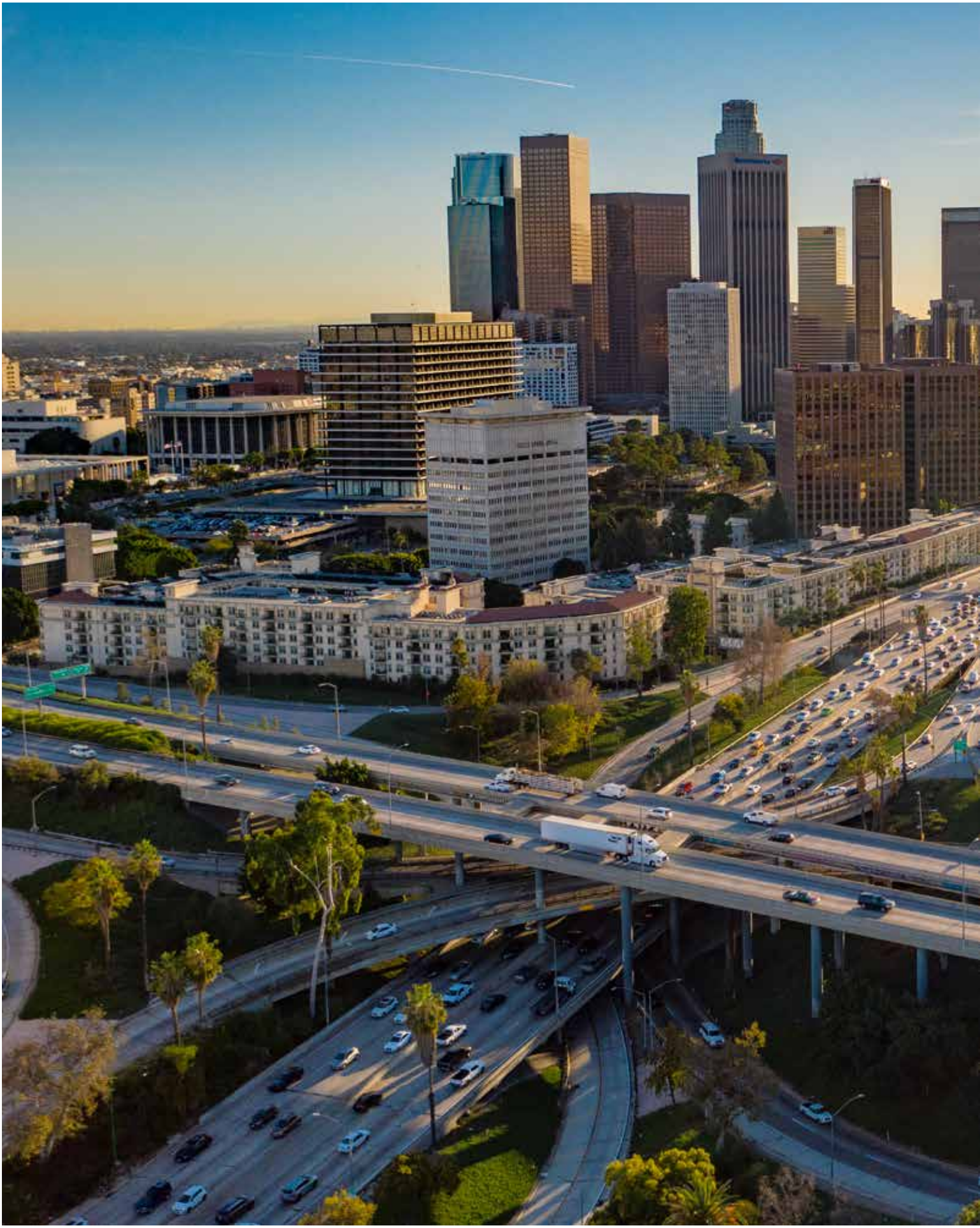
Neutronics
A BACHARACH. COMPANY

INDUSTRY REPORT:

R-1234yf equipped vehicles are here so prepare yourself for A/C service



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INDUSTRY REPORT:

Servicing R-1234yf A/C

With over 40 million R-1234yf (YF) vehicles on the road in North America, now is the time to offer R-1234yf services in your shop. By educating yourself on the state of R-1234yf A/C equipment and procedures, you will be prepared to support the millions of cars with R-1234yf on the road and offer “one stop shopping,” for vehicle A/C service.

