

**QUALITY ASSURANCE AUDIT REPORT**

**North Texas Commission**  
**Ambient Air and Meteorological Monitoring**

**Prepared for:**

**North Texas Commission**  
**8445 Freeport Parkway**  
**Irving, TX 75063**

**Prepared by:**

**AECOM**  
**9400 Amberglen Boulevard (78729)**  
**P.O. Box 201088**  
**Austin, TX 78720-1088**

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## EXECUTIVE SUMMARY

On November 11<sup>th</sup> – 15<sup>th</sup>, 2019, an audit team from the AECOM ambient air group in Austin, Texas conducted performance and technical system audits of the North Texas Commission (NTC) ambient air monitoring network. The audits provide an independent assessment of the monitoring program.

The monitoring program at NTC consists of continuous gas chromatographs (GC), volatile organic compound (VOC) canister collection systems, and meteorological sensors including wind speed, wind direction, and temperature.

The performance audit results indicate acceptable responses for measurement systems with the exceptions summarized below.

The wind direction sensor at Mineral Wells was within audit guidelines for linearity, but was outside of audit guidelines for alignment, with an alignment error of  $-8.8^{\circ}$ . This resulted in a maximum total error of  $-9.4^{\circ}$ , which is outside the audit specification of  $\pm 5.0^{\circ}$  for maximum total error. The audit staff realigned the sensor taking into account the  $3.8^{\circ}$  easterly magnetic declination in this specific area, resulting in a new maximum total error of  $1.5^{\circ}$ . The operations and data validation staff were notified of this problem and a corrective action report (CAR) was written to track these concerns and ensure that affected data are properly managed.

The wind speed sensors at Mineral Wells, Elm Fork, and Mansfield were marginally outside of audit parameters for the starting threshold, which is specified as less than  $0.4 \text{ g/cm}$ . The bearings were replaced on all sensors, resulting in responses within the audit parameter. The data validation staff concluded no significant edits were needed on these findings.

The safety placards across all sites in the network were missing an emergency route map from the site to the nearest hospital. Safety placards should contain this route in case of an emergency. The operations staff were notified of this problem and a CAR was written to track this concern.

The VOC sample inlet funnel at Wichita Falls had a noticeable amount of dust and should be cleaned soon to prevent flow restrictions. The operations staff were notified of this problem and a CAR was written to track this concern.

Out of the 48 compounds being analyzed, eleven compounds (acetylene, isoprene, 2-methylhexane, m&p-xylene, styrene, isopropylbenzene, n-propylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, 1,2,3-trimethylbenzene, and n-undecane) were found

to be outside of the audit objective of 70% - 130% recovery at several sites. In addition, the DISH, Kennedale, UT Arlington, and Rushing sites had the following GC compound recoveries outside of the audit specification:

<b>Locations</b>	<b>Compounds</b>
DISH	ethylene
Kennedale	n-decane
UT Arlington	cis-2-pentene
Rushing	propylene, methylcyclopentane, benzene

These network GC audit results are comparable historically to other AECOM auto-GC audits, with the exception of the benzene recovery at Rushing. The daily calibration results during the time of the audit were trending downward and operations were aware of the issue. Following the audit, operations performed maintenance on the GC, which appears to have alleviated the low Benzene recoveries. No problems were identified in the quality control procedures at any of these sites that would indicate a persistent measurement error. The GC audit results are contained in table ES-2. Technical systems audit results demonstrate satisfactory operational procedures for collecting valid data.

A performance evaluation (PE) sample is prepared by the AECOM QA group on a quarterly basis and submitted to the VOC laboratory for analysis. This performance evaluation sample contained known (spiked) concentrations of the target VOCs. A review of the sample recoveries for the spiked target VOCs shows that eleven of the forty-four compounds were not within the range of expected values (70-130%). Nine of these compounds were below the acceptable sample recovery, while two compounds were above the acceptable sample recovery.

