

FLUID HEAT TRANSFER SYSTEM

SL SERIES

SPECIFICATIONS

- Electrically operated
- Horizontal centrifugal pump
- 208 thru 575 Volts, 3 phase
- 20 to 360 kW and higher
- Four (4) design temperatures;
550°F, 600°F, 650°F and 750°F
- NEMA 12, 4 or 7



DESCRIPTION

THE SL series of heat transfer systems are designed for closed loop temperature control of high temperature heat transfer fluids. These completely packaged systems are designed for a maximum operating temperature of 550°F (SL550), 600°F (SL600), 650°F (SL650) or 750°F (SL750). SL Series standard components include an electric heater, centrifugal pump, thermal expansion tank, control center, strainer, supply & return valves and connecting piping mounted on a welded steel, drip proof base. Each unit is completely piped and wired and includes foam glass insulation with a metal jacket on the internal piping and heater chamber. A hot functional test is performed before shipment. The SL series is available with a variety of standard and special options. The common options are listed on pages 7 and 8 of this bulletin.

FEATURES

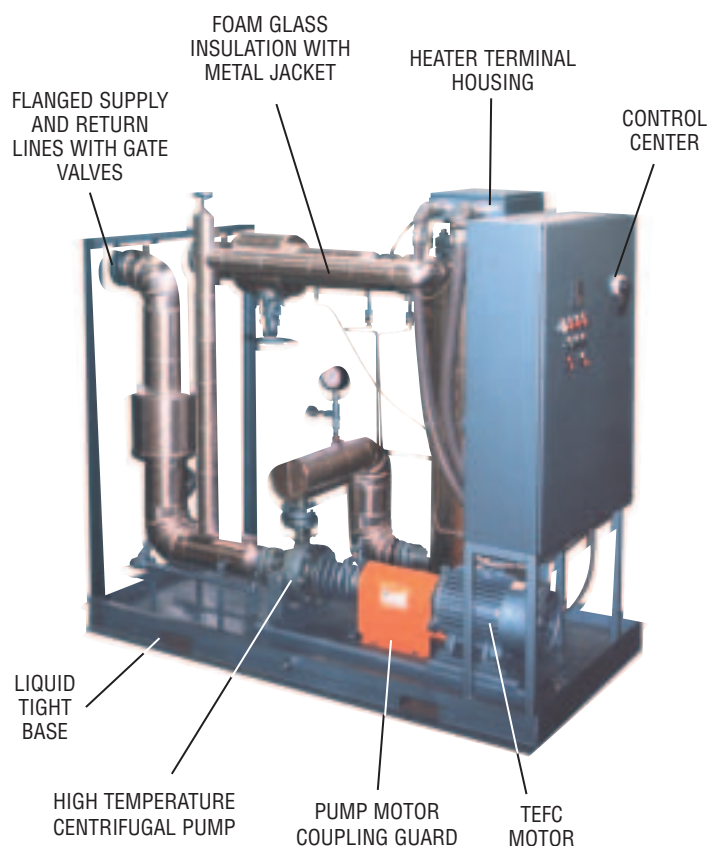
- All welded construction
- Closed cell insulation
- Drip proof base
- PID temperature controller
- High limit device with manual reset
- Expansion tank shipped loose for mounting at the highest point in the piping system
- Isolation gate valves and strainer
- SCR power control on heater circuits
- Hot functional test of system prior to shipment
- Highly customizable



HEAT EXCHANGE AND TRANSFER, INC.

500 Superior Street • Carnegie, PA 15106
Voice: 412-276-3388 • Fax 412-276-3397
E-mail: sales@heat-inc.com • Web: www.heat-inc.com

STANDARD CONSTRUCTION FEATURES



GENERAL

The system is pre-wired and skid mounted on a drip proof base. The sides and top are open for easy access. Each system is filled with fluid*, energized and fully tested at the factory prior to shipment. The customer is invited to the factory to receive operational and maintenance training during the testing of their new equipment. The system is designed for minimum field installation, requiring only process piping and utility connections.

CONTROLS

The control center is designed in accordance with the National Electric Code and includes: PID temperature controller, pre-set high limit device with manual reset, main fused disconnect, contactors, SCR power controllers, motor starter with overloads, individually fused heater and motor circuits, control voltage transformer, power indicating lights, heater selector switch and pump start/stop push buttons, all mounted and wired in a NEMA 12 enclosure.

