

MET-Biodiesel Capillary GC Columns

RESEARCH ESSENTIALS
Customized Account Management

SAFC
Consistency and Flexibility

RESEARCH SPECIALTIES
Broad Product Offering

RESEARCH BIOTECH
Innovation First to Market

Product Specifications

Product Features & Benefits

Chromatograms

FAQs

Related Products

Updated: February 2, 2009

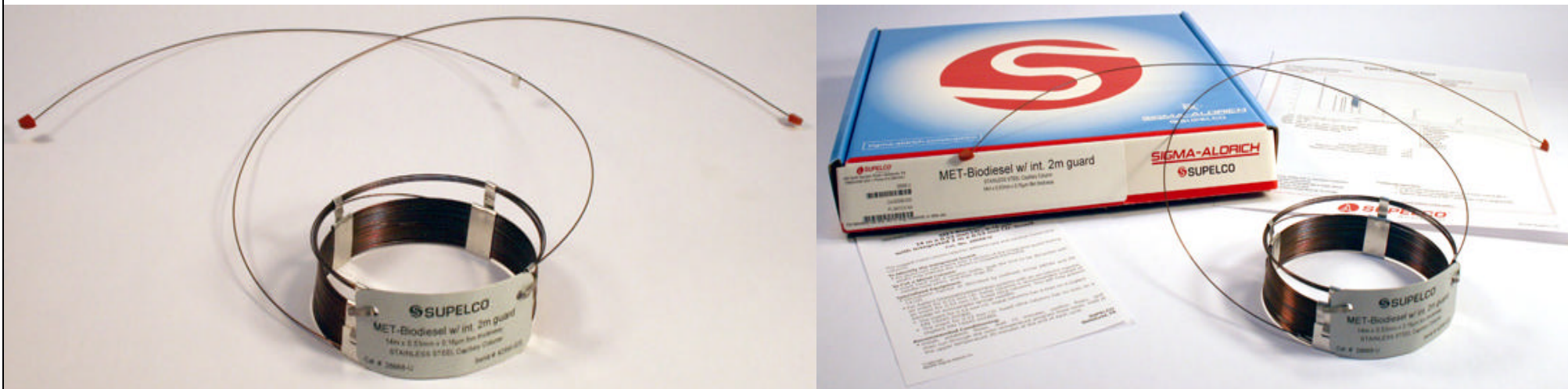
Product Specifications

Product Specifications

- What is the product?
 - **MET-Biodiesel**, 14 m x 0.53 mm I.D., 0.16 μm with a 2 m x 0.53 mm I.D. **integrated guard (P/N 28668-U)**
 - Temperature limits:
 - -60 °C to 380 °C (isothermal) / 430 °C (programmed)
- Why is it used?
 - This **rugged metal column** was designed specifically for the determination of **free and total glycerin in B100 biodiesel** samples per methods **ASTM D6584 or EN 14105**
 - Glycerin or glyceride (either mono-, di, or triglycerides) are impurities in biodiesel that clog fuel systems
 - These impurities must be absent or at very low levels
 - These methods determine if B100 biodiesel is acceptable as a fuel, with regards to glycerin/glyceride impurity

