



# PANOLIN<sup>®</sup> BIOFLUID ZFH

A GOLDEN AGE FOR TECHNOLOGY AND THE ENVIRONMENT

**Envirolin**   
Canada **ECO-FRIENDLY**  
LUBRICANT  
DISTRIBUTOR

**PANOLIN<sup>®</sup>**   
Swiss High-Quality Oil

# MISSION IMPOSSIBLE

UTTO (Universal Tractor Transmission Oil) lubricants are amazingly versatile. They lubricate, cool and protect axles and gearboxes from wear, transmit hydraulic forces, prevent wetbrake rattling, and inhibit corrosion throughout the machine. UTTO lubricants have to meet contradictory requirements – quite a challenge

for mineral oil based products, and at first sight impossible for synthetic ester based lubricants that are «too good» for wetbrakes.

But consumers today are not interested in such technical problems: they simply want a biodegradable UTTO lubricant. Biodegradable

hydraulic fluids, gearbox and engine oils are readily available today. So it was high time to meet the needs of the construction and forestry industries – and above all of the agricultural industry that is directly in contact with the food chain – with a non-toxic biodegradable UTTO lubricant.

## IF YOU CAN DREAM IT, YOU CAN DO IT



Inspired by the Silicon Valley motto, ZF and PANOLIN decided to realize this dream of a biodegradable UTTO lubricant meeting such challenging demands. The joint development project 9829 launched by ZF Friedrichshafen AG

and PANOLIN AG Madetswil had to meet all the eco-economy criteria of the PANOLIN bio-lubricants tradition: environment-friendly and cost-effective at the same time.



### TECHNICAL CRITERIA

- Fully synthetic
- Excellent anti-wear properties
- Outstanding resistance to oxidation
- No deposits even at the highest temperatures
- Very low pourpoint
- Suitable for use over a very wide temperature range



### ECOLOGICAL CRITERIA

- Non-toxic
- Rapidly biodegradable
- Resource-conserving



### ECONOMIC CRITERIA

- Long operating life; greater machine productivity
- Significant savings through fewer oil changes
- Lower disposal costs

### TO MEET THESE CRITERIA, THE ZF ENGINEERS ESTABLISHED THE FOLLOWING REQUIREMENTS FOR PROJECT 9829:

|   |             |
|---|-------------|
| Synchronization test                            | ✓ Fulfilled |
| WG 200 3-stage friction coefficient test        | ✓ Fulfilled |
| ZF main wetbrake friction coefficient test      | ✓ Fulfilled |
| ZF sub-wetbrake Eccom friction coefficient test | ✓ Fulfilled |
| ZFN 13022/TE-ML 06, 07, 07C                     | ✓ Approved  |

### ENVIRONMENT-RELATED TESTS ON THE PROJECT 9829 OIL AND ITS COMPONENTS:

|  |             |
|--|-------------|
| OECD 201 algae test                          | ✓ Fulfilled |
| OECD 202 daphnia test                        | ✓ Fulfilled |
| OECD 203 fish hazard                         | ✓ Fulfilled |
| OECD 301 B 28-day biodegradability: 71 – 78% | ✓ Fulfilled |
| VAMIL regulations                            | ✓ Fulfilled |
| Blue Angel RAL UZ 79                         | ✓ Fulfilled |