*NOTE: Fluid can be supplied with the equipment as an option.

SAFETY FEATURES

- **HIGH LIMIT DEVICE**

This controller protects system by shutting down power to the heater circuits in case of excessive temperature. Manual resetting is required. This non-adjustable device is pre-set at the factory.

- **NON WICKING INSULATION**

The heating chamber and piping are insulated with closed cell foam glass insulation which does not absorb heat transfer fluids.

- **THROUGH THE DOOR HANDLE**

Handle interlock between the main fused disconnect and the enclosure door prevents door from being opened when power is on.

- **PUMP TO HEATER INTERLOCK**

Control interlock between the motor starter and heater contactors prevents the heater from being energized when the pump is not operating.

- **CENTRIFUGAL PUMP DESIGN**

The system design pressure is well above the maximum pressure that the pump is capable of delivering.

SL SERIES

The following SL System Table lists the main features and differences between the four (4) design temperatures.

FEATURES	SL550	SL600	SL650	SL750
HEATER				
Maximum Operating Temperature	550°F	600°F	650°F	750°F
Maximum Operating Pressure	150 psig	150 psig	150 psig	150 psig
kW Range	20 to 360+	40 to 360+	40 to 360+	40 to 360+
Watt Density (W/sq in)	20	15	15	11
ASME	Optional	Optional	Optional	Standard
Baffles	Standard	Standard	Standard	Standard
Standard Terminal housing	NEMA 12	Extended NEMA 12	Extended NEMA 12	Extended NEMA 12
Horizontal Orientation	Optional	Optional	Optional	Optional
CENTRIFUGAL PUMP				
Manufacturer	Dean Brothers	Dean Brothers	Dean Brothers	Sundyne/Chempump
Model	RA2000 & 3000	RA3000	R400	HT/NC
Seal	Crane #21	Crane #21	Sealol #609	Sealless
Seal Cooling	Air	Air	Water	Water
Motor Type	TEFC	TEFC	TEFC	TELC
FLUIDS				
Mineral Oil	<550°F	<550°F	<550°F	<550°F
Synthetic Oil	<550°F	<600°F	<650°F	<750°F
Silicone Oil	<550°F	<600°F	Special Design	Special Design
EXPANSION TANK				
Vent to Atmosphere	Standard	Standard	Standard	Not Available
Inert Gas Blanketing	Optional	Optional	Optional	Standard
Sight Glass	Tubular Glass	Tubular Glass	Tubular Glass	Reflex Type
ASME Code	Optional	Optional	Optional	Standard
Relief Valve	Optional	Optional	Optional	Standard
INTER-CONNECTING PIPING				
Connections	150 lb Flanged	300 lb Flanged	300 lb Flanged	300 lb Flanged
Gaskets, Flexitallic Flexicarb	150 lb	300 lb	300 lb	300 lb
Insulation with Aluminum Cover	Foam glass	Foam glass	Foam glass	Foam glass
PROCESS COOLING (Parallel Design)				
Water to Oil Heat Exchanger	Optional	Optional	Optional	Optional
Air to Oil Heat Exchanger	Optional	Optional	Optional	Optional
CONTROLS & INSTRUMENTS				
Skid Mounted Control Box	Standard	Standard	Standard	Optional
Remote Mounted Control Box	Optional	Optional	Optional	Standard
Temperature Indicating Control	Digital PID	Digital PID	Digital PID	Digital PID
High Limit Set at	575°F	625°F	675°F	775°F
Pump Cooling Water Low Flow Alarm	Air Cooled	Air Cooled	Optional	Optional
SCR Power Controller	Standard	Standard	Standard	Standard
Control Box Heating or Cooling	Optional	Optional	Optional	Optional
GENERAL				
Drip Proof Base	Standard	Standard	Standard	Standard
Back Inlet & Outlet Port Location	Standard	Standard	Standard	Standard
Other Inlet & Outlet Port Location	Optional	Optional	Optional	Optional
Dimenso Blue Enamel Paint	Standard	Standard	Standard	Standard
Special Paint	Optional	Optional	Optional	Optional

