

Safety Standards Awareness Program for Manufacturers of Refrigerators and Air Conditioners





Client Details

Industry: Product Testing and Certification Industry

Department: Laboratory to Test and Certify



Project Details

The customer wanted the training program to have information on all the safety standards to be adopted during the manufacturing of products such as refrigerators and air conditioners.



Course Requirements

Tool: Articulate

Number of modules: 4

Quiz: Yes

Interactivity level: Medium (Level 2)

Audio: Yes

Translation: No

Course duration: 40 :00

They didn't want any changes in the content provided, as it was about testing standards.

They wanted CommLab to build the course using the development tool Articulate.



Content Details

Source content	Word docs and PPTs
Content clarity	Average
Content Type	Facts
Images	No
SME Assistance	Yes

IEC Refrigeration and Air Conditioning

- This presentation is based on the particular requirements of
- IEC 60335-2-24, Refrigerating Appliances, Ice-Cream Appliances, and Ice-Makers
- 60335-2-40, Electrical Heat Pumps, Air-Conditioners and Dehumidifiers
- 60335-2-89, Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Condensing Unit or Compressor
- This presentation focuses on the requirements that are additional or different than 60335-1.

Scope, 60335-2-24

- 60335-2-24, Edition 7, 2010-02
- Particular Requirements for Refrigerating Appliances, Ice-Cream Appliances, and Ice-Makers
- Household Refrigerating Appliances
- Ice Makers; both commercial and the type designed to be installed in freezer compartments of refrigerators
- Household Ice Cream Appliances
- Refrigerators with flammable refrigerants
- Single Phase, not more than 250V
- 3 Phase, not more than 480V
- Battery operated, not more than 24V d.c.

Screen shots from the PPTs of the client





Challenge

Product Delivery

The course needed to be delivered within 3 weeks on the customer's Learning Management System (LMS) .



CommLab Solution

Developed a Prototype

The timeframe for course development was short hence we decided to make a prototype so that the client's expectations and our understanding were aligned.

The client was happy with the prototype and had no issues.

This helped in delivering the course on time.





Challenge

Dry Content

The content was very dry and technical.

Keeping the learner involved and engaged and keeping their motivation levels high was quite a bit of a challenge.



CommLab Solution

Effective Standards

Taking the learner's profile and nature of the content into consideration we presented each product in sections for easy recall of information.

Screen shot from the PPT provided by the client

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Presented information about each product in sections for clarity

Stability/Mechanical Hazards (20): (60335-2-24 only)

Detailed view of the tests of 60335-2-24:

- **20.102** - Doors are loaded with cylindrical weights and opened. Additional weight placed on outermost edge of door
- **20.103** - Stability of refrigerating appliances with sliding drawers accessible after opening the refrigerator door
- **20.104** - Stability of appliances with sliding drawers that are accessible without opening the refrigerator door





Instructional

Interactivities

- Click on Tabs to explain the set of related concepts
- A Media Tour to explain various types of refrigerators
- Click on Numbers interactivity to explain the sub-clauses of each section in detail



Visual

Media tour - as an aid in explaining different types of refrigerators and air conditioners





Instructional

Screen shots from the customer's PPT:

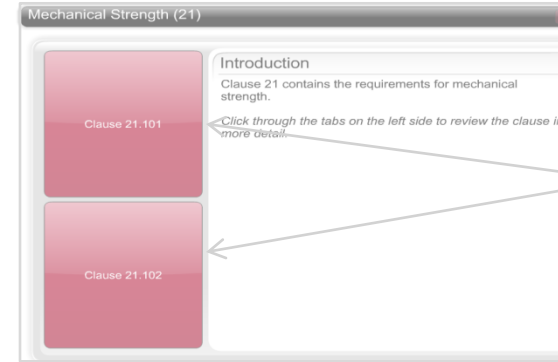
Mechanical Strength (21)

- 21.101 – Drop impact test for camping appliances
- 21.102 – Lamps are required to be guarded. Compliance is checked by applying a 75 mm diameter sphere. The sphere shall not touch the lamp.
- The other mechanical strength tests of 60335-1 are applicable

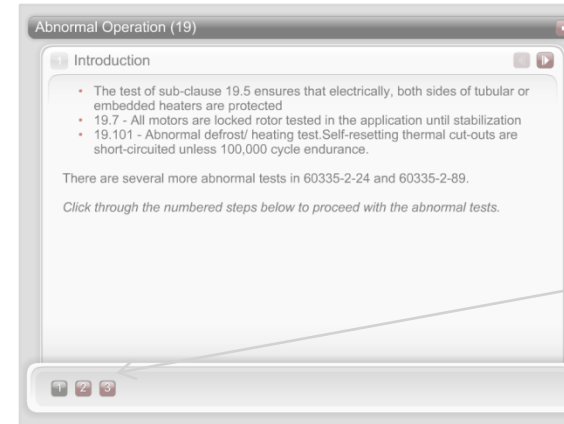
Abnormal Operation (Cont'd)

- The test of sub-clause 19.5 ensures that electrically, both sides of tubular or embedded heaters are protected
- 19.7 – All motors are locked rotor tested in the application until stabilization
- 19.101 – Abnormal defrost/heating test. Self-resetting thermal cut-outs are short-circuited unless 100,000 cycle endurance.

Screen shots from the course:



Click on Tabs



Click on Numbers



Visual

Source Content

Heating (11)

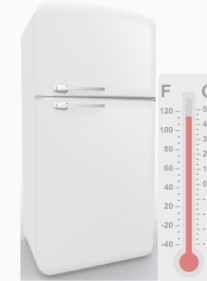
- Winding temperatures by resistance
- Winding temperatures of compressors complying with IEC 60335-2-34 Annex AA need not be measured
- Compressor protective devices shall not operate after steady conditions are achieved
- Acceptable temperature rises are reduced by 7 °K for ST and T Class appliances (Class 5 appliance in –2-89)
- Defrost test

Judicious use of visuals to make the content interesting

Heating (11)

Section 11 contains requirements for the heating test.


- The clause of part 1 is completely replaced. The test appears to be written for heating operation of the appliance, but it does mention the cooling mode
- Winding temperatures by resistance
- Winding temperatures of compressors complying with IEC 60335-2-34 Annex AA need not be measured





Customer Feedback

The feedback on the prototype course was :



“Thank you. Our first impression is very good. Things appear to be going well”.

The client was happy with the final product and was amazed at seeing the dramatic transformation of dry and boring content into an easy and understandable e-Learning course- far exceeding their expectations.