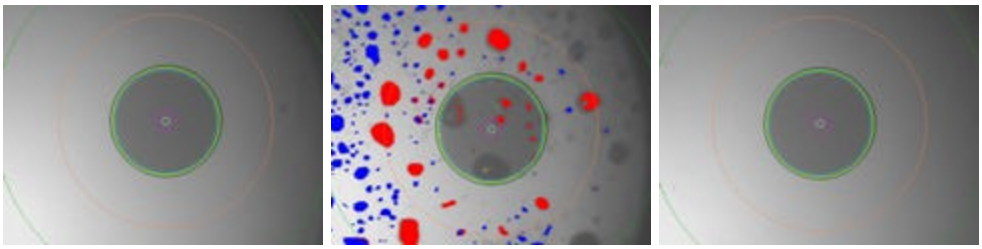
E2000 Angle in Connector Adapter

Arizona Road Dust
Cleaner 5



Baseline Contaminated 1st Pass

Vegetable Oil
Cleaner 4



Baseline | Contaminated | 1st Pass

Appendix B - Testing Apparatus

Durability Test

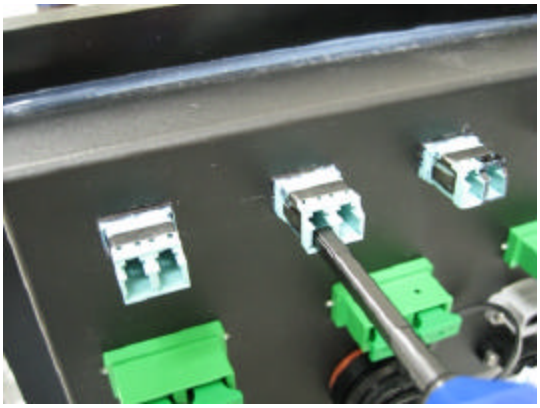


Figure 4. Cleaner with durability test apparatus