- 1,2,4-trimethylbenzene (46.1%),
- 1,3,5-trimethylbenzene (58.7%),
- 1-hexene (60.0%),
- 4-ethyltoluene (42.6%),
- Ethane (216.9%),
- Ethene (161.2%),
- Ethylbenzene (63.3%),
- M&P-xylene (65.9%),
- o-xylene (60.8%),
- Styrene (55.8%),
- Toluene (65.4%),

Over the past year, the PE sample recoveries have been lower than expected for heavier, non-halogenated VOCs. 1-hexene has historically been a problematic compound for VOC work and typically has lower recoveries. AECOM QA staff and the sampling lab have been working together to investigate the low recoveries of these compounds. The percent recovery for ethane and ethene was surprising this quarter with the addition of a 50 ml spike for each compound. Other C2 compounds can be challenging for lower concentrations due to the lab's level of quantification limit being higher than the theoretical input. AECOM QA staff shared the performance evaluation results with the VOC laboratory, and no other corrective action was taken. We will continue to evaluate these compounds in our PE samples and work with the lab to resolve these discrepancies. GD Air's most recent performance evaluation canister results for the third quarter of 2019 are contained below in Table ES-1.

**Table ES-1. Results of Performance Standard for Off-Site Analytical Lab**

Compound Name	CAS Number	Concentration (ppb-v)	Concentration Results (ppb-v)	Percent Recovery
1,1,1-Trichloroethane	71-55-6	2.8	2.4	86.6%
1,1,1,2-Tetrachloroethane	79-34-5	2.9	2.0	71.0%
1,1,2-Trichloroethane	79-00-5	2.9	2.2	75.5%
1,1-Dichloroethane	75-34-3	2.8	2.2	78.8%
1,1-Dichloroethene	75-35-4	2.9	2.2	77.2%
1,2,4-Trimethylbenzene	95-63-6	2.8	1.3	46.1%
1,2-Dibromoethane	106-93-4	2.8	2.3	80.8%
1,2-Dichloroethane	107-06-2	2.9	2.2	77.2%
1,2-Dichloropropane	78-87-5	2.9	2.3	81.8%
1,3,5-Trimethylbenzene	108-67-8	2.8	1.6	58.7%
1,3-Butadiene	106-99-0	5.8	4.8	82.5%
1-Butene	106-98-9	2.9	2.2	77.2%
1-Hexene	592-41-6	2.7	1.6	60.0%
1-Pentene	109-67-1	2.8	2.1	74.1%
2,2,4-Trimethylpentane	540-84-1	2.9	2.5	85.5%
4-Ethyltoluene (p-Ethyltoluene)	622-96-8	2.7	1.2	42.6%
Benzene	71-43-2	2.9	2.3	80.0%
Bromomethane	74-83-9	2.7	2.5	92.4%
c-1,3-Dichloropropene	10061-01-5	2.9	2.3	79.0%
Carbon tetrachloride	56-23-5	2.9	2.5	87.0%
Chlorobenzene	108-90-7	2.9	2.1	73.7%
Chloroform	67-66-3	2.8	2.4	86.1%
Chloromethane (Methyl Chloride)	74-87-3	2.9	2.5	88.4%
Cyclohexane	110-82-7	2.9	2.3	80.3%
Dichlorodifluoromethane (Freon-12)	75-71-8	2.8	2.7	97.8%
Ethane	74-84-0	17.2	37.3	216.9%
Ethene	74-85-1	5.8	9.4	161.2%
Ethylbenzene	100-41-4	2.9	1.8	63.3%
Methylene Chloride (Dichloromethane)	75-09-2	2.8	2.2	79.9%
m-Xylene & p-Xylene	106-42-3+108-38-3	5.6	3.7	65.9%
n-Butane	106-97-8	2.9	2.3	78.5%
n-Heptane	142-82-5	2.9	2.0	71.3%
n-Hexane	110-54-3	8.6	6.6	76.8%
n-Pentane	109-66-0	2.8	2.1	74.5%
o-Xylene	95-47-6	2.9	1.7	60.8%
Propane	74-98-6	2.9	2.2	75.8%
Propylene	115-07-1	5.9	4.5	76.8%
Styrene	100-42-5	2.8	1.6	55.8%
t-1,3-Dichloropropene	10061-02-6	2.9	2.2	76.5%
Tetrachloroethene	127-18-4	2.9	2.2	76.8%
Toluene	108-88-3	2.9	1.9	65.4%
Trichloroethene	79-01-6	2.9	2.4	83.0%
Trichlorofluoromethane (Freon-11)	75-69-4	2.9	2.3	78.5%
Vinyl Chloride	75-01-4	2.9	2.5	87.9%

