

A wide-angle photograph of an industrial refinery or petrochemical plant. In the foreground and middle ground, there are complex structures of metal scaffolding, pipes, and platforms. Several tall, cylindrical distillation columns with red and white horizontal bands are prominent. A large crane is visible in the background. The sky is blue with scattered white clouds, and the sun is low on the horizon, creating a bright glow and lens flare. In the far distance, a city skyline is visible.

TRANSFORMER AND WHITE OILS

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WHITE OILS

Features of white oils

- Increased stability
- Chemical and biological inertness
- Low content or complete absence of toxic compounds (heavy metals, polyaromatic compounds, sulfur-containing compounds, etc.)
- Lack of taste and odor
- Resistance to bacterial growth
- Characterized by lower resistance to oxidation

Main producers

Exxon, Shell, Petroyag, R&H, Savita, RAJ, AGPAR, others



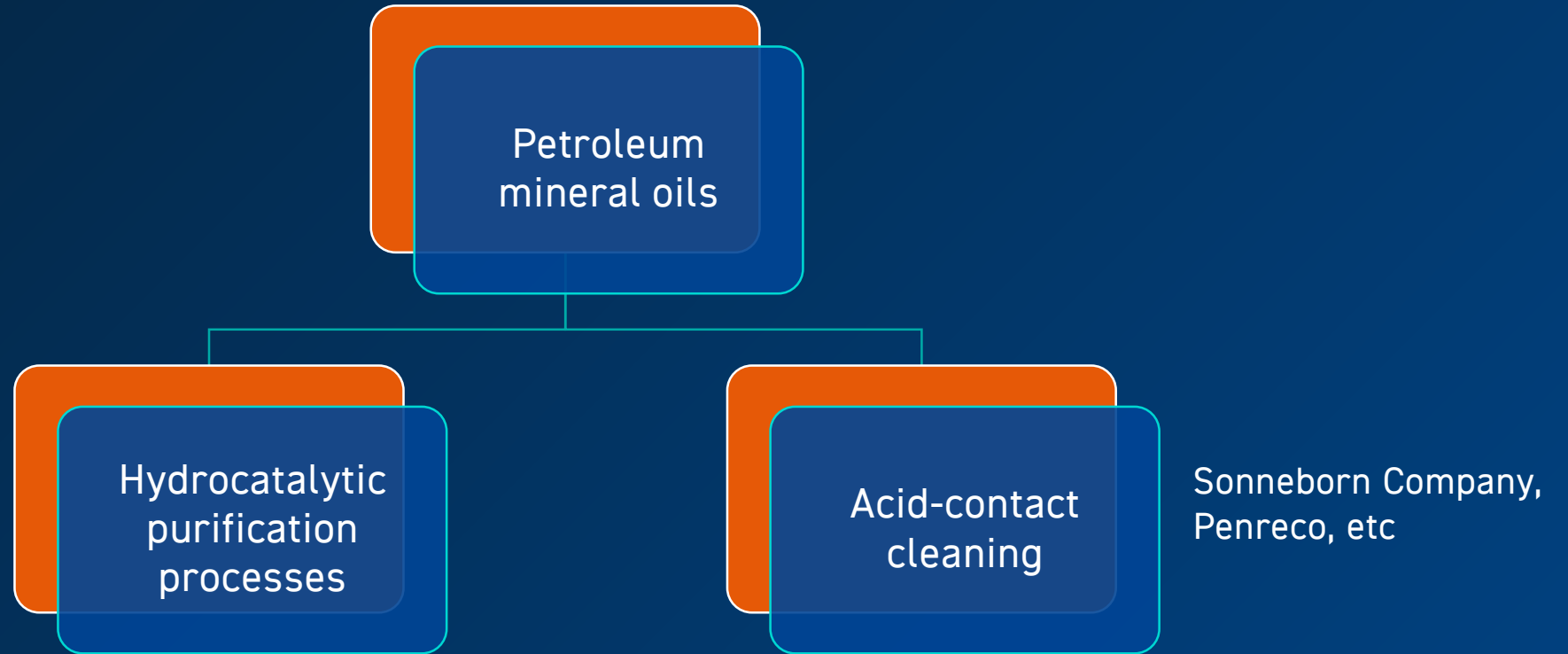
Main consumers (90%)

