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## Train the trainers workshop – HURKT, Zagreb, March 28 to 31

**Lesson Plan: R744 and Flammable Refrigerants**

**Venue: Ivana Lucica 5, Building East, Room 114**

This document outlines the content of the four day R744 and Flammable Refrigerants training. This session is aimed for trainers who are already experienced in handling refrigerants and who have a good understanding of system operation based on „heat pump cycle“.

The table below shows the lesson plan. The training includes theoretical knowledge and practical work skills on R744 and Flammable refrigerants systems.

Scope of the flammable refrigerants training includes:

- Hydrocarbon (HC) refrigerants R290, R1270, R600a;
- HFC R32;
- HFO refrigerants R1234ze, R1234yf;
- HFO blends such as R454A.

Day	Time	Topic	Room/Method	Lecturer/Assessor
		<b>R 744</b>		
March 28	09.00	Opening session	Lecture room/PP	Curko
	09.10	Introduction to Real Alternatives; Background to the use of natural refrigerants	Lecture room/PP	Curko
	09.30	Introduction to R744; Critical point and triple point	Lecture room/PP	Pavković
	10.15	R744 hazards; Working Safely with R744	Lecture room/Lab	Pavkovic
	11.00	Coffee break		
	11.15	R744 cascade systems	Lecture room/PP	Grozdek
	12.30	Lunch break		
	13.30	R744 as a secondary coolant	Lecture room/PP	Grozdek
	14.30	Theory of transcritical operation	Lecture room/PP	Pavkovic
	15.15	Coffee break		
	15.30	R 744 Transcritical systems	Lecture room/Lab	Pavkovic
	16.30	Day 1 review	Lecture room	Curko
17.00	End of Day 1			

March 29	09.00	Official trainer process	Lecture room/PP	Bassi (in English)
	09.30	Transcritical booster systems	Lecture room/PP	Grozdek
	10.00	Reducing leak potential and improving resilience	Laboratory	Grozdek
	10.30	Coffee break		
	10.45	Installation and commissioning of R744 systems	Laboratory	Grozdek
	11.45	Service and repair of R744 systems		Grozdek
	13.00	Lunch break		
	14.00	Theory assessment	Multiple choice assessment	Pavkovic/Grozdek/Bassi
	15.00	Practical assessment	Training rig and tools equipment	Pavkovic/Grozdek/Bassi
	16.45	Feedback / summary	Lecture room	Bassi
	17.00	End of Day 2		
		<b>Flamable Refrigerants</b>		
March 30	09.00	Opening session – work plan	Lecture room/PP	Curko
	09.15	Flammable refrigerants – an introduction	Lecture room/PP	Lucin
	09.30	Flammability and other safety hazards	Lecture room/PP	Lucin
	10.00	Working safely	Lecture room/Lab	Rozing
	10.15	Cylinders and cylinder handling	Lecture room/Lab	Rozing
	10.30	Service procedures	Lecture room/Lab	Lucin/Rozing
	11.30	Coffee break		
	11.45	Service procedures	Laboratory	Lucin/Rozing
	12.45	Reducing leak potential	Laboratory	Rozing
	13.00	Lunch break		
	14.00	Application of flammable refrigerants	Lecture room/Lab	Lucin
	14.45	System design differences	Lecture room/Lab	Lucin
	16.00	Discussion		Bassi/Curko
	17.00	End of Day 3		
March 31	09.00	Theory assessment	Multiple choice assessment	Lucin/Rozing/Bassi
	10.00	Practical assessment	Training rig and tools equipment	Lucin/Rozing/Bassi
	11.45	Feedback / Summary	Lecture room	Bassi/Curko
	12.00	End of session		