





Education and Training
Two Decades of Neglect

Ian Tuena



### **Current Courses Available**

CPC32413	UEE32211	MEM30205	AUR20216
Certificate III in	Certificate III in Air-	Certificate III in	Certificate II in
Plumbing	conditioning and Refrigeration	Engineering – Mechanical Trade	Automotive Air
	nemgeration	(Refrigeration/Air	Conditioning Technology
		Conditioning) –	reciliology
Basic skill set			
designed around	Used in the majority		
compliance for	of Tafe institutions	Primarily used in	Very Basic and
small split AC		Western Australia	limited
systems up to			understanding of
18 KW	Currently in		Refrigeration
	Transition Phase		



	Draft Mapping Comparison - Certificate III Refrigeration and Air Conditioning UEE32211, MEM30205 Certificate III in Plumbing, AUR20216 Certificate II in Automotive Air Conditioning Technology												
Cert 11 Subjects Full Alignment													
Limited Alignment	owledge of subject matter required as from 01/01/2018 Main Subjects for Cert IV Endorsment												
	CPC32413 Certificate III in Plumbing				UEE32211 Certificate III in Air-conditioning and Refrigeration			MEM30205 Certificate III in Engineering – Mechanical Trade (Refrigeration/Air Conditioning) – Western Australia	1			AUR20216 Certificate II in Automotive Air Conditioning Technology	
	Required by ARC to allow plumbers to fit spilts  Position, assemble and start up single head split air conditioning and water heating heat pump			UEENEEJ105A	Required by ARC to allow Electricians to fit spilts  Position, assemble and start up single head split air conditioning and water heating heat pump systems	Cert 11 qual 70							
UEENEEJ105A UEENEEJ172A	systems Recover, pressure test, evacuate, charge and leak test refrigerants – split systems	Mechanical Services Mechanical Services	Elective Elective	UEENEEJ172A	Recover, pressure test, evacuate, charge and leak test refrigerants - split systems	Cert 11 qual 60	Code	e Title	points	WA Elect Reg Req	Unit code	Unit title	Points
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	Mechanical Services	Elective	UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	Core				,	ALUBETTO OC		
UEENEEJ102A	Prepare and connect refrigerant tubing and fittings  Subjects not relevant to refrigeration course	Mechanical Services	Elective	UEENEEJ102A	Prepare and connect refrigerant tubing and fittings	Core 30	MEM05006	c Perform brazing and /or silver soldering	2	, , , , , , , , , , , , , , , , , , ,	AURETRO06	Solder electrical wiring and circuits	
CPCPCM2048A CPCPMS2021A CPCPMS3031A	Cut and join sheet metal Assemble mechanical services components Fabricate and install steel pressure piping	Mechanical Services Mechanical Services Mechanical Services	Core Core										
CPCPMS3033A	Install small bore heating systems	Mechanical Services	Core	UEENEEJ114A	Resolve problems in hydronic systems	Elective - Group B Theoretical	components						
				UEENEEE107A UEENEEE137A	Use drawings, diagrams, schedules, standards, codes and specifications  Document and apply measures to control OHS risks associated with electrotechnology work	Core Core	MEM09002	Interpret technical drawing	4	. ✓			
				UEENEEJ109A UEENEEC025B	Verify functionality and compliance of refrigeration and air conditioning installations  Participate in refrigeration and air conditioning work and competency development activities	Core Core							
