The Study in Risk-Based Manufacturing Environmental Control for Non-Sterile Drug Products

(English Translation)



Authors

Keisuke Inoue, Takeda Pharmaceutical Company Limited

Yoshimi Urayama, Chiyoda Corporation

Tsutomu Kamikukita, PhD, Towa Pharmaceutical Co., Ltd.

Toshimitsu Shirai, Transtech Inc.

Osamu Shirokizawa, Life Scientia Limited

Tokuhito Sugiyama, Sumitomo Dainippon Pharma Co., Ltd.

Masao Sudoh, Ono Pharmaceutical Co., Ltd.

Hironori Tanaka, MSD K.K. Japan

Masumi Nasukawa, CM Plus Corporation

Shigeto Hirabara, Hirabara Engineering Service Ltd.

Taku Horie, Taikisha Ltd.

Hiroshi Mitsuyoshi, Shionogi & Co., Ltd.

Hiromi Mihara, Sumika Chemical Analysis Service Co.

Takayuki Miyamoto, Taikisha Ltd.

Daikichirou Murakami, Hirabara Engineering Service Ltd.

Kuniaki Yamanaka, Freund Co.

Shigehiro Tahara, CM Plus Singapore Pte. Ltd.

Abstract

This publication has been prepared to express a sound and practical view on better manufacturing environmental controls for non-sterile drug products. This topic has been discussed over several years by a special working group of the Kansai Study Group (KSG), an accredited committee of the Parenteral Drug Association (PDA) Japan Chapter. The opinions proposed or advanced in the document are presented for the purpose of furnishing beneficial and valuable guidance to any person or organization concerned with establishing appropriate manufacturing control systems for quality products.

The leading subjects discussed among the KSG are focused on preventing cross-contamination and foreign matter ingress and are categorized into five themes: HVAC systems, facilities, gowning, cleaning, and cleanliness standards. Constructive and earnest discussion has been devoted to the key processes, where considerable amounts of powders are handled safely during the operations of weighing, granulation blending, and tableting. In the expectation of good usage, many of the principles and approaches presented here can be applied or adjusted to suit a wide spectrum of other manufacturing processes for various dosage forms of non-sterile drug products.

Acknowledgements

The Kansai Study Group would like to give special thanks to Dr. Richard Levy and Ms. Marilyn Foster for their immense contribution to this English translation.

The Study in Risk-Based Manufacturing Environmental Control for Non-Sterile Drug Products

(English Translation)

ISBN: 978-1-945584-28-2 © 2021 Parenteral Drug Association, Inc. All rights reserved.



