# HS
## Heater Skids

Designed to achieve target ISO Codes and safely heat hydraulic and lube oils, the HS is a fully self-contained heating and filtration solution ideal for service applications, mass fluid transfers, and preheating systems before they come online.

Completely customizable for hydraulic fluids and high viscosity lubrication oils up to ISO VG 680.

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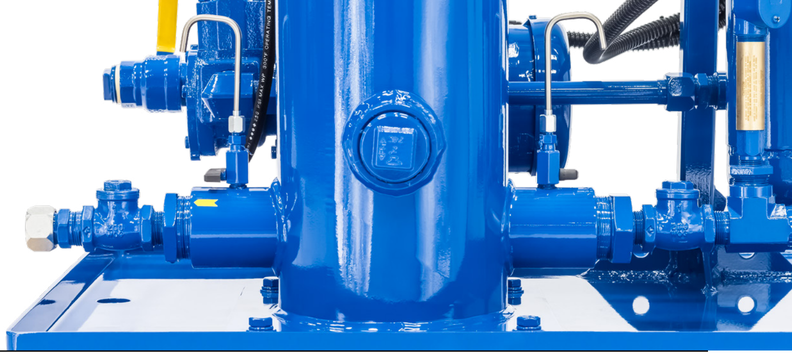
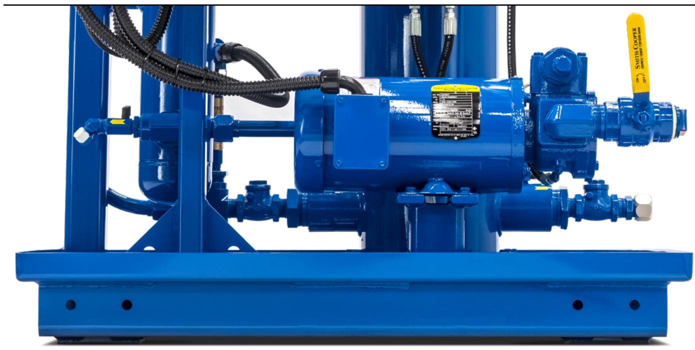
HY-PRO

hyprofiltration.com/

## More than your standard heater skid.

Whether you're performing a high velocity flush or preheating your system before it comes online, knowing your fluids are clean is the first step in extending your system and components' lifespans. HS heater skids come standard with properly positioned sample ports both up and downstream of the filter so you get consistently accurate readings and the knowledge that your system is operating as efficiently as possible.





## Rock solid from the ground up.

Standard carbon steel spill retention pans with fork guides provide a sturdy base to contain everything you need together in a single package. Add the 6" caster option for increased mobility or even select options for CE or CUL markings to meet required safety standards.

## You can't beat the heat.

With no direct contact with the heating element, your fluid will safely and quickly get up to temperature without the risk of burning. The programmable temperature control and integral no-flow switch prevent oil damage and allow you to heat your fluids at your own pace. And what's more: all this comes standard on every HS.


## Take control of your systems.

Smart relay enabled controls make the HS series heater skids easy to operate with just the push of a button. Take it one step further and select the optional PLC touch screen and make accessing real time data as easy as using that smartphone of yours.

## Filtration starts with the filter.

Within the housing on every HS is a powerful tool to help you get the most of your system and protect your critical components from particulate erosion. Media options down to $\beta 3_{[C]} \geq 4000$ on the oversized filter element deliver lower ISO Codes over longer periods of time, letting you clean your new or in use oil to ensure long gear and bearing life.

## Fits like a glove.

Designed and built specifically to meet your system's needs, HS heater skids can be completely customized so you get the powerful heating and filtration you need for that mass fluid transfer along with all the options you want to make the job easier than ever.

# HS Reference Guide

## HS10 model shown

# Filter Sizing Guidelines

## Filter Sizing Guidelines and Viscosity Conversion

Effective filter sizing requires consideration of flow rate, viscosity (operating and cold start), fluid type and degree of filtration. When properly sized, bypass during cold start can be avoided/minimized and optimum element efficiency and life achieved. The filter assembly differential pressure values provided for sizing differ for each media code, and assume 32 cSt (150 SUS) viscosity and 0.86 fluid specific gravity. Use the following steps to calculate clean element assembly pressure drop.

### Calculate ΔP coefficient for actual viscosity

**Using Saybolt Universal Seconds (SUS)**

$$\Delta P\ \text{Coefficient} = \frac{\text{Actual Operating Viscosity}^{1}\ \text{(SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

**Using Centistokes (cSt)**

$$\Delta P\ \text{Coefficient} = \frac{\text{Actual Operating Viscosity}^{1}\ \text{(cSt)}}{32} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

### Calculate actual clean filter assembly ΔP at both operating and cold start viscosity

Actual Assembly Clean ΔP = Flow Rate X ΔP Coefficient (from calculation above) X Assembly ΔP Factor (from sizing table)

### Sizing recommendations to optimize performance and permit future flexibility

- To avoid or minimize bypass during cold start the actual assembly clean ΔP calculation should be repeated for start-up conditions if cold starts are frequent.
- Actual assembly clean ΔP should not exceed 10% of bypass ΔP gauge/indicator set point at normal operating viscosity.
- If suitable assembly size is approaching the upper limit of the recommended flow rate at the desired degree of filtration consider increasing the assembly to the next larger size if a finer degree of filtration might be preferred in the future. This practice allows the future flexibility to enhance fluid cleanliness without compromising clean ΔP or filter element life.
- Once a suitable filter assembly size is determined consider increasing the assembly to the next larger size to optimize filter element life and avoid bypass during cold start.
- When using water glycol or other specified synthetics we recommend increasing the filter assembly by 1~2 sizes.