				UEENEEJ103A UEENEEJ104A	Establish the basic operating conditions of vapour compression systems  Establish the basic operating conditions of air conditioning systems	Core Core							
				UEENEEJ113A UEENEEK142A	Commission air conditioning and refrigeration systems  Apply environmentally and sustainable procedures in the energy sector	Core	MSAENV27	Participate in environmentally sustainable work practices		✓	AURAEA002	Follow environmental and sustainability best practice in an automotive workplace	core
				UEENEEJ110A	Select refrigerant piping, accessories and associated controls	Core Electrical co	components						
				UEENEEE103A	Solve problems in ELV single path circuits	Core	MEM18048	Fault find and repair/rectify basic electrical circuits	12	<b>√</b>	AURETR012	Test and repair basic electrical circuits	core
				UEENEE105A UEENEEJ153A	Fix and secure electrotechnology equipment Find and rectify faults in motors and associated controls in refrigeration and air conditioning systems	Core Core							
				UEENEEJ170A UEENEEJ194A	Diagnose and rectify faults in air conditioning and refrigeration control systems Solve problems in low voltage refrigeration circuits	Core Core	MEM18051 MEM18092		6				
				UEENEEP012A UEENEEP017A	Disconnect / reconnect composite appliances connected to low voltage installation wiring Locate and rectify faults in low voltage composite appliances using set procedures	Core	MEM10002	Terminate and connect electrical wiring	3	1			
				UEENEEP024A UEENEEP025A	Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply Attach cords, cables and plugs to electrical equipment for connection to 1000 Va.c. or 1500 Vd.c. supply	Core	MEM18046	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.	10	J			
							MEM18049	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	3	1	AUDETDO11	Install basic ancillary electrical systems and common aster	
							MEM12002	Perform electrical/electronic measurement	2	√ √ ./	AURETR011	Install basic ancillary electrical systems and components	elective
						Refrigeration Trade F	MEM12004 MEM10004	Enter and change programmable controller operational parameters	2	<u> </u>			
MEM10009B CPCPMS3036A	Install refrigeration and air conditioning plant and equipment Install air handling units	Mechanical Services Mechanical Services	Elective Elective	UEENEEJ107A	Install air conditioning and refrigeration systems, major components and associated equipment	Core Core	MEM10010		4	. ✓			
MEM18086B	Test, recover, evacuate and charge refrigeration systems	Mechanical Services	Elective	UEENEEJ108A UEENEEJ106A	Recover, pressure test, evacuate, charge and leak test refrigerants Install refrigerant pipe work, flow controls and accessories	Core Core	MEM18086 MEM18096		4	<b>√</b>	AURETU002	Recover vehicle refrigerants	elective
				UEENEEE102A	Fabricate, assemble and dismantle utilities industry components	Core	MEM10009		4	<b>√</b>	AURETU001	Install air conditioning systems	
CPCPMS3035A CPCPMS3039A	Install and test ducting systems  Maintain mechanical services equipment	Mechanical Services Mechanical Services	Elective Elective	CPCPMS3035A UEENEEJ167A	Install and test ducting systems  Resolve problems in central plant air conditioning systems	Elective - Group A Elective - Group B	MEM18089	Maintain and repair central air handling systems	6		AURETU003	Service air conditioning and HVAC systems	core