STANDARD MODELS

kW	BTU/Hr Output	Centrifugal Pump Data			Pipe Connection Size 150# Flange	Expansion Tank		Overall Dimensions (inches)			Approx. Weight (lbs.)	Model Number
		Flow (GPM)	HP	Total Head (feet)†		Size (gal)	Line Size	W	D	H*		
20	68,260	30	5	125	2	30	3/4	36	72	84	1800	SL550-20-R2-483
30	102,390	30	5	125	2	30	3/4	36	72	84	1800	SL550-30-R2-483
40	136,520	40	5	124	2	30	3/4	36	72	84	2000	SL550-40-R2-483
60	204,780	60	5	121	2	30	3/4	36	72	84	2100	SL550-60-R2-483
80	273,040	80	5	117	2	30	3/4	36	72	84	2150	SL550-80-R2-483
100	341,300	100	7.5	115	3	40	1	36	72	84	2300	SL550-100-R2-483
120	409,560	120	7.5	112	3	40	1	36	72	84	2300	SL550-120-R2-483
140	477,820	140	7.5	110	3	40	1	36	72	84	2400	SL550-140-R2-483
160	546,080	160	7.5	105	3	40	1	36	72	84	2400	SL550-160-R2-483
180	614,340	180	7.5	100	3	40	1	36	72	84	2400	SL550-180-R2-483
200	682,600	200	15	160	3	80	1	48	72	84	2800	SL550-200-R3-483
240	819,120	240	15	144	3	80	1	48	72	84	2800	SL550-240-R3-483
280	955,640	240	15	144	3	80	1	48	90	84	3400	SL550-280-R3-483
320	1,092,160	240	15	144	3	80	1	48	90	84	3500	SL550-320-R3-483
360	1,228,680	240	15	144	3	80	1	48	90	84	3500	SL550-360-R3-483

Contact factory for design information on models having ratings above 360kW and other voltages.

* Height dimension does not include expansion tank.

† FT = (PSI x 2.31)/SG

483 is Voltage and Phase code (480 Volt, 3 phase)

HEATER

The SL550 system utilizes 150 lb. design, flanged circulation heater assemblies. The heater is constructed of "U" bend tubular heating elements welded into a flange. The elements have stainless steel sheaths with a heat flux of 20 watts/sq. in. Baffling is incorporated into the heater design to improve fluid velocity and heat transfer. Heater bussing is contained in a NEMA 12 terminal housing. Vertical orientation of the heater chamber reduces floor space requirements and allows for heater removal without draining all of the fluid from the system. HEAT, Inc. flanged heaters carry a limited one year warranty.

PIPING SYSTEM

The SL550 piping system is designed and constructed in accordance with ASME B 31.1 Power Piping Code for high temperature oil piping systems. Piping consists of ASTM A106, Schedule 40 seamless carbon steel pipe with all welded fittings and ANSI 150 class flanged connections. All units include: raised face flanged inlet and outlet ports, supply and return gate valves, return line strainer, fill/drain port, air bleed line and a pump discharge pressure gauge. All hot fluid lines are insulated with closed cell foam glass insulation with an aluminum jacket.

PUMP

The standard SL550 system is equipped with a Dean Brothers centrifugal process pump, RA Series, designed to provide high flow rates at low operating pressures. This pump is designed for pumping heat transfer fluids at temperatures up to 550°F. The pump is equipped with a TEFC motor and an air cooled mechanical seal.

EXPANSION TANK

The SL550 system is equipped with an expansion tank which must be mounted without piping restriction at the highest point in the piping system. The standard carbon steel tank is designed for atmospheric operation and is rated for a maximum blanket pressure of 15 psig. The uninsulated tank comes equipped with a liquid level sight glass, vent line, 2" refill port, and auxiliary porting for an optional inert blanketing system. The tank is piped to the suction side of the pump. Tanks should be sized to be twice the expected fluid volume increase between ambient and operating temperatures.

NOTE: Some heat transfer fluids require the optional ASME design on the expansion tank with a blanketing system.

