

TABLE OF CONTENTS

| | |
|--|------------|
| FOREWORD | iii |
| NOTICE TO USERS | v |
| TABLE OF CONTENTS | vii |
| | |
| CHAPTER 1 INTRODUCTION | |
| 1.1 SCOPE | 1.1 |
| 1.2 PURPOSE | 1.1 |
| 1.3 HOW TO USE THIS GUIDE | 1.1 |
| 1.4 THE APPLICATION OF TAB | 1.1 |
| 1.5 THE TAB TECHNICIAN/TEAM | 1.2 |
| 1.6 ENERGY COSTS AND COMFORT | 1.2 |
| | |
| CHAPTER 2 PRELIMINARY TAB PROCEDURES | |
| 2.1 INITIAL PLANNING | 2.1 |
| 2.2 CONTRACT DOCUMENTS | 2.1 |
| 2.3 SYSTEM REVIEW AND ANALYSIS | 2.2 |
| 2.4 THE AGENDA | 2.4 |
| 2.5 PLANNING FIELD TAB PROCEDURES | 2.5 |
| 2.6 PRELIMINARY FIELD PROCEDURES | 2.6 |
| | |
| CHAPTER 3 GENERAL AIR SYSTEM TAB PROCEDURES | |
| 3.1 BASIC FAN TESTING PROCEDURES | 3.1 |
| 3.2 SYSTEM START-UP | 3.1 |
| 3.3 FAN TESTING | 3.1 |
| 3.4 DEFICIENCY REVIEW | 3.2 |
| 3.5 RETURN AND OUTSIDE AIR SETTINGS | 3.2 |
| 3.6 ANALYSIS OF MEASUREMENTS | 3.3 |
| 3.7 RECORDING DATA | 3.3 |
| 3.8 PROPORTIONAL BALANCING (RATIO) METHOD | 3.3 |
| 3.9 PERCENTAGE OF DESIGN AIRFLOW | 3.3 |
| 3.10 SYSTEM AIRFLOW | 3.5 |
| 3.11 BASIC OUTLET BALANCING PROCEDURES | 3.5 |
| 3.12 STEPWISE METHOD | 3.5 |
| 3.13 FAN ADJUSTMENT | 3.6 |
| 3.14 WET COIL CONDITIONS | 3.6 |
| 3.15 AIRFLOW TOTALS | 3.6 |
| 3.16 EXHAUST FANS | 3.6 |
| 3.17 FAN DRIVE ADJUSTMENT | 3.6 |



| | | |
|--|--|----------------|
| 3.18 | DAMPER ADJUSTMENTS | 3.6 |
| 3.19 | DUCT TRAVERSES | 3.7 |
| 3.20 | SYSTEM DEFICIENCIES | 3.7 |
| 3.21 | FUME HOOD EXHAUST BALANCING PROCEDURES | 3.7 |
| 3.22 | DUST COLLECTION AND EXHAUST BALANCING PROCEDURES | 3.8 |
| 3.23 | AIRFLOW MEASUREMENTS ON DISCHARGE STACKS | 3.11 |
| 3.24 | INDUSTRIAL VENTILATION | 3.12 |
| 3.25 | SELECTION OF INSTRUMENTS | 3.12 |
| CHAPTER 4 TAB PROCEDURES FOR SPECIFIC AIR SYSTEMS | | |
| 4.1 | INTRODUCTION | 4.1 |
| 4.2 | VARIABLE AIR VOLUME (VAV) SYSTEMS | 4.1 |
| 4.3 | MULTI-ZONE SYSTEMS | 4.13 |
| 4.4 | INDUCTION UNIT SYSTEMS | 4.14 |
| 4.5 | DUAL DUCT SYSTEMS | 4.14 |
| 4.6 | SPECIAL EXHAUST AIR SYSTEMS | 4.16 |
| 4.7 | PROCESS EXHAUST AIR SYSTEMS | 4.17 |
| CHAPTER 5 HYDRONIC SYSTEM TAB PROCEDURES | | |
| 5.1 | HYDRONIC SYSTEM MEASUREMENT METHODS | 5.1 |
| 5.2 | BASIC HYDRONIC SYSTEM PROCEDURES | 5.3 |
| 5.3 | PIPING SYSTEM BALANCING | 5.4 |
| 5.4 | BALANCING SPECIFIC SYSTEMS | 5.5 |
| 5.5 | VARIABLE VOLUME FLOW | 5.9 |
| 5.6 | PRIMARY-SECONDARY SYSTEMS | 5.11 |
| 5.7 | SUMMER-WINTER SYSTEMS | 5.11 |
| CHAPTER 6 TAB REPORT FORMS | | |
| 6.1 | PREPARING TAB REPORT FORMS | 6.1 |
| 6.2 | DESCRIPTION OF USE | 6.1 |
| INDEX | | I.1 |

TABLES

| | | |
|-----|-------------------------|------|
| 3-1 | Sample of Airflow Rates | 3.4 |
| 5-1 | Load-Flow Variations | 5.10 |

FIGURES

| | | |
|------|---|------|
| 2-1 | Schematic Duct System Layout | 2.3 |
| 2-2 | Instruments Selected for a Specific Job | 2.5 |
| 3-1 | Sample Supply Air Duct (Part) | 3.4 |
| 3-2 | Typical Air Diffuser CFM Measurement | 3.6 |
| 3-3 | Measuring Exhaust Air Velocity on Lab Exhaust Hood with Sash Height | 3.7 |
| 3-4 | Example of Exhaust Hood Air Balance Label | 3.8 |
| 3-5 | Sample Dust Collection Exhaust System | 3.9 |
| 4-1 | Typical Variable Air Volume (VAV) System | 4.1 |
| 4-2 | Open Loop Fan Volume Control | 4.2 |
| 4-3 | Closed Loop Fan Volume Control | 4.3 |
| 4-4 | Fan and System Curves, Constant-Speed Fan | 4.4 |
| 4-5 | Fan and System Curves, Variable-Speed Fan | 4.4 |
| 4-6 | Series Fan Powered VAV Unit | 4.9 |
| 4-7 | Parallel Fan Powered VAV Unit | 4.9 |
| 4-8 | Paper Strip at VAV Box Return Before Balancing | 4.10 |
| 4-9 | Paper Strip at VAV Box After Balancing | 4.10 |
| 4-10 | Constant Fan VAV Box | 4.12 |
| 4-11 | Intermittent Fan VAV Box (Parallel) Cycle | 4.13 |
| 4-12 | Multi-zone System | 4.14 |
| 4-13 | Dual Duct System | 4.15 |
| 4-14 | Induction Unit System | 4.16 |
| 5-1 | Hydronic Flow Measurement | 5.1 |
| 5-2 | External Ultrasonic Flow Sensor on Pipe with Insulation Removed | 5.2 |
| 5-3 | Ultrasonic Flow Meter | 5.2 |
| 5-4 | Effects of Flow Variation on Heat Transfer 20°F (11°C) Δt at 200°F (93°C) | 5.9 |
| 5-5 | Percent Variation to Maintain 90% Terminal Heat Transfer | 5.9 |
| 5-6 | Chilled Water Terminal Flow Versus Heat Transfer | 5.10 |
| 5-7 | Pump With Variable Speed Drive | 5.11 |
| 5-8 | Example of Primary and Secondary Pumping Circuits | 5.12 |
| 5-9 | Summer-Winter Systems | 5.13 |