**Table ES-2. Audit Standard Results for all Network GCs**

Compound Name	CAS Number	Audit Concentration (ppbc)	Benbrook		Decatur		Dish		Eagle Mountain Lake	
			Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery
Ethane	74-84-0	49.6	47.5	95.8%	47.3	95.5%	40.4	81.4%	45.4	91.6%
Ethylene	74-85-1	16.1	13.5	83.6%	14.2	88.1%	8.5	52.6%	12.3	76.6%
Propane	74-98-6	11.7	11.1	94.7%	10.3	88.6%	10.5	90.0%	10.6	90.6%
Propylene	115-07-1	11.7	8.8	75.5%	14.2	121.7%	9.1	78.3%	8.6	74.1%
Iso-Butane	75-28-5	14.7	17.1	116.4%	15.4	104.5%	13.9	94.7%	16.0	108.8%
N-Butane	106-97-8	15.1	17.8	117.6%	16.0	105.7%	15.5	102.4%	16.8	110.9%
Acetylene	74-86-2	7.7	5.8	74.7%	6.1	78.6%	5.6	72.7%	6.2	80.2%
Trans-2-Butene	624-64-6	14.7	17.3	117.3%	15.5	105.5%	14.5	98.6%	16.0	109.0%
1-Butene	106-98-9	14.7	17.0	115.6%	15.1	102.9%	13.4	90.7%	15.9	108.4%
Cis-2-Butene	590-18-1	15.6	17.7	113.8%	15.7	101.0%	14.6	93.5%	16.5	105.9%
Cyclopentane	287-92-3	18.4	21.7	117.8%	19.2	104.3%	18.5	100.4%	20.2	109.8%
Iso-Pentane	78-78-4	18.8	22.0	117.5%	19.5	103.9%	18.9	100.6%	20.8	111.2%
N-Pentane	109-66-0	18.8	22.6	120.4%	19.8	105.8%	19.5	104.1%	21.2	112.9%
1,3-Butadiene	106-99-0	14.6	16.4	112.6%	13.9	95.2%	12.1	83.2%	14.8	101.7%
Trans-2-Pentene	646-04-8	19.5	21.3	109.5%	18.1	93.0%	16.8	86.6%	20.2	103.6%
1-Pentene	109-67-1	19.5	19.2	98.8%	15.5	79.7%	15.0	77.2%	18.9	97.4%
Cis-2-Pentene	627-20-3	17.7	17.8	100.8%	14.7	83.0%	14.3	80.5%	15.3	86.5%
2,2-Dimethylbutane	75-83-2	22.5	25.0	110.9%	22.5	100.0%	22.2	98.6%	24.5	108.7%
2-Methylpentane	107-83-5	22.1	25.1	113.5%	22.6	102.2%	21.2	95.8%	24.6	111.2%
Isoprene	78-79-5	19.3	14.6	75.9%	12.1	62.9%	12.5	64.7%	14.1	73.2%
n-Hexane	110-54-3	22.7	23.7	104.3%	21.9	96.4%	21.5	94.8%	19.9	87.6%
Methylcyclopentane	108-87-2	22.9	19.1	83.4%	17.4	75.8%	17.9	78.3%	20.3	88.7%
2,4-Dimethylpentane	108-08-7	26.7	28.4	106.1%	26.4	98.7%	25.9	96.8%	27.1	101.2%
Benzene	71-43-2	22.9	19.0	83.0%	18.9	82.5%	20.6	90.0%	19.3	84.3%
Cyclohexane	110-82-7	22.9	22.5	98.3%	20.5	89.6%	20.9	91.3%	21.7	94.5%
2-Methylhexane	591-76-4	26.3	20.2	76.9%	17.7	67.4%	19.0	72.3%	22.1	84.0%
2,3-Dimethylpentane	565-59-3	26.5	28.9	109.4%	26.9	101.8%	27.0	102.0%	26.9	101.8%
3-Methylhexane	589-34-4	26.5	24.0	90.7%	22.3	84.2%	23.4	88.5%	25.1	94.8%
2,2,4-Trimethylpentane	540-84-1	30.2	28.1	92.9%	26.1	86.3%	26.1	86.1%	28.5	94.2%
n-Heptane	142-82-5	26.7	24.8	92.7%	23.1	86.5%	23.0	85.8%	25.1	94.0%
Methylcyclohexane	108-87-2	26.5	24.4	92.2%	22.0	83.1%	22.8	86.0%	24.9	94.2%
2,3,4-Trimethylpentane	565-75-3	30.8	27.9	90.5%	26.5	86.1%	26.0	84.3%	28.2	91.7%
Toluene	108-88-3	26.7	24.0	89.7%	22.8	85.2%	23.5	87.9%	23.9	89.3%
2-Methylheptane	592-27-8	30.2	27.4	90.6%	26.1	86.5%	24.6	81.2%	27.0	89.3%
3-Methylheptane	589-81-1	30.6	27.7	90.7%	27.0	88.5%	25.4	83.3%	27.7	90.5%
n-Octane	111-65-9	30.6	26.7	87.2%	25.9	84.6%	25.4	83.2%	27.2	88.9%
Ethylbenzene	100-41-4	31.1	24.4	78.3%	22.7	73.0%	21.8	70.2%	24.0	77.1%
M&P-Xylene	108-38-3	61.1	46.0	75.2%	44.8	73.3%	41.5	67.8%	44.9	73.4%
Styrene	100-42-5	30.6	18.7	61.2%	15.6	51.0%	21.4	70.0%	20.0	65.6%
O-Xylene	95-47-6	30.6	25.3	82.8%	23.4	76.7%	22.4	73.2%	24.3	79.6%
N-Nonane	111-84-2	33.8	28.2	83.6%	26.1	77.2%	25.5	75.6%	28.2	83.5%
Isopropylbenzene	98-82-8	33.4	26.3	78.7%	25.0	74.9%	22.6	67.7%	26.3	78.7%
n-Propylbenzene	103-65-1	32.8	24.7	75.5%	24.2	73.8%	22.6	69.0%	25.0	76.4%
1,3,5-Trimethylbenzene	108-67-8	34.7	24.1	69.5%	25.9	74.8%	23.2	66.9%	25.5	73.6%
1,2,4-Trimethylbenzene	95-63-6	35.0	23.8	67.9%	27.2	77.6%	26.3	75.2%	26.2	74.9%
n-Decane	124-18-5	35.0	27.1	77.4%	26.9	76.8%	24.9	71.2%	26.8	76.6%
1,2,3-Trimethylbenzene	526-73-8	34.7	19.4	55.8%	22.5	65.0%	22.4	64.7%	23.8	68.8%
n-Undecane	1120-21-4	42.8	22.9	53.4%	27.3	63.9%	27.7	64.8%	29.1	67.9%