Product Specifications

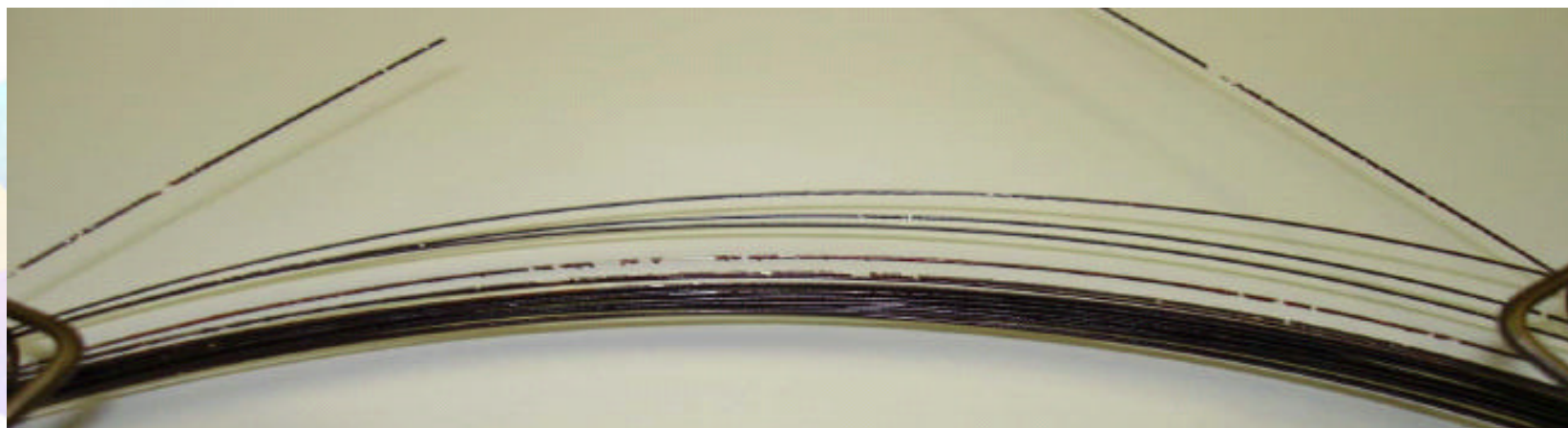
- Product packaging
 - Column is in a **3.5" coil** that is banded only (**no cage/basket**)
 - The **integrated guard** is a **separate banded 3.5" coil**
 - With the tag facing the user, the column end pointing up off the right side of the coil is the **inlet** (always wound in this direction)
 - Box includes a **Column Test Report** with a representative QA chromatogram plus the actual QA results
 - Box includes a **Data Sheet** (T708018) with care and use



Product Features & Benefits

Product Features & Benefits

- **Metal** is used as the column material, virtually **eliminating column breakage** when performing this application
 - Metal columns cannot be accidentally broken during handling
 - Metal columns do not require a coating to provide strength
 - The protective polyimide coating on the outside of fused silica columns slowly burns off at 380 °C , exposing bare fused silica which is fragile and susceptible to breakage
 - The picture below shows a fused silica column after 100+ analyses (380 °C final oven temperature)