CPCPMS3038A CPCPMS3037A	Install air conditioning control equipment Install and test split system air conditioning	Mechanical Services Mechanical Services	Elective Elective				MEM18088 MEM18085	Maintain and repair commercial air conditioning systems and components	4	<b>√</b>	AURETU004	Diagnose and repair air conditioning and HVAC systems	
CPCPMS3040A MEM10010B	Install and maintain evaporative air cooling systems Install pipework and pipework assemblies	Mechanical Services Mechanical Services	Elective Elective					,			AURETU005	Retrofit and modify air conditioning and HVAC systems	
				UEENEEJ168A	Maintain microbial control of refrigeration and air conditioning systems	Refrigeration Trade Related Elective - Group B	ated Elective Con	ponents					
				UEENEEJ115A	Resolve problems in beverage dispensers	Elective - Group B					AURTTA004 AURVTA001	Carry out servicing operations Prepare vehicles for customer use	
				UEENEEJ116A UEENEEJ117A	Resolve problems in transport refrigeration systems Resolve problems in ultra-low temperature refrigeration systems	Elective - Group B Elective - Group B	MEM18091	B Maintain and repair multi stage, cascade and/or ultra-cold industrial refrigeration systems	4				
				UEENEEJ118A UEENEEJ119A	Resolve problems in post mix refrigeration systems Resolve problems in ice making systems	Elective - Group B Elective - Group B	MEM18094	Service and repair commercial refrigeration	6		AURETU007	Overhaul air conditioning and HVAC system compressors	
				UEENEEJ120A UEENEEJ111A	Resolve problems in industrial refrigeration systems  Diagnose and rectify faults in air conditioning and refrigeration systems and components	Elective - Group B Core	MEM18090 MEM18087		6	<b>√</b>	AURTTA018	Carry out diagnostic procedures	core
				UEENEEJ166A UEENEEJ171A	Resolve problems in dairy refrigeration systems Resolve problems in refrigerated beverage vending cabinets	Elective - Group B Elective - Group B							
				UEENEEC001B UEENEEC002B	Maintain documentation Source and purchase material/parts for installation or service jobs	Elective - Group A Elective - Group A	MEM14005	Plan a complete activity		<b>√</b>			
				UEENEEC003B UEENEEC010B	Provide quotations for installation or service jobs  Deliver a service to customers	Elective - Group A Elective - Group A	MEM14004	Plan to undertake a routine task		<b>√</b>	AURAFA002	Read and respond to automotive workplace information	elective
				UEENEED101A UEENEEE009B	Use computer applications relevant to a workplace  Comply with scheduled and preventative maintenance program processes	Elective - Group A Elective - Group A					AURACA001 AURAFA003	Respond to customer needs and enquiries in an automotive workplace Communicate effectively in an automotive workplace	elective elective
				UEENEEE020B	Provide basic instruction in the use of electrotechnology apparatus	Elective - Group A	MEM17003			1			
							MEM16007 MEM16006	Organise and communicate information		1			
							MEM16008	Interact with computing technology		•			
CPCPMS3032A	Select and fit insulation and sheathing	Mechanical Services	Elective			Subjects not specifically				_			
CPCPRF3023A MEM05049B	Fabricate and install external flashings Perform routine gas tungsten arc welding	Mechanical Services Mechanical Services	Elective Elective				MEM12023 MEM12024	Perform computations		1			
MEM05050B CPCPCM2049A	Perform routine gas metal arc welding Cut using oxy-LPG-acetylene equipment	Mechanical Services Mechanical Services	Elective Elective				MEM15002 MEM15024	Apply quality procedures		<i>\</i>			