<sup>a</sup> Compound order based on elution time.

**Table ES-2. (Continued) Audit Standard Results for all Network GCs**

Compound Name	CAS Number	Audit Concentration (ppbc)	Elm Fork		Everman		Flower Mound		Godley	
			Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery
Ethane	74-84-0	49.6	44.7	90.1%	47.1	95.1%	46.3	93.4%	45.6	92.1%
Ethylene	74-85-1	16.1	13.2	81.7%	12.6	78.1%	13.8	85.6%	13.8	85.7%
Propane	74-98-6	11.7	10.2	87.3%	10.1	86.8%	10.7	91.7%	10.5	90.3%
Propylene	115-07-1	11.7	9.5	81.0%	8.3	71.3%	9.7	82.9%	8.9	76.2%
Iso-Butane	75-28-5	14.7	14.8	100.8%	16.5	112.4%	15.1	102.4%	15.8	107.3%
N-Butane	106-97-8	15.1	15.6	103.2%	17.2	113.8%	15.7	104.0%	16.6	109.9%
Acetylene	74-86-2	7.7	5.7	73.9%	5.5	71.8%	6.4	82.9%	5.8	75.4%
Trans-2-Butene	624-64-6	14.7	15.0	101.8%	16.6	112.8%	15.3	104.3%	16.7	113.5%
1-Butene	106-98-9	14.7	14.9	101.3%	16.0	108.9%	15.1	102.3%	15.9	107.9%
Cis-2-Butene	590-18-1	15.6	15.9	102.2%	17.2	110.6%	16.0	102.8%	16.9	108.5%
Cyclopentane	287-92-3	18.4	18.8	102.3%	21.2	115.2%	19.0	103.2%	20.0	108.9%
Iso-Pentane	78-78-4	18.8	19.7	105.0%	21.2	113.0%	19.3	103.2%	20.7	110.6%
N-Pentane	109-66-0	18.8	19.6	104.5%	21.7	115.5%	19.7	105.2%	21.0	111.9%
1,3-Butadiene	106-99-0	14.6	14.5	99.5%	13.0	89.4%	12.8	88.1%	15.8	108.8%
Trans-2-Pentene	646-04-8	19.5	18.2	93.4%	19.7	101.4%	18.1	92.8%	20.4	104.7%
1-Pentene	109-67-1	19.5	17.5	89.8%	16.5	85.0%	15.0	77.2%	20.1	103.6%
Cis-2-Pentene	627-20-3	17.7	15.0	84.6%	13.9	78.6%	14.3	80.5%	18.0	101.6%
2,2-Dimethylbutane	75-83-2	22.5	20.0	88.9%	24.8	110.1%	22.5	100.0%	24.2	107.6%
2-Methylpentane	107-83-5	22.1	21.0	95.0%	24.4	110.7%	22.4	101.6%	23.2	104.9%
Isoprene	78-79-5	19.3	14.3	74.1%	12.2	63.3%	12.5	64.7%	16.8	87.3%
n-Hexane	110-54-3	22.7	23.3	102.9%	19.5	86.2%	20.4	90.0%	22.7	100.0%
Methylcyclopentane	108-87-2	22.9	21.0	91.7%	19.3	84.2%	18.7	81.7%	18.2	79.2%