# HS Filter Sizing Guidelines

## Filter Sizing[1]

Filter assembly clean element ΔP after actual viscosity correction should not exceed 10% of filter assembly bypass setting. See previous page for filter assembly sizing guidelines & examples. For applications with extreme cold start condition contact Hy-Pro for sizing recommendations.

## ΔP Factors[1]

| Length | Units | Media | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **VTM** | **05M** | **1M** | **3M** | **6M** | **10M** | **16M** | **25M** | ****W** |
| 16/18 | psid/gpm | 0.0628 | 0.0473 | 0.0463 | 0.0391 | 0.0303 | 0.0271 | 0.0266 | 0.0256 | 0.0046 |
| | bard/lpm | 0.0011 | 0.0009 | 0.0008 | 0.0007 | 0.0006 | 0.0005 | 0.0005 | 0.0005 | 0.0001 |
| 36/39 | psid/gpm | 0.0440 | 0.0331 | 0.0324 | 0.0273 | 0.0212 | 0.0190 | 0.0186 | 0.0179 | 0.0032 |
| | bard/lpm | 0.0008 | 0.0006 | 0.0006 | 0.0005 | 0.0004 | 0.0003 | 0.0003 | 0.0003 | 0.0001 |

| Length | Units | Media | | | | | |
|---|---|---|---|---|---|---|---|
| | | **1A** | **3A** | **6A** | **10A** | **16A** | **25A** |
| 16/18 | psid/gpm | 0.0514 | 0.0434 | 0.0336 | 0.0302 | 0.0295 | 0.0284 |
| | bard/lpm | 0.0009 | 0.0008 | 0.0006 | 0.0005 | 0.0005 | 0.0005 |
| 36/39 | psid/gpm | 0.0360 | 0.0304 | 0.0235 | 0.0211 | 0.0207 | 0.0199 |
| | bard/lpm | 0.0007 | 0.0006 | 0.0004 | 0.0004 | 0.0004 | 0.0004 |

[1]Max flow rates and ΔP factors assume υ = 150 SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula.

# HS Specifications

| | | | | |
|---|---|---|---|---|
| Dimensions | Consult factory with model number for dimensions and connection sizes. | | | |
| Operating Temperature | **Fluid Temperature**<br>30°F to 225°F<br>(0°C to 105°C) | | **Ambient Temperature**<br>-4°F to 104°F<br>(-20C to 40C) | |
| Materials of Construction | **Housing**<br>Carbon steel with industrial coating | **Tray**<br>Carbon steel with industrial coating | **Plumbing**<br>Carbon steel with industrial coating | **Heater**<br>Aluminum low watt density fin tube |
| Electric Motor | TEFC with overload protection | | | |
| Pump | Cast iron, positive displacement gear pump with internal relief. Maximum pressure on pump inlet 15 psi (1 bar). | | | |
| Pump Relief Setting | 85 psi (5.86 bar) | | | |
| Media Description | **M**<br>G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic & lubrication fluids. $\beta x_{[C]} \geq 4000$ | | **W**<br>Stainless steel wire mesh media $\beta x_{[C]} \geq 2$ ($\beta x \geq 2$) | |

**Replacement Elements**

To determine replacement elements, use corresponding codes from your equipment part number:

| Element Type Code | Filter Element Part Number | Example |
|---|---|---|
| LF7 | HP107L[Length Code] – [Media Selection Code][Seal Code] | HP107L36–25MV |
| LF8 | HP8314L[Length Code] – [Media Selection Code][Seal Code] | HP8314L16–12MB |

| | |
|---|---|
| Fluid Compatibility | Petroleum and mineral based fluids (standard). For specified synthetics contact factory for compatibility with fluorocarbon seal option. For phosphate ester (P9) or skydrol fluid (S9) compatibility select fluid compatibility from special options. |
| Filter Sizing Guidelines | See LF filter sizing guidelines |

# HS Part Number Builder

| HS | | - | | | | | - | | - | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Flow Rate | | Power Option | Element Type | Media Selection | Seals | | Heat Capacity | | Special Options |

## Flow Rate[1]

| | | | |
|---|---|---|---|
| **3** | 3 gpm (11.4 lpm) | **20** | 20 gpm (75.7 lpm) |
| **5** | 5 gpm (18.9 lpm) | **30** | 30 gpm (114 lpm) |
| **10** | 10 gpm (37.9 lpm) | **45** | 45 gpm (170 lpm) |
| **15** | 15 gpm (56.8 lpm) | **60** | 60 gpm (225 lpm) |