CPCCPB3015A CPCPMS3041A	Install acoustic and thermal environmental protection systems Install domestic solid fuel burning appliances	Mechanical Services Mechanical Services	Elective Elective				MEM18055	Dismantle, replace and assemble engineering components	3	<b>V</b>	AURAFA001	Use numbers in an automotive workplace	elective
00.001.450.00.44											AURTTC003 AURTTE004	Diagnose and repair cooling systems Inspect and service engines	elective elective
CPCPMS3034A	Install medical gas pipeline systems	Mechanical Services	Elective			OH&S Cor	mnonorts				AURTTA009	Carry out mechanical pre-repair operations	
				CPCPCM2043A HLTAID001	Carry out WHS requirements Provide cardiopulmonary resuscitation	Elective - Group A Elective - Group A	ponents						
CPCCCM2008B	Apply OHS requirements, policies and procedures in the construction industry	Mechanical Services	Elective	HLTAID001 HLTAID003 CPCCOHS1001A	Provide first aid  Work safely in the construction industry	Elective - Group A  Elective - Group A	MEM13001 MEM13014		1	<b>√</b>	AURASA002	Follow safe working practices in an automotive workplace	core
CPCCCM2010B CPCCCM3001C	Erect and dismantle restricted height scaffolding Work safely at heights	Mechanical Services Mechanical Services	Elective Elective				MEM13003		2				
CPCCOHS2001A CPCCRI3001A	Operate elevated work platforms Operate personnel and materials hoists	Mechanical Services Mechanical Services	Elective Elective										
CPCCST2005A RIICCM210A	Carry out load slinging of off-site materials Install trench support	Mechanical Services Mechanical Services	Elective Elective										
				UEENEEI150A	Develop, enter and verify discrete control programs for programmable controllers	Elective - Group B	mable refrigeran	ts CO2 and Ammonia. Urgent training required					
				UEENEEJ174A UEENEEJ175A	Apply safety awareness and legal requirements for hydrocarbon refrigerants Service and repair self contained hydrocarbon air conditioning and refrigeration systems	Elective - Group B Elective - Group B							
				UEENEEJ176A UEENEEJ178A	Install and commission hydrocarbon refrigeration systems, components and associated equipment Apply safety awareness and legal requirements for ammonia refrigerant	Elective - Group B Elective - Group B							
				UEENEEJ179A UEENEEJ180A	Repair and service ammonia refrigeration systems Install and commission ammonia refrigeration systems, components and associated equipment	Elective - Group B Elective - Group B							
				UEENEEJ182A UEENEEJ184A	Repair and service secondary refrigeration systems  Apply safety awareness and legal requirements for carbon dioxide refrigerant	Elective - Group B Elective - Group B							
				UEENEEJ185A UEENEEJ186A	Repair and service carbon dioxide refrigeration systems Install and commission carbon dioxide refrigeration systems, components and associated equipment	Elective - Group B Elective - Group B							
				UEENEEJ188A UEENEEJ196A	Repair and service self contained carbon dioxide refrigeration and heat pump systems Operate Ammonia Refrigeration Plant	Elective - Group B Elective - Group B							
						Use of	MEM18001	C Use hand tools		√	AURTTK002	Use and maintain tools and equipment in an automotive workplace	elective
						Ancillary tra	MEM18002	Use power tools/hand held operations	2	✓	1		