Product Features & Benefits

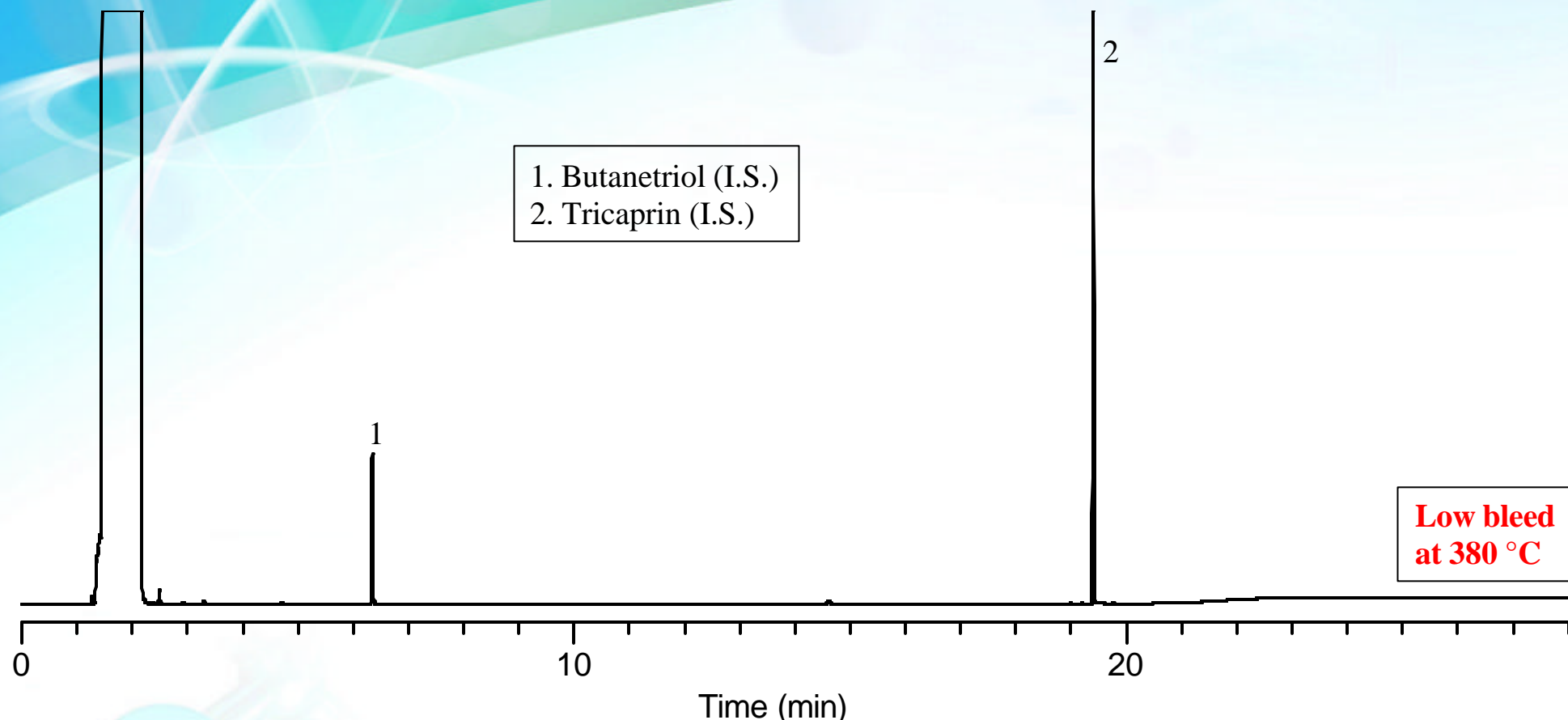
- A **guard** (whether integrated or attached)
 - Protects the analytical column from excess reagent and non-volatile compounds, **extending column life**
 - Acts as a retention gap, **minimizing peak broadening**
- An **integrated guard** provides the above benefits with a **leak-free connection**
 - The guard + analytical column are **one continuous piece** of tubing
 - There is **no union** between the guard and analytical column

Product Features & Benefits

- **Low bleed** characteristic, even at 380 °C
- Provides **good peak shape and resolution** for all glyceride impurities of interest
- Able to **separate glycerin in addition to mono-/diglycerides** (as methyl esters) plus **triglycerides** from the **FAMES**
- A maximum temperature of 380 °C (isothermal) and 430 °C (programmed) exceeds the temperature limitations specified in biodiesel methods such as **ASTM D6584 and EN 14105**

Chromatograms

Method Blank (Contains Internal Standards Only)



Column: MET-Biodiesel, 14 m x 0.53 mm I.D., 0.16 μ m with integrated 2 m x 0.53 mm I.D. guard (28668-U)

Oven: 50 °C (1 min.), 15 °C/min. to 180 °C, 7 °C/min. to 230 °C, 30 °C/min. to 380 °C (10 min.)

