Full Composite Solutions for Mobile Hydraulic Applications

WIEFP 2014, Sao Paulo 02. Sept. 2014
 Agenda:

• Introduction
• High Performance Composite Materials
• Application Examples
• Summary
Innovative Composite Solutions for Hydraulics

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• *Introduction*
  
  • *High Performance Composite Materials*
  
  • *Application Examples*
  
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Introduction

Traditional hydraulic components
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Introduction

Potential with high performance plastic solutions

Complex shapes & Integration of function

Weight Savings

Cost savings
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• **High Performance Composite Materials**

• *Application Examples*

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Material aspects

**Metals**
- Known properties
- Nearly no reduction of technical performance under the influence of temperature and time

**Plastics**
- Reduction of technical performance under the influence of temperature and time
- Creeping of the components under temperature and tension
- Chemical resistance (hot oil) dependent on material type

Source: SOLVAY Advanced Polymers – Ixef® brochure
Measures to improve technical properties

- Glass fibres → mechanical strength, temperature resistance, creeping behaviour
- Carbon fibres → mechanical strength, temperature resistance, creeping behaviour, electrical conductivity
- Talcum → Temperature resistance
- Glass balls → Temperature resistance
- Additives → UV-resistance, impact strength etc.

Tensile-elongation diagram of PA
B3S = PA6
B3WGS = PA6 GF 25

Source: BASF Ultramid ® brochure
Benefits of plastic injection molding parts:

- High flexibility regarding geometry
- Integration of functions
- Lightweight design
- Low costs per part
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Full Composite Multifunctional Filter

Technical Data/ Two Filter Sizes

- **Return line filter**
  - Tank top or in-line
  - $Q_{\text{max}1} = 150 \text{ l/min}$  $Q_{\text{max}2} = 350 \text{ l/min}$

- **Return-suction filter**
  - Tank top
  - $Q_{\text{max}1} = 150 \text{ l/min}$  $Q_{\text{max}2} = 350 \text{ l/min}$

- **Suction filter**
  - Tank top or in-line
  - $Q_{\text{max}1} = 50 \text{ l/min}$  $Q_{\text{max}2} = 100 \text{ l/min}$

- Operating pressure $p = 10 \text{ bar}$
- Temperature $T = -30 \text{ to } 110^\circ \text{C}$  (120° C short-term)
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Full Composite Multifunctional Filter

Innovative Tank Sealing Concept

- Molded seal
  - High axial sealing compression
  - Low surface flatness requirements
  - High specific surface pressure
  - 100% sealing guarantee
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Full Composite Multifunctional Filter

Quick Connection System

- No tools needed
- Radially sealing
- 360° rotatable
- Straight und elbow connections available
- Quick connection available for different hose diameters
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Customized Return-Suction Filter
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Customized Return-Suction Filter

Features

- 3 filters in one (fine filter / suction strainer, bypass strainer)
- Perfect fit for the application
- Easy to assemble → no tools required
- Sensor port
- Integrated check valve
- Easy maintenance
- Significant Weight savings
- Significant cost savings
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Customized Return-Suction Filter

Modular suction filter system for tractors with power shift transmission or continuous variable transmission (CVT)
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Customized Return-Suction Filter

Features

- Modular system for 8 different tractor models
- Integrated control valve for lube oil circuit
- Glass fibre fine filter element with integrated bypass strainer
- Quick coupling system
- Integrated sensor ports
- Easy maintenance
- Low weight compared to pervious metal solution
- Overall significat cost savings
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Plastic tank solutions

Tank features:

→ Integrated return line filter with high performance glass fibre filter element
→ Bypass strainer / Filling strainer
→ Breather filter with roll-over protection
→ Oil level gauge
→ Quick connection ports
→ Temperature sensor ports
→ Oil drain plug
→ Integrated oil baffles
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Plastic tank solutions

Tank benefits:

→ Plug & Play solution
→ External return line filter no longer required
→ Convenient filter element service
→ Clean tank module due to injection and infrared welding technology
→ High mechanical and thermal strength
→ Quick connect system: No tools req.
→ Significant cost and weight savings
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Plastic tank solutions

Tank for skid steer loader
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Main Benefits of Composite Solutions

• Cost savings
• Weight savings
• Space savings
• Multifunctional concepts
• Modular designs
• “Integration of functions”
• Easy assembly / quick connections
Thank you very much for your attention!