This document briefly takes you through the history of automotive air conditioning from the good old days of R-12 through the recent adoption of R-1234yf.

By the time you reach the end of this “State of the State,” R-1234yf Industry Update, you will have a clear understanding of R-1234yf, recognize the importance using only SAE certified tools and be well prepared to service every A/C customer that comes into your shop.

“Over 40 million R-1234yf vehicles on the road in North America”

LEFT: Drone view of downtown Los Angeles or LA skyline with skyscrapers and freeway traffic below

What is R-1234yf?

If you have not been paying attention over the past 5 years, or totally new to recent changes to automotive air conditioning service, here's a run-through of what R-1234yf is and why it was chosen.

Vehicle air conditioning
In 1939, Packard was the first automobile manufacturer to offer a factory air conditioning unit in their upscale vehicles. While initial acceptance by the public was low, air conditioning gradually became an option on many makes and models. These vehicles used the "old reliable" R-12.[1]

By the time we reached the late 1980's, R-12 was deemed detrimental to the Ozone Layer and was replaced by R-134a. Fast forward to 2006, where R-134a was found to be a significant contributor to Global Warming.[2]

Moving from R-134a to R-1234yf
The Montreal and Kyoto Protocols led to the European F-Gas rule in 2006, which mandated the use of a refrigerant with a Global Warming Potential (GWP) of 150 or less. This mandate went into affect in 2017. FYI, R-134a has a GWP of 1430 and R-1234yf has a GWP of 4 or less than 1 (depending on the test version).

As the vehicle manufacturers operate in a global marketplace, the refrigerant R-1234yf, selected for use in Europe, found its way across the seas to the US market. The EPA accepted this lower GWP refrigerant and offered Carbon Credits (Credits to their tailpipe emissions) to vehicle manufacturers for using R-1234yf.

Why R-1234yf was chosen?
Vehicle manufacturers desired a refrigerant that did not require significant changes to the A/C System, for example keeping it a Direct Expansion System, rather than adding a secondary loop.

Other refrigerants including R-744 (CO_2) and R-152a were considered but each had their own set of challenges and thus R-1234yf was selected. Extensive testing of R-1234yf demonstrated that it worked very well in the A/C systems as previously designed, and only minor tweaks were required.

Is R-1234yf flammable?
R-1234yf is classified as an A2L (slightly flammable) refrigerant. Fortunately, it is far less flammable than nearly every fluid found under the hood of a vehicle. The SAE and vehicle manufacturer exhaustive testing determined R-1234yf was safe to use in passenger vehicles.[3]

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1 "First Air Conditioned Auto". Popular Science. 123 (5): 30. November 1933. Retrieved 16 April 2015.

2 Tech 101- Refrigerant: what you can use, what you should use, what is no longer available. Jim O'Clair, May 16th, 2014 https://www.hemmings.com/blog/2014/05/16/tech-101-refrigerant-what-you-can-use-what-you-should-use-what-is-no-longer-available

3 http://www.igsd.org/sae-international-re-confirms-r-1234yf-safe-and-acceptable-and-finds-daimler-claims-to-the-contrary-unrealistic/

"The SAE and vehicle maker's exhaustive testing found R-1234yf was safe to use in passenger vehicles."

How has the industry adopted R-1234yf?

