

**INFRARED INSTRUMENTS AND SOLVENT  
COMPATIBILITY FOR OIL AND GREASE MEASUREMENT**

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**TESTING METHODS FOR OIL AND GREASE DETERMINATION ON BOTH GRAVIMETRIC AND INFRARED METHODOLOGY COME FROM DIFFERENT ENTITIES.**

**THE ANALYTICAL COMMUNITIES GENERALLY FOLLOW METHODS FROM:**

- ◆ **USEPA (EPA)**
- ◆ **STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER (SM)**
- ◆ **AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

## METHODS

<u>PUBLICATION</u>	<u>METHOD</u>	<u>FINISH</u>	<u>SOLVENT</u>
EPA	413.1	GRAV.	TF
EPA	1664	GRAV.	HEXANE
EPA	418	IR	TF
SM	5520B	GRAV.	TF
SM	5520B	GRAV.	HEXANE
SM	5520C	IR	TF
ASTM	D4281-95	GRAV.	TF
ASTM	D3921-96	IR	TF

**MOST METHODS FOR A PARTICULAR METHOD/FINISH ARE VERY SIMILAR, AND SHOULD PRODUCE LIKE RESULTS**

**3 DIFFERENT INFRARED INSTRUMENTS WERE EVALUATED**

- ◆ **FOXBORO MIRAN IFF S/N 1434(CUVETTE)**
- ◆ **WILKS INFRACAL S/N 010086(CUVETTE)**
- ◆ **DURATECH DTIR 970 S/N 064(CUVETTE)**

**ALL THREE INSTRUMENT CALIBRATIONS WERE DONE WITH  
(1) OIL/35° GRAVITY OIL USING CALIBRATION STANDARDS OF  
50, 25, 12.5, 5.0mg/l IN TF FREON.**

**5 DIFFERENT SOLVENTS WERE USED**

- ◆ **TF FREON (DUPONT)**
- ◆ **AK 225 (ASAHI GLASS)**
- ◆ **VERTREL MCA (DUPONT)**
- ◆ **S-316 (HORIBA)**
- ◆ **PERC/TETRACHLOROETHYLENE (ACROS)**

**SOLVENT COST PER TEST (140ml/14ml)**

<b>TF FREON</b>	<b>\$1.25</b>
<b>AK 225</b>	<b>\$0.85</b>
<b>VERTREL</b>	<b>\$0.75</b>
<b>S-316</b>	<b>\$3.25</b>
<b>PERC</b>	<b>\$0.75</b>

## **2 DIFFERENT HYDROCARBONS**

- ◆ **22° GRAVITY (UNUSUAL FOR GOM)**
- ◆ **40° GRAVITY (TYPICAL FOR GOM)**

**A STANDARD OF 32mg/l WAS MADE USING EACH OF THE TWO DIFFERENT OILS IN ALL 5 SOLVENTS**

**AFTER EACH INSTRUMENT WAS CALIBRATED USING 35° GRAVITY OIL IN TF WE LOOKED AT HOW THE DIFFERENT SOLVENTS WOULD RELATE TO A "STANDARD TF CALIBRATION CHART"**

	<b>FOX</b> <b>32mg/l</b> <b>w/22°</b>	<b>FOX</b> <b>32mg/l</b> <b>w/40°</b>	<b>WILKS</b> <b>32mg/l</b> <b>w/22°</b>	<b>WILKS</b> <b>32mg/l</b> <b>w/40°</b>	<b>DTIR</b> <b>32mg/l</b> <b>w/22°</b>	<b>DTIR</b> <b>32mg/l</b> <b>w/40°</b>
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<b>SOLVENT-TF</b>	<b>34</b>	<b>33</b>	<b>34</b>	<b>36</b>	<b>34</b>	<b>32 (32)</b>
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<b>SOLVENT-AK</b>	<b>34</b>	<b>28</b>	<b>30</b>	<b>24</b>	<b>33</b>	<b>29 (30)</b>
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<b>SOLVENT-VT</b>	<b>29*</b>	<b>34*</b>	<b>NOTR</b>	<b>NOTR</b>	<b>35*</b>	<b>40* (35)</b>
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<b>SOLVENT-S</b>	<b>34</b>	<b>31</b>	<b>39</b>	<b>34</b>	<b>36</b>	<b>34 (35)</b>
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<b>SOLVENT-P</b>	<b>37</b>	<b>33</b>	<b>37</b>	<b>34</b>	<b>38</b>	<b>37 (36)</b>
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	<b>(34)</b>	<b>(32)</b>	<b>(35)</b>	<b>(32)</b>	<b>(35)</b>	<b>(34)</b>
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## **CONCLUSIONS**

- ◆ **MORE ANALYSIS IS NEEDED**
- ◆ **IR CUVETTE ALLOWS VERSATILITY**
- ◆ **GOOD DATA**
- ◆ **NO PERFECT CALIBRATION CHART**
- ◆ **EXPECT BETTER DATA WITH SITE SPECIFIC  
HYDROCARBON MATCHED WITH SPECIFIC SOLVENT**
- ◆ **MANY GOOD OPTIONS FOR EXISTING AND NEW IR  
INSTRUMENTS**
- ◆ **EXTRACTION EFFICIENCIES**



## **FUTURE**

- ◆ **INDUSTRY AND REGULATORY AGENCIES MAY BE  
LOOKING FOR SOLVENTS TO REPLACE HEXANE FOR  
GRAVIMETRIC ANALYSIS**
- ◆ **INDUSTRY AND REGULATORY AGENCIES MAY BE  
LOOKING FOR SOLVENTS TO REPLACE TF IR ANALYSIS**