### **OVERVIEW**

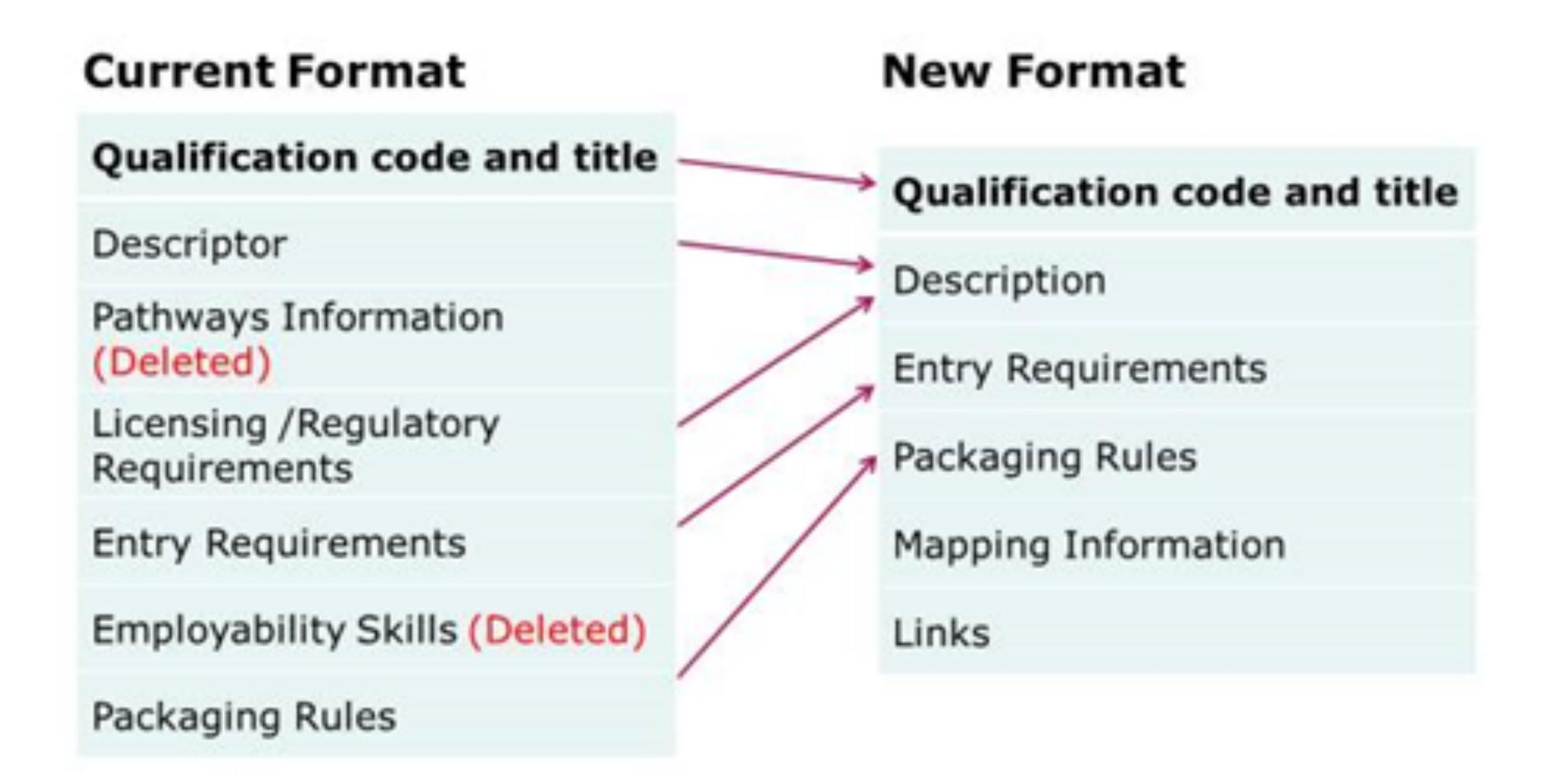
The Australian Industry and Skills Committee (AISC) has commissioned the transition of all UEE11 Electrotechnology Training Package components to the Standards for Training Packages 2012.

The Electrotechnology Industry Reference Committee (IRC) will have oversight of this project which will be facilitated by Australian Industry Standards in consultation with industry stakeholders. The project covers the transition of 87 qualifications, 75 Skill Sets and 612 Units of Competency.

The UEE11 Electrotechnology Training Package Transition Project has been divided into several sub projects Refrigeration is one of them.