## Power Options

| 60 Hz | | 50 Hz | |
|---|---|---|---|
| **E3** | 230 V ac, 1P[2] | **E2** | 220 V ac, 1P[2] |
| **23** | 230 V ac, 3P | **22** | 220 V ac, 3P |
| **46** | 460-480 V ac, 3P | **38** | 380 V ac, 3P |
| **57** | 575 V ac, 3P | **41** | 415 V ac, 3P |

## Element Type

| | |
|---|---|
| **LF7** | LF housing with HP107L36 filter coreless element with integral element 50 psid (3.4 bard) bypass |
| **LF8** | LF housing with HP8314L39 filter coreless element with integral post 50 psid (3.4 bard) bypass |
| **X** | No filter housing |

## Media Selection

| G8 Dualglass | | Stainless wire mesh | |
|---|---|---|---|
| **1M** | $\beta 3_{[C]} \geq 4000$ | **25W** | 25μ nominal |
| **3M** | $\beta 5_{[C]} \geq 4000$ | **40W** | 40μ nominal |
| **6L** | $\beta 7_{[C]} \geq 4000$ | **74W** | 74μ nominal |
| **10M**[3] | $\beta 12_{[C]} \geq 4000$ | **149W** | 149μ nominal |
| **16M** | $\beta 17_{[C]} \geq 4000$ | | |
| **25M** | $\beta 22_{[C]} \geq 4000$ | | |

## Seals

| | |
|---|---|
| **B** | Nitrile (Buna) |
| **V** | Fluorocarbon |

## Heat Capacity

| | | | |
|---|---|---|---|
| **4** | 1 x 4.5 kw heater | **36** | 3 x 12 kw heaters |
| **9** | 1 x 9 kw heater | **48** | 4 x 12 kw heaters |
| **12** | 1 x 12 kw heater | **64** | 4 x 16 kw heaters |
| **24** | 2 x 12 kw heaters | | |

## Special Options

| | | | |
|---|---|---|---|
| **8** | 8" solid steel wheel caster upgrade | **P9**[4] | Phosphate ester fluid compatibility modification |
| **B** | Basket strainer | **S** | 304 stainless steel filter vessels |
| **C** | CE marked for machinery safety directive 2006/42/EC | **S9**[5] | Skydrol fluid compatibility modification |
| **D** | High filter element ΔP indicator light | **T** | Hose kit (suction/return hoses & wands) |
| **J** | Individual heater selector switch | **U** | 50' (13 m) electrical cord (no plug) |
| **M** | Discharge line visual flow meter | **V** | Inlet control valve N/C solenoid |
| **O** | On-board PM-1 particle monitor | **Y** | VFD variable speed motor frequency control |

[1] Nominal flow rates at 60 Hz motor speeds.
[2] Option only available when coupled with 4 kw heater option and 3 or 5 gpm max flow rate unit.
[3] For elements HP8314, use 12M for media code in place of 10M.
[4] When selected, must be paired with Seal option "V." Contact factory for more information or assistance in fluid compatibility.
[5] When selected, must be paired with Seal option "E-WS." Contact factory for more information or assistance in fluid compatibility.

For all up to date option details and compatibilites, please reference our Contamination Solutions Price List or contact customer service.

# Filtration starts with the filter.

**Lower ISO Codes: Lower Total Cost of Ownership** Hy-Pro filter elements deliver lower operating ISO Codes so you know your fluids are always clean, meaning lower total cost of ownership and reducing element consumption, downtime, repairs, and efficiency losses.

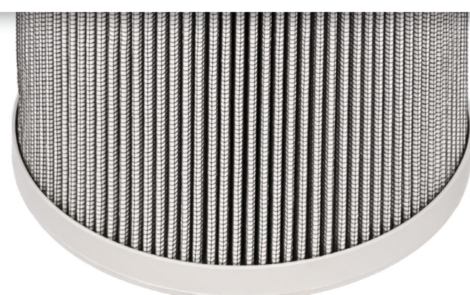
**DFE Rated Filter Elements** DFE is Hy-Pro's proprietary testing process which extends ISO 16889 Multi Pass testing to include real world, dynamic conditions and ensures that our filter elements excel in your most demanding hydraulic and lube applications.

**Upgrade Your Filtration** Keeping fluids clean results in big reliability gains and upgrading to Hy-Pro filter elements is the first step to clean oil and improved efficiency.

**Advanced Media Options** DFE glass media maintaining efficiency to $\beta 3_{[c]} \geq 4000$, Dualglass + water removal media to remove free and emulsified water, stainless wire mesh for coarse filtration applications, and Dynafuzz stainless fiber media for EHC and aerospace applications.

**Delivery in days, not weeks** From a massive inventory of ready-to-ship filter elements to flexible manufacturing processes, Hy-Pro is equipped for incredibly fast response time to ensure you get your filter elements and protect your uptime.

**More than just filtration** Purchasing Hy-Pro filter elements means you not only get the best filters, you also get the unrivaled support, training, knowledge and expertise of the Hy-Pro team working shoulder-to-shoulder with you to eliminate fluid contamination.



**Want to find out more? Get in touch.**
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