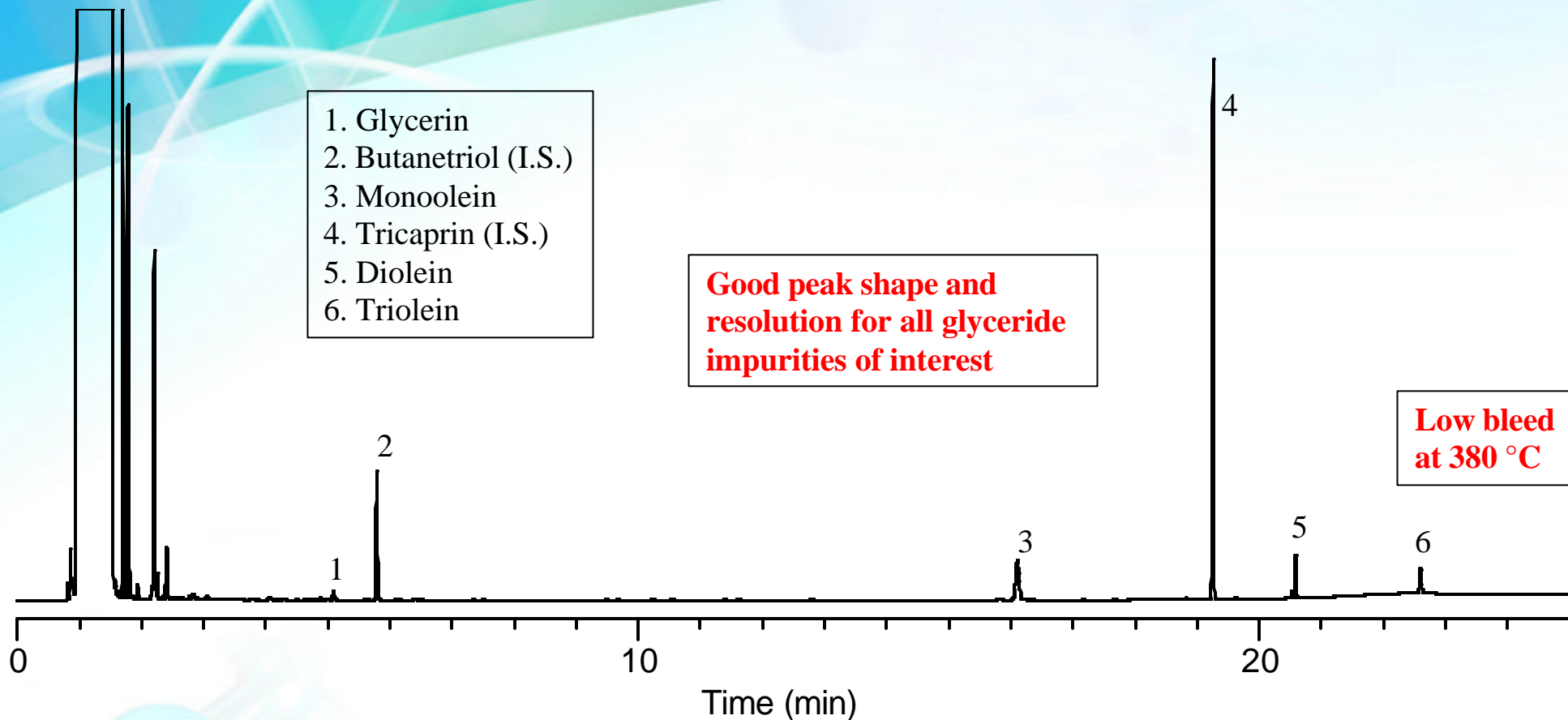
Det.: FID, 380 °C

Carrier Gas: helium, 3.0 mL/min.

Injection: 1 μ L, cold on-column

Sample: Method blank consisting of Butanetriol Internal Standard (44896-U) and Tricaprin Internal Standard (44897-U), derivatized with MSTFA (394866) then diluted in n-heptane

ASTM D6584 Calibration Standard – Run 1



Column: MET-Biodiesel, 14 m x 0.53 mm I.D., 0.16 μ m with integrated 2 m x 0.53 mm I.D. guard (28668-U)

Oven: 50 °C (1 min.), 15 °C/min. to 180 °C, 7 °C/min. to 230 °C, 30 °C/min. to 380 °C (10 min.)