SL600 & SL650 SERIES

STANDARD MODELS

kW	BTU/Hr Output	Centrifugal Pump Data			Pipe Connection Size 300# Flange	Expansion Tank		Dimensions (inches)			Approx. Weight (lbs.)	SL600 Model Number	SL650 Model Number
		Flow (GPM)	HP	Total Head (feet)†		Size (gal)	Line Size	W	D	H*			
40	136,520	40	5	124	2	40	3/4	48	72	88	2100	SL600-40-R3-483	SL650-40-R4-483
60	204,780	60	5	112	2	40	3/4	48	72	88	2150	SL600-60-R3-483	SL650-60-R4-483
80	273,040	80	5	100	2	40	3/4	48	72	88	2300	SL600-80-R3-483	SL650-80-R4-483
100	341,300	100	10	124	3	80	1	48	72	88	2400	SL600-100-R3-483	SL650-100-R4-483
120	409,560	120	10	123	3	80	1	48	72	88	2400	SL600-120-R3-483	SL650-120-R4-483
140	477,820	140	10	122	3	80	1	48	72	88	2800	SL600-140-R3-483	SL650-140-R4-483
160	546,080	160	10	120	3	80	1	48	72	88	2800	SL600-160-R3-483	SL650-160-R4-483
200	682,600	200	15	160	3	80	1	48	90	88	3400	SL600-200-R3-483	SL650-200-R4-483
240	819,120	240	15	144	3	80	1	48	90	88	3500	SL600-240-R3-483	SL650-240-R4-483
280	955,640	240	15	144	3	80	1	48	90	88	3900	SL600-280-R3-483	SL650-280-R4-483
320	1,092,160	240	15	144	3	80	1	48	90	88	3900	SL600-320-R3-483	SL650-320-R4-483

Contact factory for design information on models above 320kW and other voltages.

* Height dimension does not include expansion tank.

† FT = (PSI x 2.31)/SG

483 is Voltage and Phase code (480 Volt, 3 phase)

HEATER

The SL600 & SL650 systems utilize 300 lb. design, flanged circulation heater assemblies. The heater is constructed of "U" bend tubular heating elements welded into a flange. The elements have stainless steel sheaths with a heat flux of 15 watts/sq. in. Baffling is incorporated into the heater design to improve fluid velocity and heat transfer. Heater bussing is contained in an extended NEMA 12 terminal housing. Vertical orientation of the heater chamber reduces floor space requirements and allows for heater removal without draining all of the fluid from the system. All HEAT, Inc. flanged heaters carry a limited one year warranty.

PIPING SYSTEM

The SL600 & SL650 piping systems are designed and constructed in accordance with ASME B 31.1 Power Piping Code for high temperature oil piping systems. Piping consists of ASTM A106, Schedule 40 seamless carbon steel pipe with all welded fittings and ANSI 300 class flanged connections. All units include: raised face flanged inlet and outlet ports, supply and return gate valves, return line strainer, fill/drain port, air bleed line and a pump discharge pressure gauge. All hot fluid lines are insulated with closed cell foam glass insulation with an aluminum jacket.

PUMP

The standard SL600 and SL650 systems are equipped with a Dean Brothers centrifugal process pump. The SL600 unit uses the 600°F designed RA3000 Series with an air cooled mechanical seal. The SL650 unit has a 650°F designed R400 Series with a water cooled mechanical seal. Both pumps are equipped with a TEFC motor and are designed for pumping heat transfer fluids.

EXPANSION TANK

The SL600 and SL650 systems are equipped with an expansion tank which must be mounted without piping restriction at the highest point in the piping system. The standard carbon steel tank is designed for atmospheric operation and is rated for a maximum blanket pressure of 15 psig. The uninsulated tank comes equipped with a liquid level sight glass, vent line, 2" refill port, and auxiliary porting for an optional inert blanketing system. The tank is piped to the suction side of the pump. Tanks should be sized to be twice the expected fluid volume increase between ambient and operating temperatures.

NOTE: Some heat transfer fluids require the optional ASME design on the expansion tank with a blanketing system.