Table of Contents

INTROD	UCTION AND BACKGROUND1	I CATEGOI	RY III: GOWNING	50
Purpose of the Study		1 Topic A.1	Gowning Rooms—1: Choosing separate	
Approach to the Study		1	rooms for gowning/de-gowning	50
Concept of this Study			Gowning Rooms—2: Separate entrance	
•	,	-	and exit routes	52
CATEGORY I: HVAC3		Topic B.1	Gowning Type: Choosing clothing change or gowning	5/1
Topic A.1	Differential Pressure/Airflow—1: Setting	Tonic R 2	Personal Protective Equipment—1:	דע
	the differential pressure between rooms 3	3 10010 0.2	Need for personal protective equipment	56
Topic A.2	Differential Pressure/Airflow—2: Choosing the	. Tonic B 3	Personal Protective Equipment—2:	50
	control method for differential pressure	, .	Need for goggles, gloves, and masks	57
	Filter—1: Selecting the appropriate air filter 9	Tonic R 4	Laundry: Procedures for laundering	,
Topic B.2	Filter—2: Installing a differential pressure	Topic D. 1	work clothes	58
	gauge and determining the monitoring	Topic C.1		-
	frequency of differential pressure	l lopic cir	transfer of hair from gowning room to	
Topic B.3	j , ,		processing room	60
т . с	of filter replacement		•	
Topic C	Air Change Rate: Setting the air change rate 17	/	procedures for cleaning and the frequency	
Topic D	Temperature and Humidity: Choosing water		of cleaning the gowning room	61
	grade for humidification and establishing a	,	3 3 3	
т : . г	control method	CATEGO	RY IV: CLEANING OF PROCESSING ROOMS.	62
Topic E	Dust Collection: Controlling local dust	Tonic Δ 1	Cleaning—1: Developing cleaning procedures	
Tania F	collection	iopic A. i	for processing rooms	62
Topic F	Exhaust Treatment: Filters and optional scrubber	Tonic A 2	Cleaning-2: Cleaning of upper part of	02
	Scrubber 24	1 10pic /1.2	walls and ceilings	65
CATEGORY II: FACILITIES25		Tonic A.3	Cleaning—3: Pros and cons of wet and dry	-
			cleaning of processing rooms	67
	Air Shower—1: Need for air shower	INDIC A 4	Cleaning—4: Specifications for	
•	Air Shower—2: When to use an air shower 27	7	disinfecting with ethanol in the standard	
Topic B.1	Drains—1: Arranging drain ports and		operating procedure	68
	control items	1000 (A 2	Cleaning—5: Daily and periodic cleaning	
	Drains—2: Specifications of drain ports	Tonic A 6	Cleaning—6: Cleaning during manufacturing	
	Drains—3: Sloping the floor		campaigns and at product change	72
Topic C.1	Facility Elements—1: Specifications of door	Topic A.7	Cleaning—7: Verification methods for cleaning	
	handles	<u>,</u>	processing rooms	73
lopic C.2	Facility Elements—2: Specifications and	Topic A.8	Cleaning—8: Control methods for	
T : 63	swing direction of doors		cleaning equipment	75
Topic C.3	,	=		
Topic D.1	3 3 3 11 1 3 3	CUIFACI	RY V: SPECIFICATIONS OF CLEANLINESS	77
•	Lighting—2: Lighting in processing rooms 39	Innic /\ I	Standards of Cleanliness: Setting standards of	
	Pest Control—1: Setting pest control standards 40),	cleanliness based on airborne particulates	77
Iopic E.2	Pest Control—2: Pest control in the HVAC		F	-
.	system	<u>/</u>		
Topic E.3	Pest Control—3: Pest control in the	•		
-	manufacturing facility			
Topic F	Utilities: Quality control of compressed air 48	3		

FIGURES AND TABLES INDEX

Figure I-1	Differential Pressures 3	Figure I-8	Typical Measures against Dust22
Figure I-2	Reverse Differential Pressure 4	Table I-4	Capture Velocity of Contaminants
Figure I-3	Flow Chart of HVAC System Using Manual Controls: Opening of Supply and Exhaust Air Dumpers are Fixed6	Table I-5	or Pollutants
Figure I-4	, ,	Table II-1	Pros and Cons of LEDs
	Control	Figure II-1	PDCA Management Cycle 40
Table I-1	Capacity of Typical Air Filters9	Figure II-2	Example of Pest Control Measures in
Table I-2	Location of Filter and Differential Pressure		HVAC Systems
	Gauges with Recording Frequency11	Figure II-3	Installation of Insect Screens that
Figure I-5	Flow Chart of Typical HVAC System 12		Allow Easy Maintenance
Figure I-6	Typical Flow Chart of HVAC System and Filter	Figure II-4	Installation of the Middle-Efficiency Filter 43
	Locations14	Figure II-5	Machine-Room Chamber System43
Table I-3	Filter Application and Timing of Filter Replacement14	•	Gowning Area Model
Figure I-7	Test Result of the Fluctuation in the Gas Concentration by Air Changes	•	Routes in Gowning System

Note to Readers

This document was produced and published by the PDA Japan Chapter, and has been translated into English. It does not represent the official point of view of PDA, Inc., and has not gone through the PDA technical document creation and review process.