



# Tyco Electronics



## HarnWare

Harness Design

 Tyco Electronics

# Training Guide

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## Welcome to the HarnWare training guide

### Introduction

By the mid-1990's developments in PC hardware and software provided a more affordable and ergonomic basis for a second generation CAD system for wiring harness design. After much debate, HarnWare was the name chosen for the system. Originally Raychem only intended HarnWare for in-house use. However, even the limited Version 1 software attracted considerable interest among customers and partners. We decided to make the system available to Tyco customers prepared to invest time in attending a training course and learn how to make effective use of HarnWare for mutual business benefits.

Now Raychem is part of Tyco Electronics, and the number of HarnWare users has grown to more than 1000 engineers in 332 companies located in over 36 countries. This means that HarnWare is now the most widely used wiring harness design database system. This achievement is particularly impressive, as it has occurred by word of mouth and without any advertising or marketing expenditure.

### Registration

Please contact your sales engineer to discuss whether HarnWare is appropriate for your application.

We have a formal means of approving new HarnWare users and accepting them for training. We do not want to discourage participation but are being challenged by our senior management to monitor and assess the value of HarnWare to our business. Consequently we need to ensure that:

1. The proposed new user is from a valued customer who we want to support
2. Is working on a major program of interest to us
3. Participation represents a major business opportunity
4. Financial payback can be calculated and the timing known
5. Incremental business can be expected and the value can be estimated
6. Forecast business can be audited

Then complete the booking form and return within 10 working days to the address given on the booking form. Attendees will receive written confirmation and full joining instruction on receipt of the booking form. Courses are held at Tyco Electronics's Headquarters in Swindon, times are normally -

- Monday 9.00 am to 5.00 pm
- Tuesday to Thursday 8.30 am to 5.00 pm
- Friday 8.30 am to 1.00 pm (this can be extended if required).

Training can be carried out at customer premises upon arrangement. Contact your sales engineer to discuss.

Your attention is drawn to the specified pre-requisites of each course. It is in the interest of the attendee and his organisation, and other delegates, that these are met, to ensure the fullest possible benefits are achieved from the training. In the cases where the pre-requisites cannot be met, please contact your sales engineer who will offer advice on the suitability of the attendee for the course and suggest ways in which the attendee can be helped to meet the pre-requisites.

All training courses are offered subject to our Standard Terms and Conditions which form part of this document. Tyco Electronics reserves the right to cancel courses with insufficient numbers enrolled and to levy a penalty fee, no greater than the booking price, in the event of 'no shows' or late cancellations.

## **Post Training Support**

HarnWare is a powerful harness design tool that is easy and intuitive to use. It contains all of the functionality required to design a complete harness, and to be effective, the user must be able to use all of these functions with confidence from the start. This is unlike a conventional CAD system where the beginner can produce useful work using only basic commands and build to expert status over a period of time.

To get the most from HarnWare, the user must consolidate the training immediately and use the system often. This training is a detailed hands-on course aimed specifically at end users.

In a concentrated learning situation, where lots of information has to be quickly absorbed, it is sometimes hard to retain everything taught. We have recognised that assistance after training is helpful and are prepared to offer post training support. We would send an expert to your site, a short time after training, to help you go through some real harness designs of your own. This would be an informal arrangement and would allow attendees to consolidate their formal training and cover any topics that they were uncertain about.

## **On-Line Help**

When you are up and running there will be times when you need help from Tyco Electronics. You may require information about a product, have a specific design query, require guidance on using HarnWare or

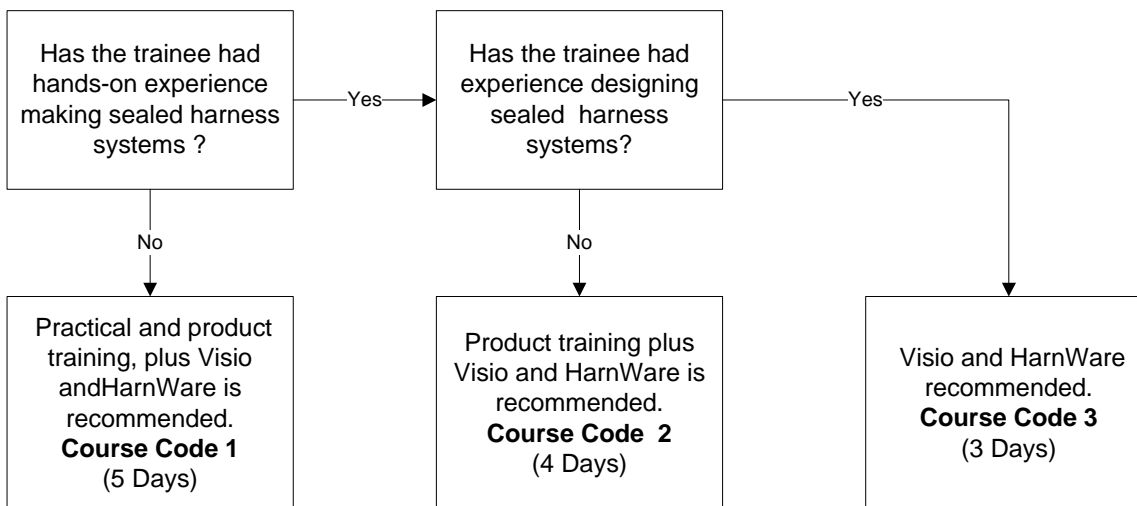
have encountered a problem. During training you will be given the name and number of your first point of contact. Tyco Electronics have introduced a system of SPOCCs. (Single Point of Customer Contact) who are people trained to analyse your requirements and efficiently transfer you to the best person to help you. A SPOCC will be responsible for your company and it is their name you will be given. For example, if you have a product query, the SPOCC will transfer you to the relevant support person.. Likewise with a HarnWare query, you will be transferred to the HarnWare support team.