2,4-Dimethylpentane	108-08-7	26.7	32.2	120.5%	27.3	102.1%	25.4	95.1%	25.2	94.4%
Benzene	71-43-2	22.9	20.9	91.1%	19.5	85.2%	19.2	83.8%	17.6	76.7%
Cyclohexane	110-82-7	22.9	22.9	100.1%	23.0	100.5%	20.4	89.1%	20.5	89.7%
2-Methylhexane	591-76-4	26.3	21.8	82.9%	19.3	73.5%	21.5	81.8%	18.6	70.8%
2,3-Dimethylpentane	565-59-3	26.5	32.1	121.5%	29.6	112.0%	25.1	94.9%	26.3	99.3%
3-Methylhexane	589-34-4	26.5	28.2	106.7%	24.9	93.9%	23.7	89.5%	23.4	88.3%
2,2,4-Trimethylpentane	540-84-1	30.2	32.0	105.7%	27.7	91.4%	27.2	90.0%	25.6	84.7%
n-Heptane	142-82-5	26.7	27.6	103.3%	23.7	88.8%	23.7	88.8%	22.1	82.5%
Methylcyclohexane	108-87-2	26.5	27.6	104.3%	24.9	94.0%	23.7	89.7%	22.7	85.8%
2,3,4-Trimethylpentane	565-75-3	30.8	31.4	102.0%	28.2	91.5%	27.1	87.9%	25.7	83.3%
Toluene	108-88-3	26.7	26.9	100.5%	23.1	86.5%	23.3	87.2%	22.3	83.4%
2-Methylheptane	592-27-8	30.2	30.3	100.3%	26.5	87.6%	26.1	86.2%	25.5	84.4%
3-Methylheptane	589-81-1	30.6	31.5	103.2%	27.0	88.5%	26.5	86.7%	25.3	82.9%
n-Octane	111-65-9	30.6	31.4	102.6%	27.6	90.3%	26.3	86.1%	24.6	80.3%
Ethylbenzene	100-41-4	31.1	27.9	89.5%	25.6	82.1%	23.3	74.9%	23.1	74.2%
M&P-Xylene	108-38-3	61.1	53.6	87.8%	51.6	84.5%	43.9	71.8%	44.4	72.7%
Styrene	100-42-5	30.6	23.6	77.3%	18.9	61.8%	17.2	56.2%	18.7	61.2%
O-Xylene	95-47-6	30.6	28.8	94.4%	27.1	88.8%	21.5	70.5%	24.2	79.2%
N-Nonane	111-84-2	33.8	32.1	95.2%	30.5	90.4%	26.4	78.3%	27.3	80.9%
Isopropylbenzene	98-82-8	33.4	29.9	89.5%	28.3	84.7%	25.6	76.8%	24.3	72.7%
n-Propylbenzene	103-65-1	32.8	28.4	86.7%	26.5	80.8%	25.5	77.7%	23.5	71.6%
1,3,5-Trimethylbenzene	108-67-8	34.7	28.2	81.4%	27.5	79.2%	24.5	70.6%	23.2	66.9%
1,2,4-Trimethylbenzene	95-63-6	35.0	29.2	83.4%	25.9	74.0%	27.8	79.3%	23.3	66.6%
n-Decane	124-18-5	35.0	30.1	85.9%	26.7	76.4%	26.6	76.1%	26.0	74.2%
1,2,3-Trimethylbenzene	526-73-8	34.7	27.7	79.9%	23.7	68.3%	24.9	72.0%	19.9	57.5%
n-Undecane	1120-21-4	42.8	31.7	74.1%	28.3	66.2%	30.7	71.7%	21.2	49.5%

