



Advanced Solutions For Challenging Feeds

# Unity™ Hydrotreating Catalysts



# Part Of Our Unified Approach

Honeywell UOP's hydroprocessing catalyst portfolio is called Unity™ because we deliver complete catalyst, equipment, licensing and technical support solutions for hydrotreating and hydrocracking. The advanced hydrotreating lineup helps you get the most from heavier and opportunity crudes while meeting tight environmental regulations on fuel quality.

UNITY HYDROTREATING							
DEMETALLIZATION			CLEAN FUELS			PRETREAT	
Si DEMET	As DEMET	Ni/V DEMET	FCC GASOLINE	NAPHTHA	DISTILLATE	FCC VGO PRETREAT	HYDROCRACKING PRETREAT
HYT-9110	UF-75	HYT-8109	HYT-2018	HYT-1118	HYT-4118	HYT-5119	HYT-6119
HYT-9119	UF-80	HYT-8119	HYT-2117	HYT-1119	HYT-6119	HYT-5219	HYT-6219
			HYT-2118	HYT-9129	HYT-6219		
			HYT-2119				



**Hydrotreating In Action:** From technical experts working together with you to catalysts that help optimize unit performance, you get it all with Honeywell UOP. Our commitment to serving customers with quality products, expert support, and new technologies is stronger than ever.

Meet All Your Needs With Honeywell UOP



# Complete Portfolio

Honeywell UOP hydrotreating catalysts are pilot-plant tested and commercially proven. You'll have access to a full range of hydrotreating solutions, so you can meet your exact needs. From Demetallization to Clean Fuels to Pretreat, each Unity Hydrotreating catalyst has been developed and manufactured to Honeywell UOP quality performance standards. Plus, they're universally compatible and can be used in UOP-designed units as well as other units.

## Flexibility To Meet Your Processing Objectives

You have processing goals for your hydrotreating units. Honeywell UOP has the hydrotreating catalysts to achieve these goals. We'll work with you to find the catalyst or combination of catalysts to help achieve your desired outcome. Whether you want to reduce sulfur, nitrogen and aromatics or enhance cetane, density and smoke point — or often all of the above — you can count on UOP hydrotreating catalysts and our expert team to deliver.

## More Than A Century Of Know-How

Honeywell UOP has been serving the refining industry for more than 100 years, including 65 years in hydroprocessing. We have the hydrotreating catalysts and proven technical expertise for optimizing your operations.



### Complete Solutions

- Process technology
- Revamp design solutions
- Catalyst solutions
- Equipment solutions



### Global Supplier

- A leading supplier of hydrocracking catalysts
- Experience processing a wide range of feedstocks
- Investing in new hydrotreating catalysts

# 100<sup>+</sup> YEARS

### Industry Experience

- 100+ years in the refining industry
- 65+ years in hydroprocessing
- Proven technical expertise



## Solutions For Every Need

### Demetallization

Removing metals from a hydrotreating unit's feed helps to maintain longer cycle lengths and get the most from your hydrotreating catalyst. Honeywell UOP demet solutions capture silicon, arsenic, nickel, vanadium and more before they impact downstream units and valuable catalysts.

DEMETALLIZATION		
Si DEMET	As DEMET	Ni/V DEMET
HYT-9110	UF-75	HYT-8109
HYT-9119	UF-80	HYT-8119

### Clean Fuels

Helps to improve the quality of your fuel products and meet environmental regulations. Whether you need high-activity catalysts for removing nitrogen and sulfur or you're seeking the selective removal of sulfur in gasoline, these catalyst solutions provide a range of options. The catalyst formulations enable the right level of hydrogen addition and resilience to feed contaminants.

CLEAN FUELS		
FCC GASOLINE	NAPHTHA	DISTILLATE
HYT-2018	HYT-1118	HYT-4118
HYT-2117	HYT-1119	HYT-6119
HYT-2118	HYT-9129	HYT-6219
HYT-2119		

### Pretreat

For a range of contaminant removal and downstream protection, Honeywell UOP pretreat catalysts have you covered. They work with a variety of feeds and configurations to remove nitrogen and sulfur while providing excellent saturation. These high-performance catalysts also feature superb stability for a long cycle length.