- Chemical industry
- Perfume and cosmetic industry
- Food industry
- Agricultural industry

WHITE OILS

Ways of white oil production

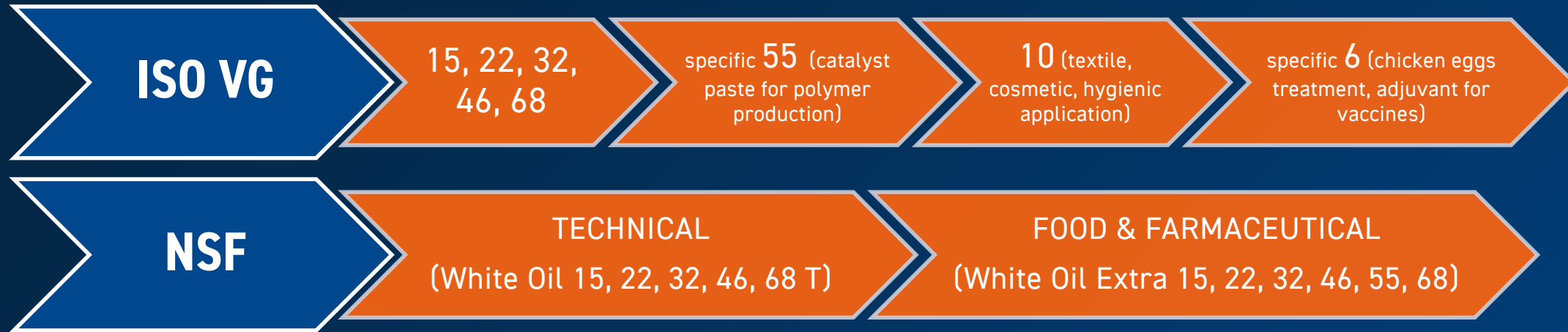
Licensors: Exxon, Chevron (ex. Gulf), IFP, Lyondell (ex. Atlantic Richfield, Duotreat process), BASF
Manufacturers: Exxon, Hansen & Rosenthal, Lyondell-Citgo, Penreco, Petro-Canada, Sonneborn, GPN Lubricants, Lukoil



Process features:

- ✓ Higher product yields
- ✓ High capital costs due to high temperatures and pressures to ensure the hydrogenation process (reactors, catalysts, hydrogen production)
- ✓ Low product yield
- ✓ Hard-to-recycle waste in the form of acid sludge

WHITE OILS CLASSIFICATIONS AND REQUIREMENTS



The standards EAC FM H1 «accident food contact» (NSF H1)

- Saybolt color scale $\geq +20$
- Low content of aromatic hydrocarbons (до 5%)
- Conform to FDA regulation:
 - 21 CFR 178.3620 Mineral oil / Technical white mineral oil
 - 21 CFR 178.3570 White mineral oil, accident food contact

The standards EAC FM 3H «direct food contact» (NSF 3H)

- Saybolt color scale $\geq +30$
- Extra-low content of aromatic hydrocarbons ($< 0,1\%$)
- Readily carbonizable substances - absence
- FDA regulation:
 - 21 CFR 178.878 White mineral oil
 - 21 CFR 172.884 Odorless light petroleum hydrocarbons.
 - 21 CFR 178.3620 Mineral oil
 - 21 CFR 178.3740 for use as a plasticizer in polymeric substances
 - 21 CFR 573.680 for use in animal feed production
 - 40 CFR 180.910 Pesticide Inert ingredient
 - 40 CFR 180.930 Pesticide Inert ingredient
- US Pharmacopoeia/National Formulary USP/EU Pharmacopoeia/ (EP) based on BP/ DAB
- Commission Regulation (EU):
 - No 10/2011 dd 14 Jan 2011 On plastic materials and articles intended to come into contact with food (reference No 95883);
 - No 1935/2004 on materials and articles intended to come into contact with food (in respect of Article 17, Traceability)