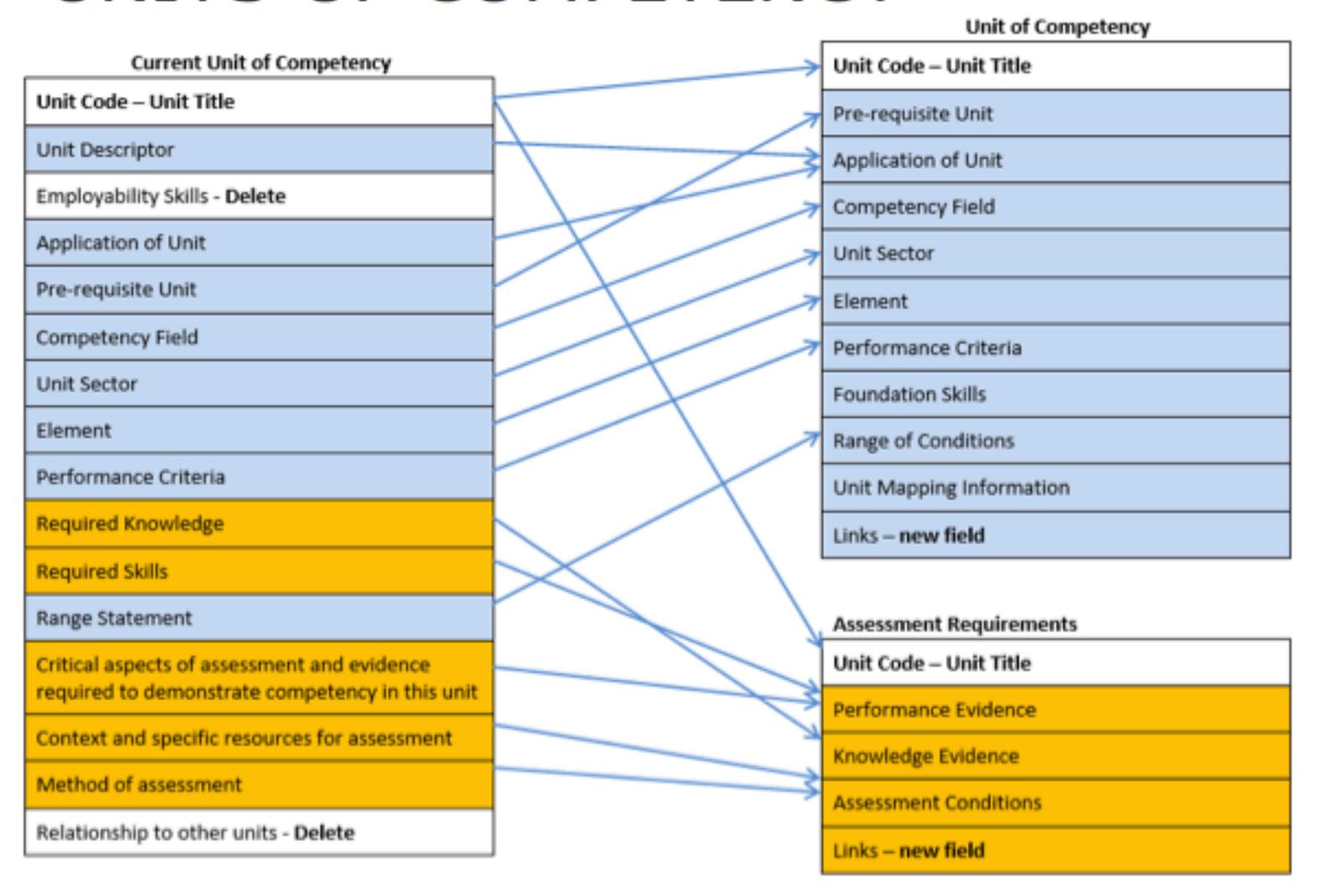


# QUALIFICATIONS - CURRENT TO NEW





## UNITS OF COMPETENCY





## Are we simply rearranging the deck chairs?





The Refrigeration and Air Conditioning TAC has finalised the draft Training Package materials for this sub project.

The draft materials will undergo an independent edit and quality assurance review.

Final drafts will be available for viewing after the finalisation of all sub-projects, including the review of 43 critical Units of Competency.

### **18 January 2018**

### Case for Change for review 43 Units approved

The Case for Change to review 43 Units of Competency has been approved by the Australian Industry and Skills Committee.

## The Electrical TAC will commence reviewing these units as part of this project.



### Are we on board the Costa Concordia?





# Agreements History:

> Montreal Protocol:

Discontinuing the use of ozone depleting refrigerants: CFC, HCFC.