PRETREAT	
FCC VGO PRETREAT	HYDROCRACKING PRETREAT
HYT-5119	HYT-6119
HYT-5219	HYT-6219

# Hydrotreating Portfolio Examples

Honeywell UOP offers a complete range of advanced hydrotreating catalysts and technologies.

Here are details on just a few:

HYT

9119

**Helps protect valuable downstream hydrotreating, reforming and isomerization catalysts from deactivation due to silicon poisoning.**

- Improved capacity for silicon and sulfur removal performance compared to leading silicon trap catalysts
- Provides transition activity to handle highly reactive diolefins and prevent excessive gum formation

UF

UF-80

**High-capacity catalyst used for the removal of arsenic compounds in hydrotreating unit feeds.**

- The feed applications include straight-run feedstock, cracked feedstock, and FCC unit feedstock
- Provides protection of downstream catalysts that are sensitive to arsenic to help prevent premature catalyst deactivation

HYT

1119

**High-performance NiMo hydrotreating catalyst for the removal of sulfur and nitrogen.**

- Designed for use in light distillate or naphtha hydrotreating service
- Increased stability and silicon pickup
- Lower loading density for improved fill costs

HYT

9129

**NiMo catalyst balancing a high silicon pick-up capacity with high activity for sulfur and nitrogen compound removal.**

- Helps protect valuable downstream hydrotreating, reforming and isomerization catalysts from deactivation due to silicon
- Provides high activity to remove sulfur and nitrogen compounds
- Helps extend cycle lengths in coker naphtha service

HYT

4118

**Enhances ULSD unit performance through superior desulfurization and low hydrogen consumption.**

- Designed for low- to medium-pressure ultra-low sulfur diesel hydrotreating
- High activity and stability for longer cycle lengths while meeting ULSD product qualities
- Highly competitive fill cost while achieving high desulfurization performance
- Controls hydrogen consumption to optimize hydrotreating unit
- Works with a range of feedstocks including straight run diesel, light cycle oils, light coker gas oils and other cracked feedstocks

HYT

6219

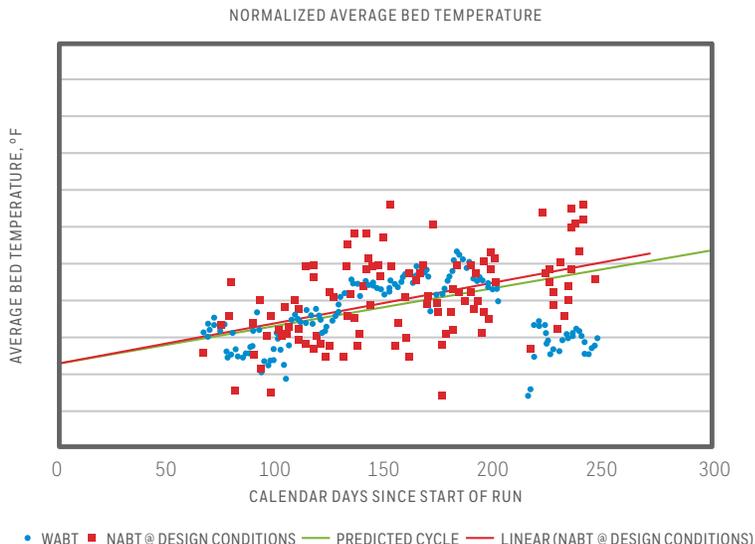
**State-of-the-art, high-activity catalyst that provides excellent desulfurization, denitrogenation, and hydrogenation.**

- Designed for challenging feedstocks, including distillates, VGO, heavy coker gas oils, DAO, and more
- Achieves longer operating cycles and improves sulfur and nitrogen reduction in hydrocracking pretreat and ultra-low sulfur diesel units
- Enhanced dispersion of metals results in higher activity and increased stability
- Rejuvenation demonstrated up to 95% of fresh catalyst activity

