

TSL

CLASS A CHILLERS AND HEAT PUMPS

AIR CONDENSED WITH SCROLL COMPRESSORS



TSL CS (Chilling Only)	294	324	374	404	454	496	556	596	636	676	748	808	868	900		
Cooling capacity @16/10°C; 35°C outside air	kW	306.9	354.2	396.2	431.8	494.7	529.0	597.6	649.9	687.4	727.4	808.9	856.2	943.1	986.0	
Total absorbed power	kW	90.0	106.5	118.7	129.7	149.1	156.1	179.8	196.7	204.9	219.2	232.6	254.3	266.9	297.4	
EER (UNI 14511)		3.41	3.33	3.34	3.33	3.32	3.39	3.32	3.30	3.35	3.32	3.48	3.37	3.53	3.32	
ESEER		4.63	4.76	4.56	4.60	4.75	4.66	4.78	4.85	4.72	4.82	4.63	4.58	4.72	4.45	
Sound power (Standard Model)	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94	
Sound power (Low Noise Set-up)	db(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91	
Sound power (Super Low Noise Set-up)	db(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89	
Dimensions (L x D x H) *	mm	3520 x 2256 x 2652			4520 x 2256 x 2652			5520 x 2256 x 2652			6515 x 2256 x 2652		7515 x 2256 x 2652		8515 x 2256 x 2652	

TSL HS (Heat Pump)	294	324	374	404	454	496	556	596	636	676	748	808	868	900		
Cooling capacity @16/10°C; 35°C outside air	kW	306.9	354.2	396.2	431.8	494.7	529.0	597.6	651.8	687.5	727.1	816.4	866.2	930.5	1015.0	
Total absorbed power	kW	90.0	106.5	118.7	129.7	149.1	156.1	179.8	197.0	205.1	219.6	232.1	253.3	272.5	289.9	
EER (UNI 14511)		3.41	3.33	3.34	3.33	3.32	3.39	3.32	3.31	3.35	3.31	3.52	3.42	3.42	3.50	
ESEER		4.63	4.76	4.56	4.60	4.75	4.66	4.78	4.85	4.74	4.84	4.56	4.53	4.61	4.41	
Sound power (Standard Model)	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	95	
Sound power (Low Noise Set-up)	db(A)	86	87	87	87	89	87	88	87	89	89	90	89	90	91	
Sound power (Super Low Noise Set-up)	db(A)	84	85	85	85	87	85	86	85	87	87	88	87	88	89	
Dimensions (L x D x H) *	mm	3520 x 2256 x 2652			4520 x 2256 x 2652			5520 x 2256 x 2652			7085 x 2256 x 2652		9085 x 2256 x 2652		11085 x 2256 x 2652	
Thermal power @40/45°C; 7°C outside air	kW	292.0	336.4	390.8	413.5	462.4	504.6	566.4	603.9	648.5	685.5	772.8	839.2	876.0	975.4	
Total absorbed power	kW	91.3	105.0	122.2	129.2	144.4	156.9	177.2	188.3	202.9	214.2	242.0	262.8	273.5	304.7	
COP (UNI 14511)		3.20	3.20	3.20	3.20	3.20	3.22	3.20	3.21	3.20	3.20	3.19	3.19	3.20	3.20	
SCOP		3.94	4.05	4.01	4.03	4.15	3.80	3.93	3.96	3.94	4.03	3.77	3.82	3.87	3.61	

TSL FS (Free Cooling)	294	324	374	404	454	496	556	596	636	676	748	808	868	900		
Cooling capacity @16/10°C; 35°C outside air **	kW	302.3	345.6	385.4	417.3	466.3	521.3	592.2	636.8	676.9	714.4	795.1	868.9	928.3	999.0	
Total absorbed power	kW	91.3	108.0	119.8	130.9	151.1	158.3	182.5	199.9	207.3	222.2	235.8	258.1	270.3	301.5	
EER (UNI 14511)		3.31	3.20	3.22	3.19	3.09	3.29	3.24	3.19	3.27	3.22	3.37	3.36	3.43	3.31	
Total Free-Cooling Temperature	°C	-7.8	-9.9	-4.8	-5.8	-7.2	-4.3	-6.5	-7.7	-5.2	-6.1	-5.1	-6.7	-5.2	-6.6	
ESEER		4.58	4.66	4.48	4.48	4.53	4.65	4.79	4.81	4.75	4.85	4.59	4.67	4.69	4.59	
Sound power (Standard Model)	db(A)	89	90	90	90	92	91	92	91	93	93	93	93	94	94	
Sound power (Low Noise Set-up)	db(A)	86	87	87	87	89	87	89	88	90	90	90	90	91	91	
Sound power (Super Low Noise Set-up)	db(A)	83	85	85	85	86	85	87	86	87	88	88	87	88	89	
Dimensions (L x D x H) *	mm	3520 x 2256 x 2652			4520 x 2256 x 2652			5520 x 2256 x 2652			6515 x 2256 x 2652		7515 x 2256 x 2652		8515 x 2256 x 2652	

*Preliminary
Ethylene glycol
Also available with 60 Hz power supply
Data declared with use of R410A refrigerant