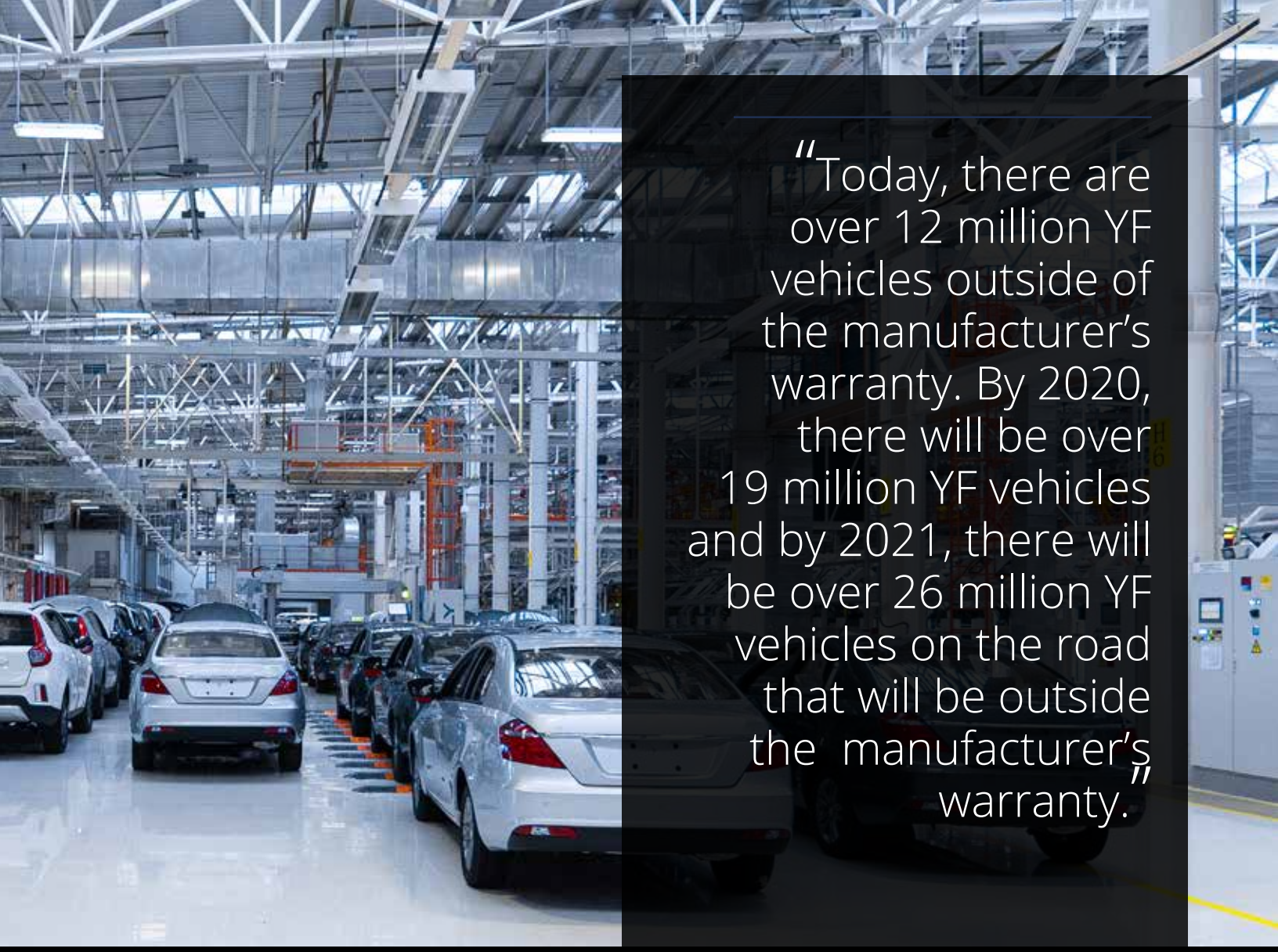
There are currently over 40 million vehicles in the US today using R-1234yf. With the number of vehicles that will be outside of the manufacturer's warranty growing each year, your time to support after-market R-1234yf A/C servicing is now.