Det.: FID, 380 °C

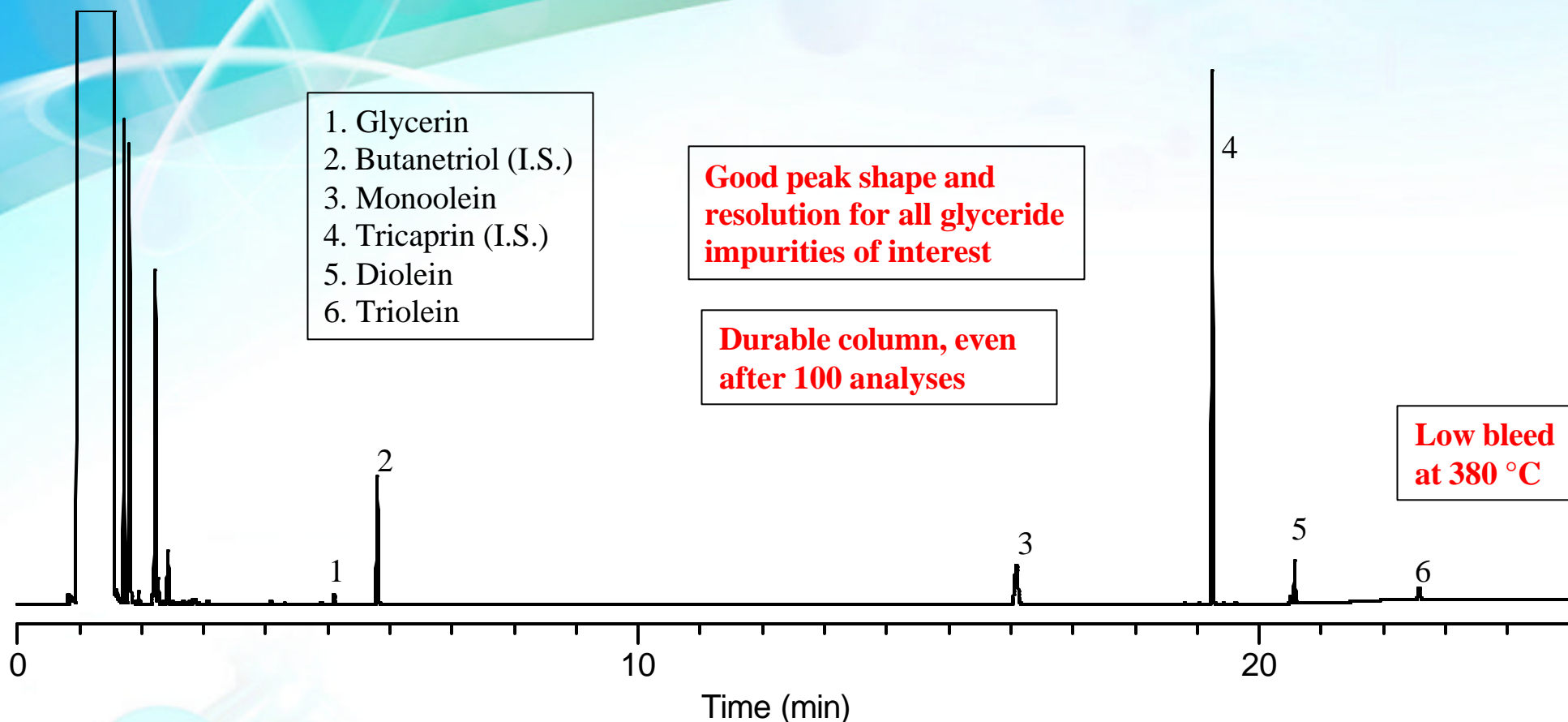
Carrier Gas: helium, 3.0 mL/min.

Injection: 1 μ L, cold on-column

Sample: ASTM D6584 Standard Solution 1 (44899-U) plus Butanetriol Internal Standard (44896-U) and

11 Tricaprin Internal Standard (44897-U), derivatized with MSTFA (394866) then diluted in n-heptane

ASTM D6584 Calibration Standard – Run 100



Column: MET-Biodiesel, 14 m x 0.53 mm I.D., 0.16 μ m with integrated 2 m x 0.53 mm I.D. guard (28668-U)

Oven: 50 °C (1 min.), 15 °C/min. to 180 °C, 7 °C/min. to 230 °C, 30 °C/min. to 380 °C (10 min.)