<sup>a</sup> Compound order based on elution time.

**Table ES-2. (Continued) Audit Standard Results for all Network GCs**

Compound Name	CAS Number	Audit Concentration (ppbc)	Kennedale		Mansfield		Rhome		Rushing		UTA	
			Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery	Post Processed ppbc	Percent Recovery
Ethane	74-84-0	49.6	40.9	82.6%	47.3	95.4%	51.5	104.0%	46.2	93.2%	45.9	92.7%
Ethylene	74-85-1	16.1	11.8	73.0%	11.5	71.5%	13.1	81.2%	12.4	76.7%	12.3	76.3%
Propane	74-98-6	11.7	10.0	85.8%	10.7	91.9%	11.5	98.2%	9.7	83.2%	11.0	94.3%
Propylene	115-07-1	11.7	8.3	71.0%	8.8	75.2%	9.5	81.6%	7.7	66.0%	9.2	78.6%
Iso-Butane	75-28-5	14.7	15.9	108.2%	16.9	114.8%	18.6	126.2%	16.0	108.8%	17.8	121.1%
N-Butane	106-97-8	15.1	16.3	108.1%	18.2	120.7%	19.4	128.6%	16.8	111.0%	18.6	123.3%
Acetylene	74-86-2	7.7	5.3	68.8%	6.1	79.8%	5.6	73.1%	5.0	65.4%	5.5	71.9%
Trans-2-Butene	624-64-6	14.7	15.5	105.5%	17.3	117.8%	18.7	127.1%	16.0	108.5%	17.5	119.0%
1-Butene	106-98-9	14.7	15.3	104.2%	16.7	113.2%	18.1	123.3%	15.3	104.1%	16.9	114.8%
Cis-2-Butene	590-18-1	15.6	16.1	103.8%	17.8	114.6%	18.9	121.4%	16.3	105.1%	17.7	113.5%
Cyclopentane	287-92-3	18.4	19.7	106.8%	21.9	119.0%	23.0	124.9%	19.8	107.8%	22.3	121.5%
Iso-Pentane	78-78-4	18.8	20.3	108.1%	22.7	121.1%	23.7	126.6%	20.3	108.2%	22.8	121.8%
N-Pentane	109-66-0	18.8	20.2	107.9%	23.0	122.9%	24.2	129.0%	20.9	111.2%	22.8	121.7%
1,3-Butadiene	106-99-0	14.6	14.2	97.4%	16.2	111.6%	16.2	111.1%	14.6	100.2%	14.2	97.5%
Trans-2-Pentene	646-04-8	19.5	19.4	100.0%	21.6	111.3%	23.0	118.4%	19.5	100.2%	19.4	99.6%
1-Pentene	109-67-1	19.5	18.6	95.6%	20.9	107.3%	20.6	105.8%	18.0	92.3%	18.4	94.8%
Cis-2-Pentene	627-20-3	17.7	17.2	96.9%	19.2	108.3%	19.0	107.3%	17.2	97.2%	11.0	62.3%
2,2-Dimethylbutane	75-83-2	22.5	23.8	105.6%	26.8	119.2%	28.1	124.9%	24.2	107.7%	26.0	115.6%
2-Methylpentane	107-83-5	22.1	22.9	103.9%	25.7	116.3%	26.9	121.7%	22.4	101.7%	26.0	117.7%
Isoprene	78-79-5	19.3	15.5	80.6%	16.5	85.5%	16.1	83.4%	15.1	78.4%	15.0	78.0%
n-Hexane	110-54-3	22.7	20.9	92.4%	21.6	95.3%	21.4	94.2%	20.3	89.4%	21.0	92.8%
Methylcyclopentane	108-87-2	22.9	20.4	89.0%	19.0	82.7%	20.0	87.3%	15.2	66.3%	20.9	91.3%
2,4-Dimethylpentane	108-08-7	26.7	24.2	90.5%	25.7	96.2%	28.5	106.8%	27.5	102.9%	24.6	91.8%