Early adopters of R-1234yf have already started to surpass their manufacturers warranty period, and that number increases year over year. Today, there are over 12 million YF vehicles outside of the manufacturer's warranty. By 2020, there will be over 19 million YF vehicles and by 2021, there will be over 26 million YF vehicles on the road that will be outside the manufacturer's warranty. That's a load of cars that could require A/C Servicing!

CAR MODEL YEAR

2013 **2014** **2015**

With thanks to https://www.carlogos.org for using their car logos.



"Today, there are over 12 million YF vehicles outside of the manufacturer's warranty. By 2020, there will be over 19 million YF vehicles and by 2021, there will be over 26 million YF vehicles on the road that will be outside the manufacturer's warranty."

2016 **2017** **2018**

TOYOTA
VOLVO
HONDA
RAM
KIA
BUICK
THE LINCOLN MOTOR COMPANY
Mercedes-Benz
PORSCHE
Ford
SUBARU
ACURA
MITSUBISHI MOTORS
HYUNDAI
MINI


LEGEND SERIES™

SAE standards for R-1234yf service tools

SAE International, initially established as the Society of Automobile Engineers and later becoming the Society of Automotive Engineers, is a US-based, globally active professional association and standards developing organization for engineering professionals in various industries.

With the introduction of R-1234yf, SAE established new standards for servicing vehicles with R-1234yf. These new standards require a SAE J2843™ or SAE J3030™ approved A/C Service Machine (RRR), a SAE J2913™ Leak Detector, a SAE J2912™ or SAE J2927™ refrigerant analyzer, and a SAE J2851™ recovery machine.

Below, you will find each of the applicable SAE Standards and a brief description on the respective standard:

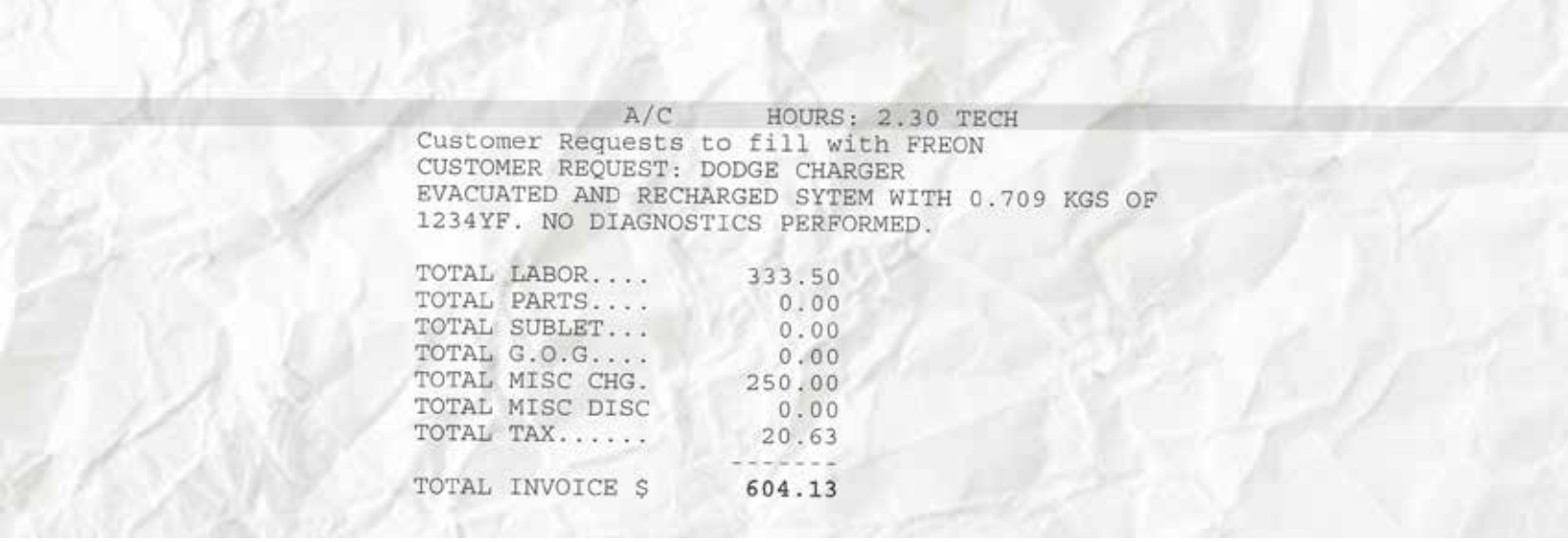
SAE J2843™: R-1234yf [HFO-1234yf] Recovery/Recycling/Recharging Equipment for Flammable Refrigerants for Mobile Air-Conditioning Systems - This SAE Standard applies to equipment to be used with R-1234yf refrigerant only. It establishes requirements for the equipment used to recharge R-1234yf to meet accuracy and purity levels defined in SAE J2099™. Refrigerant service equipment is required to ensure adequate refrigerant recovery to reduce emissions and provide for accurate recharging of mobile air conditioning systems.