>Kyoto Protocol:

Counts only HFC refrigerants based on 100 yr. GWP

> Paris COP21 Paris 2015

Limit global warming to < 2°C

> Kilgali Announcement 2016

Phase out of HFC refrigerants



# The HVAC&R Industry has embarked on the greatest Change since 1935

80% of the Industry doesn't know it



# ARA and ARMA Road map for the RAC Industry to move FORWARD!!

- Review Current Courses CPC, MEM, UEE, AU
- Aligning all existing course modules into a form that allows for a consistent learning outcome across all streams overseen by refrigeration industry
- Identify shortfalls and upgrades required
- Engage curriculum writers to upgrade modules and insert new modules
- Develop common core modules required across all streams that will be co recognised by all ancillary trades
- Review modules and hours required then form a clear structure and pathway to progress from cert III, to cert IV, diploma, degree, masters, doctorate.
- Review and develop capstone testing by independent or industry body to ensure RTO standards are maintained at adequate levels.



# ARA and ARMA Road map for the RAC Industry to move FORWARD!!

- Develop new Cert. III RAC course including base knowledge on All natural refrigerants, HFO, and interim HFC refrigerants
- Develop full flammable refrigerants course inclusive of HC, NH3, HFC and HFO refrigerants to Cert. IV level
- Develop full CO2 refrigerants course inclusive of Transcritical, Subcritical, Pumped Liquid, and Cascade systems to Cert. IV level
- Develop full Ammonia refrigerants course inclusive of single stage, two stage, flooded, low charge DX NH3 systems to Cert. IV level



# ARA and ARMA Road map for the RAC Industry to move FORWARD!!

• All of the new RAC course which will also form the pathway to higher education qualifications such as diploma, degree, masters, doctorate. The course content also forms the basis of the ancillary trade qualifications such as mech. services and automotive. This also ensures consistency of the subjects being taught in each trade as it is driven from the knowledge base of refrigeration.



## Training packages review.

Apply safety awareness and legal requirements for hydrocarbon refrigerants	Elective - Group B Compulsory
Service and repair self contained hydrocarbon air conditioning and refrigeration	
systems	Elective - Group B Compulsory
Install and commission hydrocarbon refrigeration systems, components and	
associated equipment	Elective - Group B Compulsory
Apply safety awareness and legal requirements for ammonia refrigerant	Elective - Group B Compulsory
Repair and service ammonia refrigeration systems	Elective - Group B Compulsory
Install and commission ammonia refrigeration systems, components and associated	
equipment	Elective - Group B Compulsory
Repair and service secondary refrigeration systems	Elective - Group B Compulsory
Apply safety awareness and legal requirements for carbon dioxide refrigerant	Elective - Group B <b>Compulsory</b>
Repair and service carbon dioxide refrigeration systems	Elective - Group B Compulsory
Install and commission carbon dioxide refrigeration systems, components and	
associated equipment	Elective - Group B Compulsory
Repair and service self contained carbon dioxide refrigeration and heat pump	
systems	Elective - Group B Compulsory
Operate Ammonia Refrigeration Plant	Elective - Group B Compulsory
	Service and repair self contained hydrocarbon air conditioning and refrigeration systems Install and commission hydrocarbon refrigeration systems, components and associated equipment Apply safety awareness and legal requirements for ammonia refrigerant Repair and service ammonia refrigeration systems Install and commission ammonia refrigeration systems, components and associated equipment Repair and service secondary refrigeration systems  Apply safety awareness and legal requirements for carbon dioxide refrigerant Repair and service carbon dioxide refrigeration systems Install and commission carbon dioxide refrigeration systems, components and associated equipment Repair and service self contained carbon dioxide refrigeration and heat pump systems



## Where we need to go from here

What industry needs to jump on board and be proactive with.

- Letters to the Australian industry standards outlining what you seek as an industry stakeholder within training packages
- ARA Recommend a RAC training package to support industry needs.
- Industry to Unite and Demand Education Funding (approx 40% of current Licence fees is directed into consolidated funds this needs to be returned to the industry in the form of Re Training)
- Can Funds be re allocated from RRA \$63million investment account?
- Could an Education Levey be placed on ALL refrigerants sold?



# The HFC phase out Train arrived at the Station on January first this year





### The inevitable result if we don't act on education

# NOW!!!