Det.: FID, 380 °C

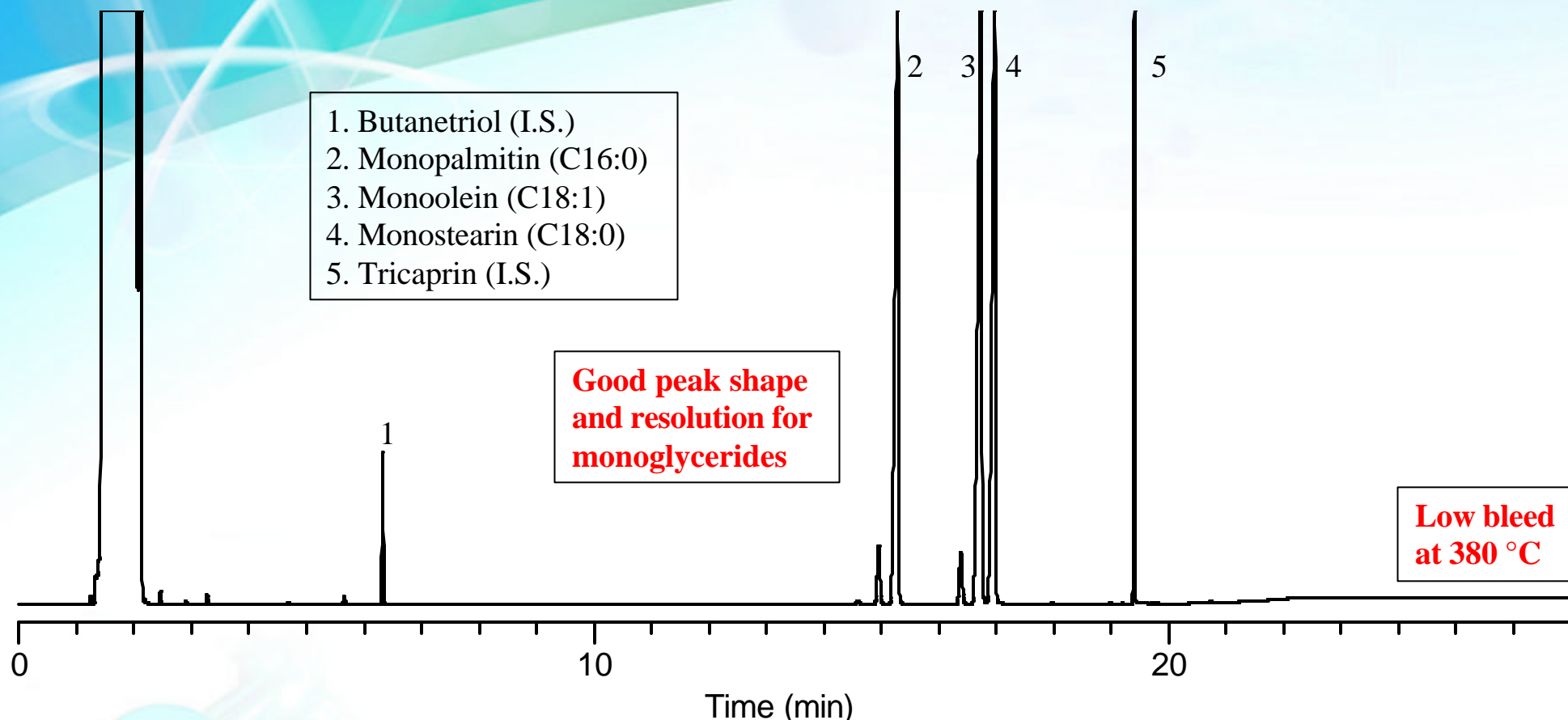
Carrier Gas: helium, 3.0 mL/min.

Injection: 1 μ L, cold on-column

Sample: ASTM D6584 Standard Solution 1 (44899-U) plus Butanetriol Internal Standard (44896-U) and Tricaprin Internal Standard (44897-U), derivatized with MSTFA (394866) then diluted in n-heptane

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EN 14105 Monoglyceride Standard



Column: MET-Biodiesel, 14 m x 0.53 mm I.D., 0.16 μ m with integrated 2 m x 0.53 mm I.D. guard (28668-U)

Oven: 50 °C (1 min.), 15 °C/min. to 180 °C, 7 °C/min. to 230 °C, 30 °C/min. to 380 °C (10 min.)