# Unity Hydrotreating In Action

## Meeting Sulfur Reduction Goals

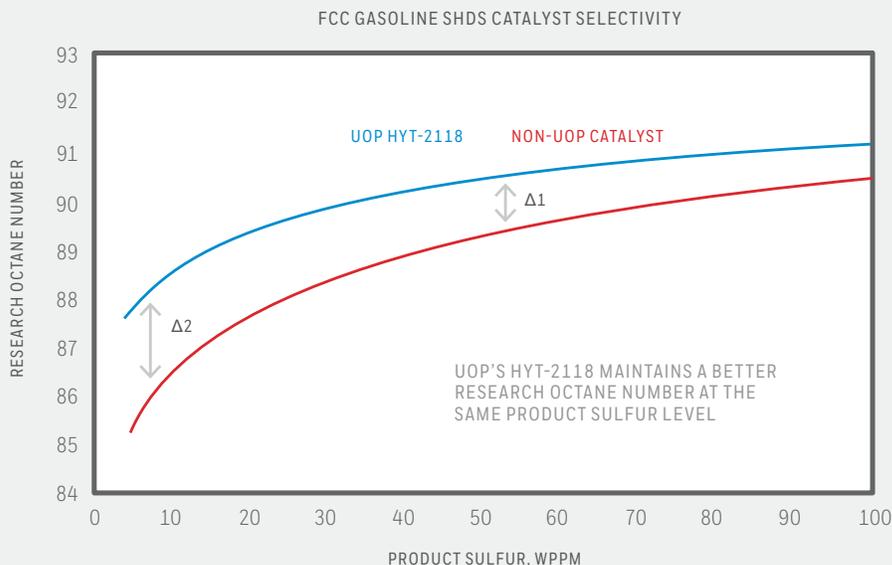
When a major refiner with a single-stage hydrocracking unit was unable to remove enough sulfur from their feedstock to produce their desired quality of diesel, they turned to Honeywell UOP for help. After analyzing the feedstock and performing pilot plant tests, Honeywell developed a hydrotreating solution using its HYT-6219 catalyst. Once the hydrotreating catalysts were loaded, the refiner quickly achieved its goal of less than 10 wppm sulfur in its diesel product. The activity and stability of the HYT-6219 hydrotreating catalyst stayed in line with predicted levels and continues to meet processing objectives.



The predicted levels of activity and stability for HYT-6219 were extremely accurate under the refiner's operating conditions.

## Improved Selectivity Without Performance Loss\*

To meet EPA guidelines for sulfur content, refiners are required to reduce sulfur in FCC gasoline to very low levels, which presents a significant drop in octane. Honeywell UOP's HYT-2118, selective desulfurization catalyst, offers higher selectivity than commercially available Non-UOP catalysts. Combined with HYT-2117, Honeywell UOP's selective hydrogenation catalyst, and HYT-2119, Honeywell UOP's mercaptan control catalyst, HYT-2118 provides a comprehensive solution for selective desulfurization for FCC gasoline. More importantly, HYT-2118 helps to preserve additional octane at lower product sulfur levels.