We have also set up a HarnWare bulletin board at HarnWare.com web site on the Internet. Through this medium we will keep you informed of new developments, share information on drawing and products, offer support and allow users to communicate with each other, and with us.

The key support services available via <http://www.harnware.com/Contact.asp>

## Course Planner

Three training courses are offered and their choice is dependent upon the trainees practical harnessing experience or Tyco Electronics product knowledge. To get the most from HarnWare it is essential that users have a 'feel' for using heat shrink parts and a basic product knowledge, preferably gained by designing harnesses manually. Use the planner below and the details contained in the course description, including the pre-requisites, to decide upon the best course for you.



## Course Details

| Course Code | Title                                  | Duration |
|-------------|--|----------|
| 1           | Harness Assembly Components and Design | 5 days   |
| 2           | Harness Components and Design          | 4 days   |
| 3           | Harness Design                         | 3 days   |

Contact your local Tyco Electronics Sales representative or contact us at <http://www.harnware.com/Contact.asp> for prices and terms and conditions.

## Course Code - 1 Design

## Harness Assembly, Components and

### Introduction

This course provides the trainee with the complete range of skills required to design a Raychem harness from concept, through design to final assembly. It is aimed at users who want to design Raychem harnesses using HarnWare and who require an understanding of harness assembly techniques and component selection.

Practical instruction in all aspects of building a harness is given with an emphasis on hands-on experience. Information on product selection, part numbering, performance etc. is also given.

The steps required to produce a design, See 3 Day Course Code 3

### Pre-requisites

No Raychem harnessing assembly skill or product knowledge is necessary but the following pre-requisites are recommended.

1. Familiarity with Microsoft Windows and preferably a working knowledge of a Microsoft Office product such as Word or Excel.
2. Mouse and keyboard proficiency (but not typing skills).
3. Familiarity with Windows Help.
4. Familiarity with Windows print systems e.g. changing format between landscape and portrait.
5. Basic harness design knowledge and familiarity with circular connectors and industry terminology such as screening, contacts, crimp, splice etc.
6. Familiarity with wiring schematics and harness drawing conventions, including an appreciation of draughting techniques, drawing presentation, and draughting standards.

### Duration

**5 days** comprising **1 day** practical training, **1 day** product training and **3 days** HarnWare which includes use of Microsoft Visio, the drawing software.

### Objective

On completion of the course the attendee will be able to:-

- Build a Raychem harness, including wire laying, braid installation, heat shrinking tubing and moulded parts, screen termination, adaptor assembly, use of adhesives, installation of marker sleeves and the use of solder devices.
- Select different products, be familiar with part numbering conventions, introduced to design rules and have knowledge of the material systems used in harness manufacture.
- Guidance on harness design best practices including selection of materials, screening requirements and components. During the interactive course trainees will generate drawings, wiring schematic, bills of materials, assembly time estimates and codes of practice listings. In addition to the major topics, functions such as wire size advice, HarnWare Help, web links, product data sheets, export options and printing options.

## Topics

- Basic Microsoft Visio drawing techniques
- Wire lay up techniques
- Use of braid for screening
- Installing heat shrink tubing
- Installing heat shrink moulded parts
- Adaptor assembly
- Braid termination
- Installation of marker sleeves
- Installation of solder devices
- Wire and Cable product training
- Heat Shrink product training
- Adaptor training
- Marker training
- Solder device and splice training
- Choice of material system
- Connector/adaptor identification and selection
- Wire selection and creation of wire list
- Cable lay design
- Braid and tube selection
- Selection of moulded parts
- Selection of wire and cable markers
- Handling solder sleeves and wire splices
- Choosing feedthroughs
- Choosing connector/adaptor assemblies
- Flying leads
- Multicore cable handling
- Wire routing
- Parts listing and parts list export
- Labour estimating
- COP and fax-on-demand listing
- Using system and product Help
- Printing
- File properties

### Introduction

This course is aimed at users who want to design harnesses using HarnWare and are experienced in assembling Raychem harnesses or are familiar with the concepts involved in making harnesses using heat shrink components, but require component selection information and product training.