Det.: FID, 380 °C

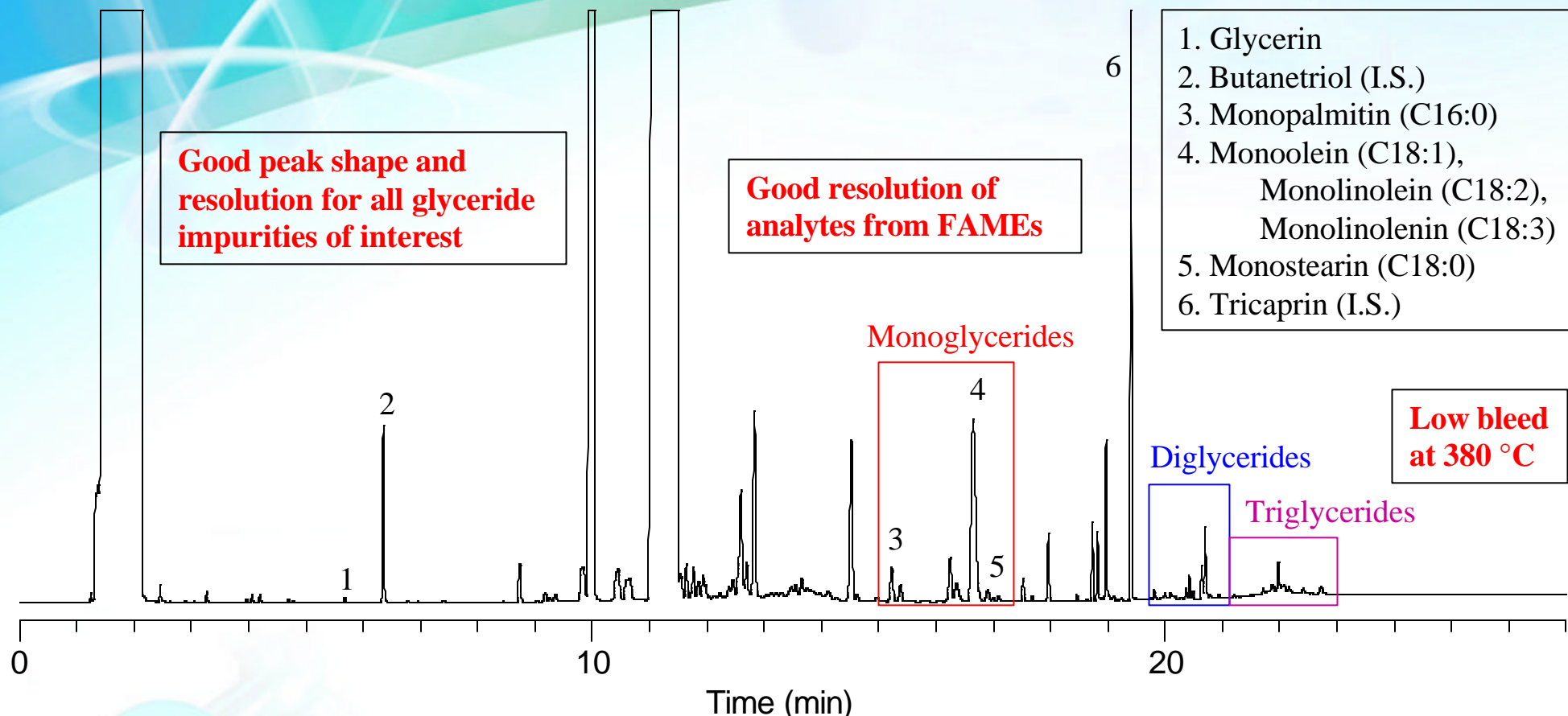
Carrier Gas: helium, 3.0 mL/min.