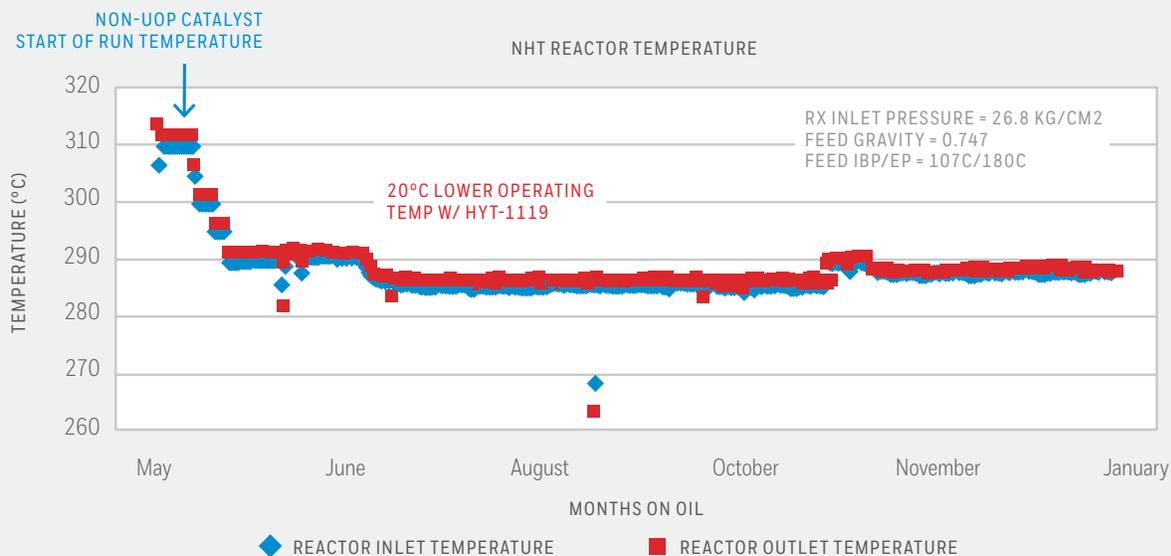
## Upgraded Quality\*

A refiner with a challenging feed of cracked stock and coker material wished to produce ultra-low sulfur diesel, but was unable to achieve the ultra-low sulfur requirements. Working with Honeywell UOP changed that. Using HYT-6219 in the hydrotreating unit helped to dramatically lower sulfur content while also raising cetane levels. The commercial unit now produces high-quality – and highly profitable – diesel fuel.

PRODUCT QUALITY	PREVIOUS CYCLE	AFTER RELOAD WITH HYT-6219
Sulfur, wt-ppm	50 – 150	3 – 8
Cetane Index	46 – 51	48 – 53
Pour Point, °C	-5 to – 18	-13 to < -20
CFPP, °C	-3	- 10
Flash Point, °C	64 – 66	60 – 68

## Operational Savings\*

With utility costs and short cycles eating into the profits, a naphtha refiner asked Honeywell UOP for help. With a switch to highly active HYT-1119, the refiner achieved the needed levels of sulfur and nitrogen removal while dropping the reactor's operating temperature by 20° C. Not only did the refiner cut utility costs through the lower temperature, but they also saved through a much longer cycle.



\*Performance of catalysts and refinery units may vary based on many variables, such as feedstock quality, environmental conditions, system configuration, age of catalysts and others. Results shown cannot be expected in all cases.

# Part Of The Unity Portfolio

Hydrotreating technologies and catalysts are one piece of the complete Honeywell UOP Unity hydroprocessing portfolio.

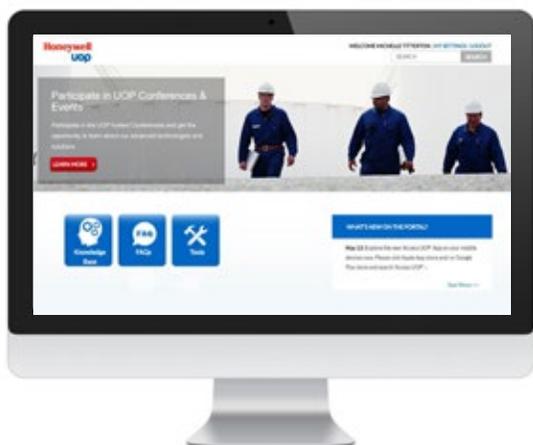
Whether your goal is to meet new stringent product specifications, improve flexibility or meet catalyst cycle length, count on Honeywell UOP for the catalysts, processes, and more needed to help improve unit performance.

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## Customer Portal

The Honeywell UOP portal offers information on products and services pertinent to our customers and partners. The portal also offers site-specific support and tools that will help you manage and operate your Honeywell UOP processes.

Login at **[www.accessuop.com](http://www.accessuop.com)**.



## Learn More

For more information about Honeywell UOP's hydrotreating catalysts, please contact your Honeywell UOP representative or visit **[www.uop.com](http://www.uop.com)**.

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