STANDARD MODELS

kW	BTU/Hr Output	Centrifugal Pump Data			Pipe Connection Size 300# Flange	Expansion Tank		Overall Dimensions (inches)			Approx. Weight (lbs.)	Model Number
		Flow (GPM)	HP	Total Head (feet)†		Size (gal)	Line Size	W	D	H*		
40	136,520	40	7.5	157	2	40	3/4	36	72	88	2100	SL750-40-CM-483
60	204,780	60	7.5	148	2	40	3/4	36	72	88	2200	SL750-60-CM-483
80	273,040	80	7.5	130	2	40	3/4	36	72	88	2300	SL750-80-CM-483
100	341,300	100	15	148	3	40	1	48	72	88	2400	SL750-100-CM-483
120	409,560	120	15	140	3	40	1	48	72	88	2400	SL750-120-CM-483
140	477,820	140	15	140	3	60	1	48	72	88	3000	SL750-140-CM-483
160	546,080	160	20	168	3	60	1	48	72	88	3200	SL750-160-CM-483
200	682,600	200	20	160	3	80	1	48	90	88	3400	SL750-200-CM-483
240	819,120	200	20	160	3	80	1	48	90	88	3500	SL750-240-CM-483
280	955,640	200	20	160	3	80	1	48	90	88	3900	SL750-280-CM-483
320	1,092,160	200	20	160	3	80	1	48	90	88	3900	SL750-320-CM-483
Contact factory for design information on models above 320kW and other voltages.												

* Height dimension does not include expansion tank.

† FT = (PSI x 2.31)/SG

483 is Voltage and Phase code (480 Volt, 3 phase)

HEATER

The SL750 system utilizes 300 lb. design, flanged, ASME designed and stamped circulation heater assemblies. The heater is constructed of "U" bend tubular heating elements welded into a flange. The elements have stainless steel sheaths with a heat flux of 11 watts/sq. in. Baffling is incorporated into the heater design to improve fluid velocity and heat transfer. Heater bussing is contained in an extended NEMA 12 terminal housing. Vertical orientation of the heater chamber reduces floor space requirements and allows for heater removal without draining all of the fluid from the system. All HEAT, Inc. flanged heaters carry a limited one year warranty.

PIPING SYSTEM

The SL750 piping system is designed and constructed in accordance with ASME B 31.1 Power Piping Code for high temperature oil piping systems. Piping consists of ASTM A106, Schedule 40 seamless carbon steel pipe with all welded fittings and ANSI 300 class flanged connections. All units include: raised face flanged inlet and outlet ports, supply and return gate valves, return line strainer, fill/drain port, air bleed line and a pump discharge pressure gauge. All hot fluid lines are insulated with closed cell foam glass insulation with an aluminum jacket.

PUMP

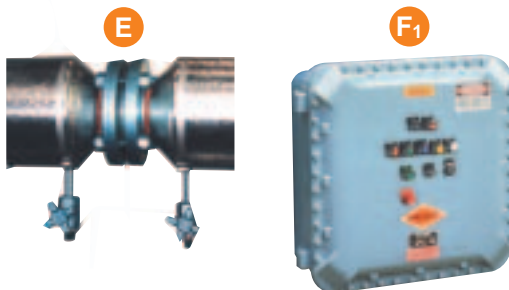
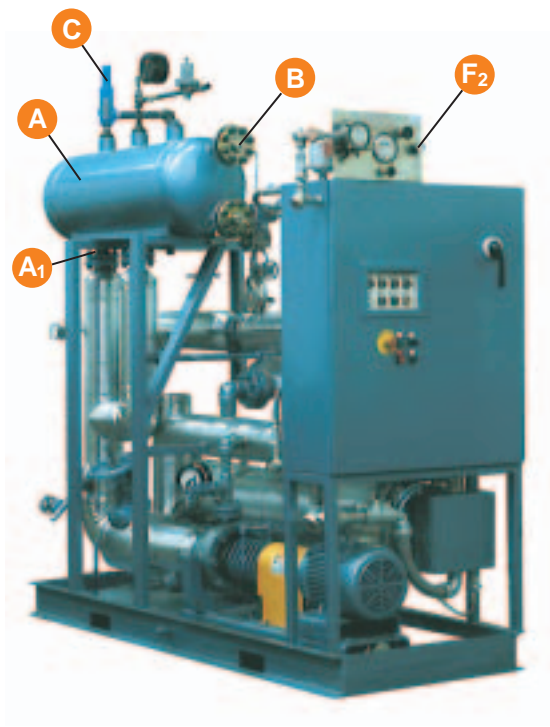
The standard SL750 system is equipped with either a Sundyne (HT Series) or Chempump (NC Series) sealless, canned motor pump designed to provide high flow rates at low operating pressures. This pump is designed for pumping heat transfer fluids at temperatures up to 750°F. The pump is equipped with a TELC motor and requires water cooling to maintain acceptable motor winding temperatures.

