



The Carrier Marine group provides specialized heating, ventilation and air conditioning (HVAC) systems and services for shipbuilders, ship owners and operators worldwide. With offices and service engineers based around the world, the Carrier Marine team leverages its design expertise, energy auditing, retro commissioning, and maintenance to meet the particular needs of marine customers.

Carrier Marine is part of UTC Building & Industrial Systems, the world's largest provider of building technologies. The group offers a comprehensive range of elevator, escalator, fire safety, security, controls & automation, and HVAC solutions and services to the Marine industry through trusted brands including: Autronica, Carrier, Marioff, and Otis.

ENGINEERING EVALUATION OF NON CERTIFIED SPARE PARTS

A. Types of Inspection

- Visual Inspection Analysis – with 10x magnification (quality of construction)
- Engineering Inspection (dimensions + missing part)
- Metallurgical Analysis



a Carlyle Engineering evaluation

B. 5F/5H Counterfeit Components Analysis

Part Name	Part Number	Checks Performed				Issues / Drawing Discrepancies
		Engrg	Dim'l	Met'l	Reject	
Crankshaft Cleaned / Parco	5H40-1924	X			X	No Parco on shaft
Crankshaft Casting	5H40-1914		X	X	X	Wrong casting PN marked on shaft (for 5H46), material not correct grade of ductile iron
Crankshaft Machining	5H40-1524		X		X	Counterweight angle off (balance)
Valve Plate Machining	5H40-1103		X		X	Dowel locations & spring pocket depths off, poor performance & reliability concerns (valve and possible spring)
Suction Valve	5H40-1142		X		X	Wrong thickness, ID, OD and TP, inner edge material defect, poor performance & reliability, requires durability testing
Suction Valve Spring	5H40-1791		X		X	Ends not square, end grinding overheated the parts, poor reliability, requires durability testing
Discharge Valve Guide Machining	5H40-1553		X		X	Dowel locations & spring pocket depths off, poor performance & reliability concerns (valve possible spring)
Discharge Valve	5H40-1132		X		X	Wrong thickness, ID and TP, outer edge material defect, poor performance & reliability, requires durability testing
Discharge Valve Spring	5H40-7322		X		X	Ends not square, end grinding overheated the parts, poor reliability, requires durability testing
Discharge Valve Inner seat	5H40-1191		X	X	X	Valve seat much smaller than design, possible impact failure
Oil Pump Assembly	5H40-B343	X			X	Parts catch and aren't smooth due to stop on pin
Oil Pump Idler	5H40-6542		X	X	X	ID is 0.028" oversized, will appear prematurely & bind up
Oil Pump Rotor	5H40-6552		X	X	X	OD & Gear ID off, Excessive leakage and possible binding
Oil Pump Cover Assembly	5H40-532		X		X	Pin is 0.0008" undersized, will wear prematurely & bind up
Seal Cover Plate	5H40-2433		X	X	X	Hardness way low, location dia, small and ID small, scratches on seal surface, will cause leakage

**B. 5F/5H Counterfeit Components Analysis**

Part Name	Part Number	Checks Performed				Issues / Drawing Discrepancies
		Engrg	Dim'l	Met'l	Reject	
Connecting Rod Machining / Assembly	5H40-103		X		X	Crankbore undersized 0.0006"
Connecting Rod Casting	5H40-1904		X	X	X	Casting dimensions small (weak, balance off)
Connecting Rod Bolt	5H40-1041		X	X	X	No grade markings, Hardness low (low strength)
Piston Machining	5H40-1023		X		X	has black coating, Many dimension off, excessive CV and possible interference
Shaft Seal Spring & Bellows Assembly	5H40-B293		X		X	Dimensions off, will likely wear prematurely
Shaft Seal Rotor	5H40-B303		X		X	Dimension off, will likely leak refrigerant
Valve Plate Gasket	5H40-1083	X	X		X	Many dimension off, added CV and may trap a valve
Unloader Cylinder Top Gasket	5H40-1701	X	X		X	Bolt circle off 0.06", notch narrow and off location

C. Why to Choose Certified parts

- Exact Fit
- Warranty
- Avoid low efficiencies
- Avoid sudden breakdowns
- Ensure trouble free operation in any case

In the end:

A certified Part costs less than an imitation part

D. Conclusion

The parts shown above in the counterfeit component analysis are determined to be rejects and unacceptable for use in Carlyle compressors.

Use of any other knock-off / counterfeit parts could lead to malfunctions and will void the Carlyle warranty.

For more informations please contact TOTALINE at +30 210 6796 470



18, Kifissou Ave. 104 42 Athens - Greece
Tel: +30 210 67 96 470
Fax: +30 210 67 96 396



AHI CARRIER SOUTH EASTERN EUROPE S.A.