The steps required to produce a design, route wires, select components, run labour estimates, generate cable lays, extract parts lists and output drawings and other reports using Microsoft Visio and HarnWare are described.

### Pre-requisites

No Raychem product knowledge is necessary but the following pre-requisites are recommended.

1. Familiarity with Microsoft Windows and preferably a working knowledge of a Microsoft Office product such as Word or Excel.
2. Mouse and keyboard proficiency (but not typing skills).
3. Familiarity with Windows Help.
4. Familiarity with Windows print systems e.g. changing format between landscape and portrait.
5. Basic harness design knowledge and familiarity with circular connectors and industry terminology such as screening, contacts, crimp, splice etc.
6. Familiarity with wiring schematics and harness drawing conventions, including an appreciation of draughting techniques, drawing presentation, and draughting standards.
7. Experience in Raychem harness assembly techniques.

### Duration

**4 days** comprising **1 day** product training and **3 days** HarnWare which includes use of Microsoft Visio, the drawing software.

### Objective

On completion of the course the attendee will be able to:-

- Select different products, be familiar with part numbering conventions, introduced to design rules and have knowledge of the material systems used in harness manufacture.
- Guidance on harness design best practices including selection of materials, screening requirements and components. During the interactive course trainees will generate drawings, wiring schematic, bills of materials, assembly time estimates and codes of practice listings. In addition to the major topics, functions such as wire size advice, HarnWare Help, web links, product data sheets, export options and printing options

## Topics

- Basic Microsoft Visio drawing techniques
- Wire and Cable product training
- Heat Shrink product training
- Adaptor training
- Marker training
- Solder device and splice training
- Choice of material system
- Connector/adaptor identification and selection
- Wire selection and creation of wire list
- Cable lay design
- Braid and tube selection
- Selection of moulded parts
- Selection of wire and cable markers
- Handling solder sleeves and wire splices
- Choosing feedthroughs
- Choosing connector/adaptor assemblies
- Flying leads
- Multicore cable handling
- Wire routing
- Parts listing and parts list export
- Labour estimating
- COP and fax-on-demand listing
- Using system and product Help
- Printing
- File properties

### Introduction

This course is aimed at users who want to design harnesses using HarnWare and are experienced in assembling Raychem harnesses or are familiar with the concepts involved in making harnesses using heat shrink components. They will also be experienced in designing harnesses by selecting components manually and be familiar with Raychem products, numbering conventions and design rules.

The steps required to produce a design, route wires, select components, run labour estimates, generate cable lays, extract parts lists and output drawings and other reports using Microsoft Visio and HarnWare are described.

### Pre-requisites

The following pre-requisites are recommended:-

1. Familiarity with Microsoft Windows and preferably a working knowledge of a Microsoft Office product such as Word or Excel.
2. Mouse and keyboard proficiency (but not typing skills).
3. Familiarity with Windows Help.
4. Familiarity with Windows print systems e.g. changing format between landscape and portrait.
5. Basic harness design knowledge and familiarity with circular connectors and industry terminology such as screening, contacts, crimp, splice etc.
6. Familiarity with wiring schematics and harness drawing conventions, including an appreciation of draughting techniques, drawing presentation, and draughting standards.
7. Experience in Raychem harness assembly techniques.
8. Experience in designing Raychem harnesses and selecting components manually.

Please note the hardware requirements detailed earlier in this document.

### Duration

**3 days** HarnWare training which includes use of Microsoft Visio, the drawing software.

### Objective

On completion of the course the attendee will be able to:-

- Design harness to best practices including selection of materials, screening requirements and components. During the interactive course trainees will generate drawings, wiring schematic, bills of materials, assembly time estimates and codes of practice listings. In addition to the major topics, functions such as wire size advice, HarnWare Help, web links, product data sheets, export options and printing options

### Topics

- Basic Microsoft Visio drawing techniques
- Choice of material system
- Connector/adaptor identification and selection
- Wire selection and creation of wire list
- Cable lay design
- Braid and tube selection
- Selection of moulded parts
- Selection of wire and cable markers
- Handling solder sleeves and wire splices
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## HarnWare

## Course Booking Form

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<http://www.harnware.com/downloads/HarnwareCourseBookingForm.pdf>