Benzene	71-43-2	22.9	20.3	88.4%	20.2	88.3%	20.7	90.5%	14.9	64.9%	19.1	83.3%
Cyclohexane	110-82-7	22.9	22.0	95.9%	21.2	92.4%	24.2	105.5%	21.4	93.2%	21.3	93.1%
2-Methylhexane	591-76-4	26.3	22.2	84.7%	21.4	81.6%	20.9	79.4%	13.1	49.9%	22.4	85.2%
2,3-Dimethylpentane	565-59-3	26.5	24.8	93.8%	26.9	101.6%	29.6	111.8%	30.1	113.7%	24.2	91.6%
3-Methylhexane	589-34-4	26.5	24.2	91.6%	24.4	92.1%	28.0	106.0%	22.1	83.5%	23.7	89.5%
2,2,4-Trimethylpentane	540-84-1	30.2	25.9	85.7%	27.6	91.2%	28.5	94.4%	25.6	84.6%	26.5	87.7%
n-Heptane	142-82-5	26.7	22.7	84.8%	24.7	92.3%	24.3	90.8%	21.2	79.5%	23.6	88.1%
Methylcyclohexane	108-87-2	26.5	23.1	87.5%	23.8	90.0%	23.8	90.0%	22.5	84.9%	23.8	90.0%
2,3,4-Trimethylpentane	565-75-3	30.8	25.5	82.8%	27.4	89.0%	28.8	93.4%	26.1	84.9%	26.2	85.0%
Toluene	108-88-3	26.7	22.0	82.3%	24.0	89.8%	25.1	93.9%	20.2	75.6%	22.0	82.2%
2-Methylheptane	592-27-8	30.2	24.2	79.9%	26.5	87.8%	28.8	95.1%	25.9	85.8%	25.3	83.7%
3-Methylheptane	589-81-1	30.6	24.7	80.9%	27.1	88.6%	30.4	99.6%	27.0	88.2%	25.8	84.4%
n-Octane	111-65-9	30.6	24.1	78.9%	27.2	89.1%	27.6	90.3%	25.1	82.0%	24.8	81.2%
Ethylbenzene	100-41-4	31.1	21.8	70.1%	23.9	76.7%	24.6	78.9%	22.0	70.8%	23.3	74.9%
M&P-Xylene	108-38-3	61.1	40.7	66.6%	45.6	74.7%	46.8	76.6%	46.9	76.8%	44.0	72.0%
Styrene	100-42-5	30.6	17.8	58.1%	22.1	72.2%	20.1	65.8%	15.0	49.2%	19.3	63.2%
O-Xylene	95-47-6	30.6	21.6	70.6%	23.4	76.4%	25.8	84.4%	28.7	94.0%	23.3	76.2%
N-Nonane	111-84-2	33.8	25.3	75.0%	28.3	83.9%	28.0	83.1%	28.6	84.8%	26.0	77.1%
Isopropylbenzene	98-82-8	33.4	23.0	68.8%	25.2	75.4%	26.7	80.0%	25.1	75.2%	24.8	74.3%
n-Propylbenzene	103-65-1	32.8	21.6	66.1%	24.5	74.9%	25.8	78.6%	22.8	69.6%	23.1	70.4%
1,3,5-Trimethylbenzene	108-67-8	34.7	19.8	57.2%	24.4	70.5%	28.1	81.1%	25.4	73.2%	22.5	65.0%
1,2,4-Trimethylbenzene	95-63-6	35.0	20.2	57.8%	26.8	76.6%	26.6	75.8%	26.6	75.9%	22.9	65.3%
n-Decane	124-18-5	35.0	23.0	65.8%	25.7	73.5%	28.7	82.0%	27.6	78.8%	24.6	70.4%
1,2,3-Trimethylbenzene	526-73-8	34.7	17.6	50.8%	24.3	70.1%	22.6	65.2%	21.2	61.1%	19.4	55.9%
n-Undecane	1120-21-4	42.8	21.5	50.3%	27.1	63.3%	24.1	56.3%	20.4	47.6%	22.6	52.9%

<sup>a</sup> Compound order based on elution time.