SAE J8251™: Recovery Equipment for Contaminated R-134a or R-1234yf Refrigerant from Mobile Automotive Air Conditioning Systems - This SAE standard covers equipment used to remove contaminated R-134a and/or R-1234yf refrigerant from Mobile Air Conditioning (MAC) systems.

SAE J2912™: Performance Requirements for R-134a and R-1234yf Refrigerant Analyzers for use with Mobile Air Conditioning Systems - This SAE Standard applies to refrigerant identification equipment to be used for identifying R-134a and R-1234yf refrigerant when servicing a mobile A/C system or for identifying refrigerant in a container to be used to charge a mobile A/C system. Identification of other refrigerants is the option of the equipment manufacturer, although it shall not misidentify refrigerants.

SAE J2913™: R-1234yf Refrigerant Electronic Leak Detectors, Minimum Performance Criteria - This SAE Standard provides testing and functional requirements to meet specified minimum performance criteria for electronic probe-type leak detectors. The equipment specified here will identify smaller refrigerant leaks when servicing motor vehicle air conditioning systems, including those engineered with improved sealing and smaller refrigerant charges to address environmental concerns and increase system efficiency.

SAE J3030™: Automotive Refrigerant Recovery/Recycling/Recharging Equipment Intended for use with Both R-1234yf and R-134a - The purpose of this SAE Standard is to establish the specific minimum equipment requirements for recovery/recycling/recharge equipment intended for use with both R-1234yf and R-134a in a common refrigerant circuit that has been directly removed from, and is intended for reuse in, mobile air-conditioning (A/C) systems.



A/C HOURS: 2.30 TECH
Customer Requests to fill with FREON
CUSTOMER REQUEST: DODGE CHARGER
EVACUATED AND RECHARGED SYTEM WITH 0.709 KGS OF
1234YF. NO DIAGNOSTICS PERFORMED.

TOTAL LABOR....	333.50
TOTAL PARTS....	0.00
TOTAL SUBLET...	0.00
TOTAL G.O.G....	0.00
TOTAL MISC CHG.	250.00
TOTAL MISC DISC	0.00
TOTAL TAX.....	20.63
TOTAL INVOICE $	**604.13**

ROI on servicing after equipment investments

You don't think that you have enough R-1234yf customers? This is a common sentiment that is expressed when it comes to servicing R-1234yf. As was outlined earlier, there are currently over 12 million vehicles that have R-1234yf, and are out of the manufacturer warranty. There is a high probability that there are some in your local area.

Is the cost of R-1234yf service equipment what's holding you back? Look no further then the example here to see just how quickly you can recoup your cost and start turning pure profit.

Dodge Charger Example
The Dodge Charger, illustrated above, needed a recharge due to an A/C line that was rubbed through after a supercharger was installed and the steel drain line from the supercharger was left unsecured.

It took .709 kg or 1lb. 9oz of R-1234yf to recharge the system. The cost for the refrigerant @ $70/lb, is $109.00 with a selling price of $250.00, add in the labor for $333.50 (that really took an hour) and the revenue is $583.50 for an hour's work.