EXPANSION TANK

The SL750 system is equipped with an ASME designed and stamped expansion tank which must be mounted without piping restriction at the highest point in the piping system. The standard carbon steel tank is equipped with a nitrogen blanket system and is designed for a maximum blanket pressure of 150 psig. The uninsulated tank comes equipped with a liquid level sight glass, vent line, 2" refill port, and auxiliary porting. The tank is piped to the suction side of the pump. Tanks should be sized to be twice the expected fluid volume increase between ambient and operating temperatures.

NOTE: Startup service is provided with the SL750 Series

OPTIONS AND CUSTOM DESIGNS

**A TOP MOUNTED EXPANSION TANK -**

The tank will be designed to mount on top of the system when remote mounting is undesirable. (A₁) Double drop leg piping allows full process flow through the expansion tank to remove air and low boilers during startup.

B LOW or HIGH LEVEL FLUID ALARM -

A float type level switch is mounted in the expansion tank. The fluid alarm will automatically shut the system down and turn an alarm light "ON" if the expansion tank fluid drops below (low) or rises above (high) the desired level.

C NITROGEN BLANKET - An inert gas blanket on the expansion tank provides NPSH for the pump, limits oxidation of the heat transfer fluid and prevents fluid phase change. This is standard on the SL750 Series.

D LOW or HIGH PRESSURE ALARM - A pressure switch will automatically shut the system down and turns an alarm light "ON" if the system pressure is outside the desired range. (not shown)

E HEAT TRANSFER FLUID LOW FLOW ALARM - A differential pressure switch across an orifice plate flow element automatically shuts down the heater and turns an alarm light "ON" if the heat transfer fluid flow drops below the alarm limit.

F HAZARDOUS AREA DESIGNS - Units are available using a cast NEMA-7 (F₁) enclosure or with an air purge for (F₂) Class I, Division 1 or 2 areas.

G SIDE ENCLOSURES - Removable sheet metal panels are available.

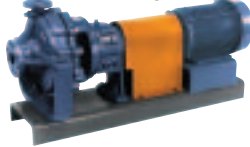
H ASME STAMP - The heating chamber and expansion tank can be stamped in accordance with the ASME Boiler and Pressure Vessel Code.

OPTIONS AND CUSTOM DESIGNS

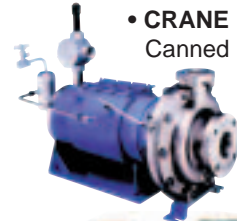


• **VIKING**
Positive Displacement

• **DEAN BROTHERS**
Centrifugal



• **DICKOW**
Magnetic Driven



• **CRANE**
Canned

I PUMP SELECTION - Special pumps are available, including choice of brand and pump type.

*Pump Photos Courtesy
of the manufacturer*

• **SUNDYNE**
Canned



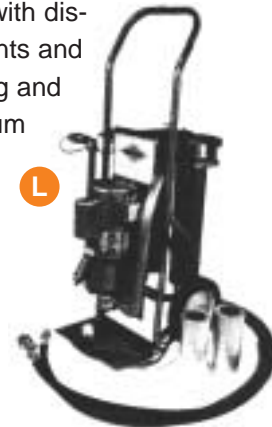
J COOLING - Cooling is available as an option on SL systems using shell and tube heat exchanger and an on/off three way diverting valve. This design can be modified for proportional cooling if required.

K CUSTOM DESIGNS - The SL Series can be custom designed for your special application.

L MODEL PFS-1 PORTABLE PUMPING AND FILTERING OIL SYSTEM - This is a compact portable unit and is equipped with disposable elements to remove contaminants and water from oil. This unit is great for filling and draining heat transfer systems. (Maximum fluid temperature is 200°F.) Request Bulletin SO-1.



M HEAT TRANSFER FLUIDS
Heat Exchange And Transfer, Inc. is a distributor for most heat transfer fluid manufacturers.



N STARTUP SUPERVISION - This service is optional on the SL550, SL600 and SL650 systems and is provided with the SL750 system. Request Service Sheet GSP for policy and rates.

APPLICATIONS

Represented by:

- REACTORS • ROLLS • EXTRUDERS
- KETTLES • MOLDS • LINE TRACING
- DRYERS • DIES • EXCHANGERS
- PLATENS • TANKS • PRESSES