



# SMALL BORE TUBING INTEGRITY COURSE

USING TWIN FERRULE COMPRESSION FITTINGS



BRITISH FLUID POWER ASSOCIATION

COURSE OVERVIEW



## ABOUT THE COURSE

This is a one day course covering the various theoretical, practical and safety elements involved in the manufacture of Small Bore Tubing Assemblies using twin ferrule compression fittings. This course includes the benefits of small bore tube assemblies, tube preparation, bending, assembly, installation runs, producing to drawings and thread identification. During the training the attendees will take part in a series of practical tasks along with a theory question paper. A high quality personalised course book, certification of skills achievement

and registration on the BFPA National data base, give both the attendee and employer confidence that the correct methods and culture are being adopted and used.

## WHY SHOULD YOU ATTEND THE COURSE

By completing this comprehensive BFPA Small Bore Tubing Integrity Course, candidates will be able to demonstrate that they have gained the appropriate skills, knowledge and ability when working with twin ferrule compression fittings and tube line fabrication.

## CHAPTER ONE

### TWIN FERRULE COMPRESSION FITTINGS

- correct tightening, including the use of gap gauges
- pre-swaging
- disassembly and reassembly
- common installation problems
- visual identification of metric and imperial fittings
- recommendations for clamping of small bore tube
- tube fitting identification marks
- twin ferrule fitting sealing areas
- different profiles of the ferrules used by different manufacturers
- installation procedures for port connectors
- assembly procedures for plugs and caps
- assembly procedures for tube insert and plastic tubing

## CHAPTER TWO

### TUBE VERSUS PIPE

- definition of tube and pipe
- the advantages of tubing over pipe
- bending quality tube and the use of less fittings
- tube selection
- tube hardness
- surface condition
- gas services
- good and bad tube storage
- tube materials, wall thickness and typical working pressures
- temperature reduction factors



## CHAPTER THREE

### TUBE PREPARATION

- correct handling of tube
- common tools and how they should be used in the preparation of tube

## CHAPTER FOUR

### TUBE BENDING PRINCIPLES

- main parts of a tube bender
- spring back during the bending process
- defective bends
- recommended free tubing length
- tube gain
- tube line fabrication
- basis for measurement when producing a bend
- managing the change to the plane of bending
- marking the tube
- positioning the tube
- producing an offset bend

## CHAPTER FIVE

### PLANNING THE ROUTE

- good and bad practice for tube runs
- working to a sample drawing considering tube gain and offset bend allowance in order to calculate the correct length

## CHAPTER SIX

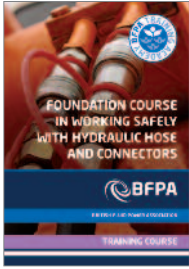
### ASSOCIATED THREADS

- understand how to correctly identify an end termination by following 8 steps
- use a range of measuring instruments and gauges in conjunction with tabulated data to positively identify a range of end terminations
- understand the main characteristics and geometry of the male and female along with how it seals for the following end terminations: BSP port/stud, BSPT, JIC, Metric port/stud, NPT and SAE port/stud
- understand how to correctly tighten adjustable (positional) elbows



## OTHER COURSES AVAILABLE

### BFPA HOSE ASSEMBLY SKILLS TRAINING PROGRAMME



This one day course has been developed to provide an introduction into hydraulic hose, connectors and the safe assembly of these components for industry use. The course is classroom based, during the day the attendee will gain a knowledge and understanding of safe hose assembly and if applied will only enhance the safety within the hydraulic industry and that of the attendee.

### HOSE INTEGRITY, INSPECTION AND MANAGEMENT



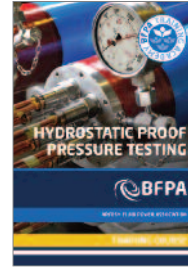
In this one day BFPA training course the key themes covered include: hose life expectancy; risk analysis; competence by way of a robust competence assurance system; identify, inspect & record; hose register – recording of a hose assembly prior to it going into service; and visual hose assembly (installation) inspection check list. The attendees will be assessed during the day through a question paper requiring a 70% pass rate.

### BFPA HOSE ASSEMBLY SKILLS TRAINING PROGRAMME



The skills course will take the candidate through the many techniques and considerations essential for the safe production of a quality hose assembly and ultimately leading to installation. This two day course involves both the theoretical and practical elements in working with hose and connectors. During the 2 days the attendees will be trained and practically assessed to an industry level of ability in working with hose and connectors.

### BFPA HYDROSTATIC PROOF PRESSURE TESTING COURSE



This one day pressure testing course has been developed by the BFPA to enable the attendee to hydrostatically test a given component. The course centres around the testing of flexible hose and rigid tube and during the day attendees will receive both theoretical understanding and practical experience of procedures.



ON COMPLETION  
OF ANY OF THESE COURSES  
YOU CAN APPLY FOR THE BFPA  
TRAINING PASSPORT CARD

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