Injection: 1 μ L, cold on-column

Sample: EN 14105 Monoglyceride Stock Solution (49446-U) plus Butanetriol Internal Standard (44896-U) and

13 Tricaprin Internal Standard (44897-U), derivatized with MSTFA (394866) then diluted in n-heptane

B100 Biodiesel Sample



Column: MET-Biodiesel, 14 m x 0.53 mm I.D., 0.16 μ m with integrated 2 m x 0.53 mm I.D. guard (28668-U)

Oven: 50 °C (1 min.), 15 °C/min. to 180 °C, 7 °C/min. to 230 °C, 30 °C/min. to 380 °C (10 min.)

Det.: FID, 380 °C

Carrier Gas: helium, 3.0 mL/min.

Injection: 1 μ L, cold on-column

Sample: B100 Biodiesel sample plus Butanetriol Internal Standard (44896-U) and Tricaprin Internal Standard (44897-U), derivatized with MSTFA (394866) then diluted in n-heptane

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FAQs

FAQs

- How do I **identify the integrated guard** (inlet end)?
 - An aluminum tab is bent over a section of the integrated guard
 - NOTE: Tailing peaks may indicate the column is installed backward
- How do I **cut a metal column**?
 - Score hard (saw) with a ceramic wafer, grab the end to be discarded with needle-nose pliers, and then snap off
- What is the **recommended conditioning**?
 - Install, establish flows, wait 15 minutes, confirm flows, and then run through the oven temperature program three times (hold at the upper temperature 30 minutes at the end of each cycle)

FAQs

- Do these **methods require specialized equipment?**
 - On-column injector as described by methods ASTM D6584 and EN 14105
- I have an **Agilent®/HP instrument** (5890/6850/6890/7890) and damage autosampler syringe needles. Any advice?
 - The on-column injector for these systems requires an special insert
 - For the MET-Biodiesel column,
 - **USE** the insert for 0.53 mm I.D. metal columns (Agilent P/N 19245-20780, has 4 rings)
 - **DO NOT USE** the insert for 0.53 mm I.D. fused silica columns (Agilent P/N 19245-20580, has no rings)

FAQs

- Can I use this column? My **method specifies** a 10 or 15 m x 0.32 mm I.D., 0.10 μm column with a 2 to 5 m x 0.53 mm I.D. guard
 - It is true these methods mention the above **column dimensions**
 - However, both include statements which allow this column to be used
 - ASTM D6584 Section 6.1.2 states the above column dimensions “have been found **satisfactory**” and that “any column with **better or equivalent** chromatographic efficiency and selectivity can be used”
 - EN 14105:2003 Section 4.2 states the above column dimensions “**are advised**” leaving open that a better or equivalent column can be used
- Who can I contact with **additional questions**?
 - Supelco’s Technical Service chemists at 800-359-3041 (US and Canada only), 814-359-3041, or techservice@sial.com

Related Products

Related Products

- Sigma-Aldrich/Supelco offers **one-stop convenience** for products required to test B100 biodiesel for **free and total glycerin**
 - MET-Biodiesel capillary **GC column**
 - High-quality **chemical standards**
 - ASTM D6584 and EN 14105 multi-level, multi-component calibration solutions
 - EN 14105 monoglycerides stock solution
 - Individual stock solutions for self-preparing multi-component solutions
 - Internal standards for addition to sample extracts prior to analysis
 - **Derivatization reagents & solvent**
 - A wide variety of **vials and syringes** for preparing chemical standards and B100 biodiesel samples prior to GC analysis

Related Products

- **Other applications** probably being performed at the same facility
 - Determination of **methanol content in B100 biodiesel** (method EN 14110)
 - Chemical standards, vials/syringes, and capillary GC columns
 - Identifying **FAME profiles of B100 biodiesel** (method EN 14103)
 - Chemical standards, derivatization reagents, vials/syringes, and capillary GC columns
 - Determination of **water content in B100 biodiesel** (method EN 14214 or ISO 12937)
 - HYDRANAL[®] reagents
 - Purification of B100 biodiesel (**separation of FAMEs and glycerin** into two fractions)
 - DOWEX[®] DR-G8 dried cation exchange resin, which is designed as a processing aid to reduce and remove trace levels of glycerin, salts, soaps, and other organics from crude biodiesel streams

Thank You!