ITALIAN
COOLING
SOLUTIONS

HiRef

CLASS A CHILLERS AND HEAT PUMPS

AIR CONDENSED WITH SCROLL COMPRESSORS

TSL



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307 - 986 kW



TSL

CLASS A CHILLERS AND HEAT PUMPS

AIR CONDENSED WITH SCROLL COMPRESSORS



R410A
GWP = 2088 (AR4)

R454B
GWP = 466 (AR4)



AVAILABLE WITH TRADITIONAL R410A REFRIGERANT

AVAILABLE IN A2L READY VERSION

Supplied with R410A, the unit is configured and equipped with all the safety devices necessary for use with a mildly flammable refrigerant (class ASHRAE A2L). This allows the old generation refrigerant to be subsequently replaced with the new class A2, low environmental impact R454B (**GWP -78%**), so as to be able to manage system adjustment to the F-GAS Directive on the use of high GWP substances within the required timeframe.

AVAILABLE WITH R454B REFRIGERANT CHARGE (A2L)

HiRef, in compliance with the European "F-Gas" standard which applies gradual but increasingly stringent restrictions to the use of HFC refrigerant gases (79% reduction of tonnes of equivalent CO₂ by 2030), encourages the development and use of new **ultra-low GWP refrigerants**, more environment-friendly than traditional gases. At HiRef, we care about sustainability and we believe that this class of refrigerants is the solution that best preserves long-term investments as a perfect combination of value, safety (they are only slightly flammable) and eco-compatibility.

SYSTEM SAFETY PRECAUTIONS AND MEASURES

A2L class refrigerants are slightly flammable and therefore require certain precautions in the air conditioning system to avoid the risk of igniting fires by preventing, through an adequate design, leaks of refrigerant which could evolve into possible fire risks. The main safety measures suggested by HiRef include the installation of a refrigerant presence sensor and a ventilation kit, controlled by an alarm detection and management system.

REFRIGERANT PRESENCE SENSOR

A sensor is installed inside each independent section of the control panel and inside each separate compartment that contains one or more compressors to detect any gas leaks.

ALARM CONTROL AND MANAGEMENT SYSTEM

A centralised control system constantly monitors the values detected by the sensors and pressure switches. Deviations from the safety levels are signalled as warnings if they fall within a first safety threshold (low alarm level). If the second safety threshold is also exceeded, the alarm is classified as "severe" and the control system sends a shutdown command to the components of the refrigeration circuit.

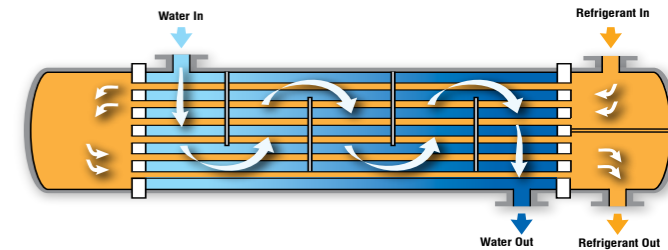
VENTILATION SYSTEM

A ventilation system and a pressure switch are installed in the control panel compartment, to ensure that the compartment remains under constant overpressure conditions thanks to air intake from outside the machine.

The new **TSL** range chillers and heat pumps are air/water units in energy class A for both cooling and heating, available for use with R410A refrigerant or, in the "A2L" version, with low environmental impact R454B refrigerant. The new **TSL** range is designed to manage the conditioning of industrial plants and thermal loads in technological applications, where 24/7 reliability under all working conditions, one of the assets of these units, is a critically important requirement. The **TSL** range uses latest generation scroll compressors, tube bundle water heat exchangers optimised for use with high pressure refrigerants (R410A/R454B) and axial fans suitable for outdoor installation.

RELIABILITY: TUBE BUNDLE

The use of tube bundle exchangers with exchange water flow on the shell side implies a lower risk of blocking the flow due to exchanger clogging compared to units with plate heat exchangers. This is thanks to the larger through-sections, the exchanged power being the same. Additionally, the dual-pass heat exchanger allows high heat exchange efficiency both in "chiller" and in "heat pump" modes, permitting lower consumption for the user.



MAXIMUM ENERGY EFFICIENCY

The units of the **TSL** range fall within the energy efficiency class A, on both the chilling only version and the heat pump version. This is thanks to a careful selection of internal components, which also includes the adoption of innovative high efficiency scroll compressors with direct start, permanent magnet motor technology. Adopting permanent magnet technology reduces the efficiency loss caused by induced currents and motor overheating, resulting in overall energy savings.



MAXIMUM EFFICIENCY WITH PARTIAL LOADS

The high modulation range guaranteed by the multi-scroll technology used on **TSL** units allows cooling/heating requirements to be met at any time, minimising energy waste and thus increasing seasonal efficiency. The high degree of partial load operation (up to 11% of the rated power), combined with water flow rate modulation (up to 20% of the nominal flow) allows operating costs and system maintenance costs to be reduced.



ESEER UP TO 4.85

- » 3 Different soundproofing set-ups available:
 - Standard, Low Noise and Super Low Noise
- » Electric control panel with IP55 protection rating
- » Class A units in both **chiller** and **heat pump** modes
- » Optional EC motor fans
- » Electrically controlled expansion valve
- » Easy accessibility thanks to the optimization of the internal space
- » Programmable microprocessor control with proprietary software
- » Compliance with ERP regulations