ROI, Do The Math!

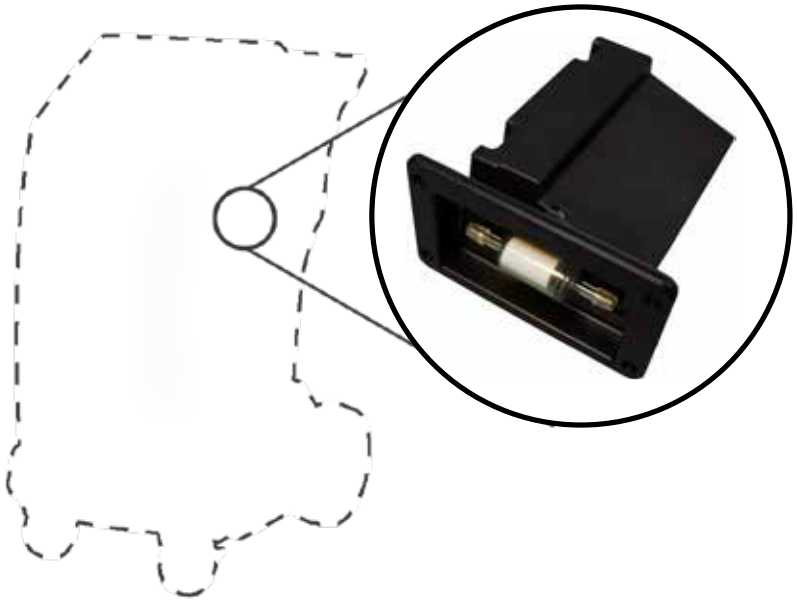
Refrigerant Charge:	$250.00
Labor Charge:	$333.50
Total Revenue:	$583.50
Refrigerant Cost:	$109.00
Labor Cost (1hr):	$60.00
Total Costs:	$169.00
Total Profit per service:	$414.50
Avg. Cost of R-1234yf Service Machine:	$7,000.00
17 Services @ $414.50 per service:	$7,046.50

How many A/C services do you do in a year?

You still don't think that you have enough R-1234yf customers? Just let the local body shops know that you are equipped and ready to serve their R-1234yf needs and they no longer have to rely on the dealers to service their customers.

NOTE: The examples outlined above were gathered from multiple sources and may not reflect actual service costs or ROI for specific regions.

Built-in refrigerant identifiers vs hand-held



Built-in refrigerant identifiers:

Neutronics EID series
These are SAE J2927™ and SAE J2912™ certified refrigerant analyzers that are built into RRR A/C Service Machine. This simplifies the whole process and creates one system to both identify, recover, recycle and recharge the refrigerant during A/C Servicing.

Hand-held refrigerant identifiers:

Neutronics Legend ID
A SAE J2912™ portable refrigerant analyzer that provides a little more flexibility in the shop. This device allows you to have multiple recovery machines (without built-in identifiers), and take one analyzer machine to machine, rather than lugging around one machine from bay to bay. The hand-held devices allow technicians to pre-check vehicles, without having to connect the RRR service cart, reducing evaluation time and helping to sort vehicles before servicing.

For a complete list of certified SAE equipment, visit: https://macdb.sae.org/

LEGEND SERIES™
REFRIGERANT IDENTIFIER

NEW R-1234yf
SEALANT COUPLER
NOW AVAILABLE

ACSD SEALANT
DETECTION KIT

MINI ID™ R-1234yf
REFRIGERANT IDENTIFIER

Get in touch now with your R-1234yf experts or to learn more about R-1234yf service and our refrigerant identifiers.

Telephone: +1 (610) 524-8800 or visit our website at: www.refrigerantid.com

Neutronics Inc., 456 Creamery Way, Exton, PA 19341 U.S.A. Telephone: +1 (610) 524-8800, www.neutronicsinc.com