WHITE OIL NSF CLASSIFICATION

■ Food-grade oils acc. to NSF International

H1 lubricant	"Food-grade (FG) lubricants" "Food-grade oil" Occasional, technically unavoidable contact with foodstuffs not hazardous
H2 lubricant	Contact with food not permitted. Use only outside of the closed production process.
H3 lubricant	Soluble oils for cleaning or rust protection for machines

✓ 3H direct contact with food

EURASION STANDARDIZATION SYSTEM FOR WHITE OILS

Advantages of the national voluntary certification system "Eurasian Register of Food Lubricants" in comparison with NSF

NSF	EAC FM
USDA 21 CFR 178.3570	USDA 21 CFR 178.3570
USDA 21 CFR 178.3620	USDA 21 CFR 178.3620
GRAS (substances Generally Recognized as Safe)	GRAS (substances Generally Recognized as Safe)
Composition	Composition
Label	Label
—	The standard of the organization
—	SDS
—	Acute oral toxicity test — DL50 per os
—	Expert conclusion



EAC FM 3H

Gazpromneft White Oil
Extra

EAC FM H1

Gazpromneft White Oil T

<https://eac-fm.ru/register/>

PRODUCT RANGE OF WHITE OILS GPN-SM

Technical food grade white oils

Gazpromneft White Oil 68 T

Gazpromneft White Oil 46 T

Gazpromneft White Oil 32 T

Gazpromneft White Oil 22 T

Gazpromneft White Oil 15 T

Performance level:

- Accidental contact with food products
- 21 CFR 178.3570
- Technical white oil
- 21 CFR 178.3620 (b)
- EAC FM H1 registration (NSF analog)
- Low content of aromatic hydrocarbons (up to 5%)
- Saybolt color $\geq$ +20

Food, pharmaceutical and medicinal white oils

Gazpromneft White Oil
Extra 100

Gazpromneft White Oil
Extra 68

Gazpromneft White Oil
Extra 55

Gazpromneft White Oil
Extra 46

Gazpromneft White Oil
Extra 32

Gazpromneft White Oil
Extra 22

Gazpromneft White Oil
Extra 15

Performance level :

- Direct contact with food products
- 21 CFR 172.878
- Food grade oil
- 21 CFR 178.3620 (a)
- Pharmacopoeial standard (USP/European Pharma)
- EAC FM 3H registration (NSF analog)
- Saybolt color $\geq$ +30
- Exceptionally low aromatic hydrocarbon content ($< 0,1\%$)

GAZPROMNEFT WHITE OIL USE EXPERIENCE

PETROCHEMISTRY

Gazpromneft White Oil Extra 100

- a component of the catalyst paste in the production of UPS (impact-resistant polystyrene)

Gazpromneft White Oil Extra 68

- component of the catalyst paste in the production of polystyrene
- plasticizer in the production of polystyrene

Gazpromneft White Oil Extra 32

- plasticizer in the production of TEP (thermoplastics)

Gazpromneft White Oil Extra 15

- solvent in the production of polypropylene

Gazpromneft White Oil 22 T

- solvent production of HDPE

Gazpromneft White Oil 46 T

- as a lubricant for compressors of the 1st stage production of HDPE

Gazpromneft White Oil 68 T

- as an oil for flushing and cooling HDPE hypercompressors

COSMETIC

Gazpromneft White Oil Extra 68

- hair care
- detergent component

Gazpromneft White Oil Extra 46

- component of

Gazpromneft White Oil Extra 32

- component of cosmetics
- detergent component

VARNISHES AND PAINTS

Gazpromneft White Oil Extra 68

- component of innovative polymer compositions

Gazpromneft White Oil 15 T

- paint component