



**COMPRESSOR RESTAGING  
FOR MAXIMUM PERFORMANCE AND PROFIT**

**Solar<sup>®</sup> Turbines**  
*A Caterpillar Company*

# RESTAGE YOUR COMPRESSOR BOOST YOUR PROFITS

If you're looking for a way to increase gas compression profitability, you may find it in your own equipment. Even if your Solar® compressors are relatively new, you could benefit from restaging. Restaging your existing gas compressors is an easy way to improve performance and bring a significant return on investment.

## FLOW RANGE, EFFICIENCY, FUEL ECONOMY

Why restage compressors? Over time, normal usage and change in operating conditions – gas flow, pressures, temperature and gas composition – can affect your equipment's productivity or range of operation. Restaging restores your compressors to optimum performance.

The benefits include:

- Extension of system life
- Greater efficiency for reduced fuel costs and increased gas production
- Increased flow range and flexibility

## RENEWING PERFORMANCE

You can restage at any time during the life of your compression system. Restaging during a compressor overhaul minimizes equipment downtime. The restaging process changes the gas flow and head characteristics to optimize efficiency around a new set of operating conditions. It is a highly cost-effective way to get the most from your compression system. You can achieve even greater performance gains by also uprating the gas turbine driver.

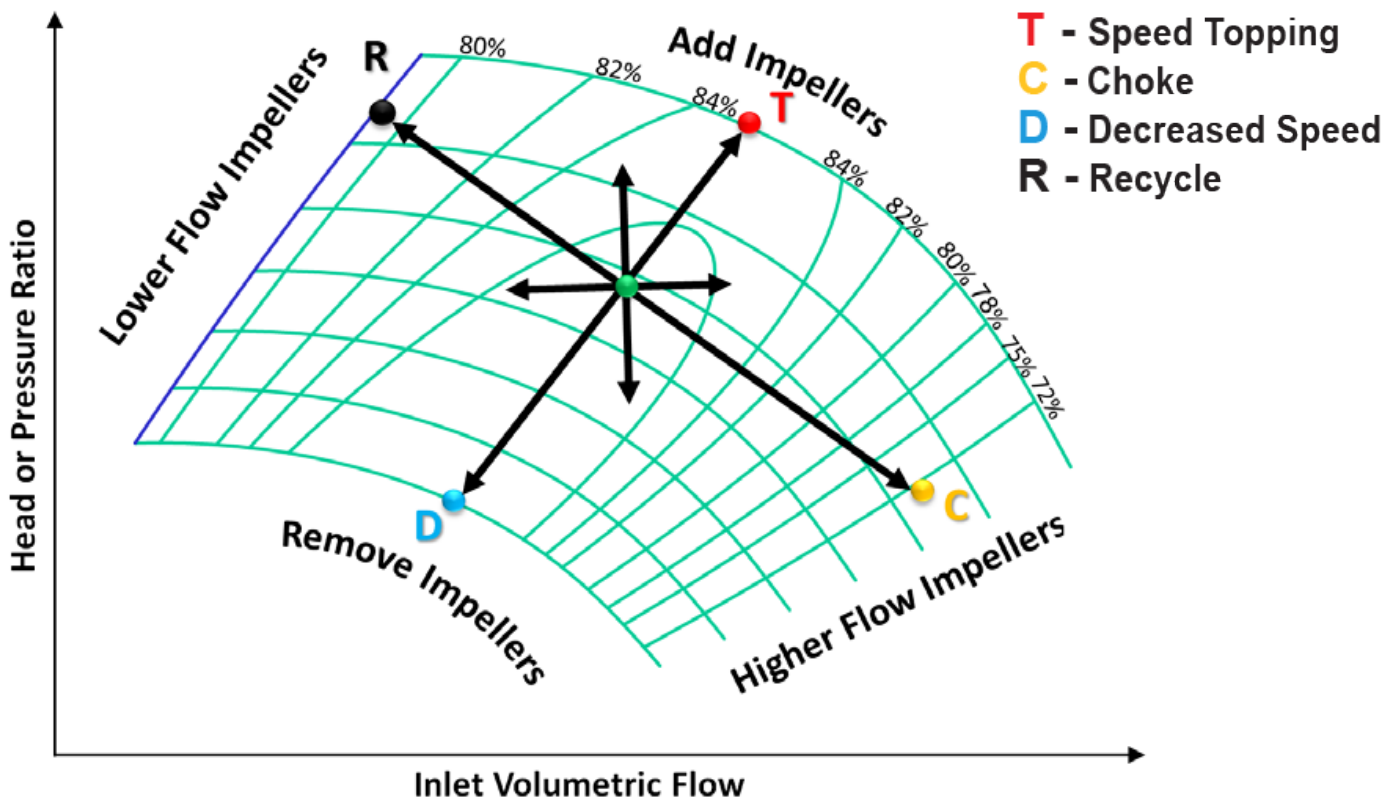


# KNOWING WHEN TO RESTAGE

In the oil and gas industry, gas compressors are subject to continually changing conditions. At Solar, we assess your compressor's behavior and determine the optimal aero or rotor dynamic configuration needed, while minimizing your potential downtime. Here are a few guidelines to know when to restage:

- If you are speed topped, add impellers
- If you are running at reduced speed, remove impellers
- If you are running close to recycle, install lower flow impellers
- If you are running in choked flow, install higher flow impellers

We consider the ability to restage a compressor to adjust for changing operating conditions one of the most customer-oriented features of our technology!



# SEE HOW RESTAGING PAYS YOU BACK

A compressor restage brings you immediate benefits in efficiency and performance. Consider these examples:

GAS TRANSMISSION		Objective: Increased Flow
<b>Current operating conditions:</b> <ul style="list-style-type: none"><li>• P1 = 565 psia (3895 kPa)</li><li>• P2 = 815 psia (5620 kPa)</li><li>• Standard flow = <b>275 mmscfd (307,175 Nm /hr)</b></li><li>• Isentropic efficiency = <b>74%</b></li></ul>	<b>Increased Efficiency</b>	<b>Restaged operating conditions:</b> <ul style="list-style-type: none"><li>• P1 = 565 psia (3895 kPa)</li><li>• P2 = 815 psia (5620 kPa)</li><li>• Standard flow = <b>325 mmscfd (363,025 Nm /hr)</b></li><li>• Isentropic efficiency = <b>84%</b></li></ul>
<b>Result: Increased efficiency from 74% to 84%; 18% decrease in turbine fuel cost    Payback: 3 months</b>		

GAS INJECTION		Objective: Increased Discharged Pressure
<b>Current operating conditions:</b> <ul style="list-style-type: none"><li>• P1 = 415 psia (2860 kPa)</li><li>• P2 = <b>920 psia (6343 kPa)</b></li><li>• Standard flow = <b>136 mmscfd (151,912 Nm /hr)</b></li><li>• Isentropic efficiency = 81%</li></ul>	<b>Increased Production</b>	<b>Restaged operating conditions:</b> <ul style="list-style-type: none"><li>• P1 = 415 psia (2860 kPa)</li><li>• P2 = <b>1200 psia (8274 kPa)</b></li><li>• Standard flow = <b>98 mmscfd (109,466 Nm /hr)</b></li><li>• Isentropic efficiency = 81%</li></ul>
<b>Result: 280 psi discharge pressure; increased oil production revenue significantly</b>		

GAS GATHERING		Objective: Decreased Suction Pressure
<b>Current operating conditions:</b> <ul style="list-style-type: none"><li>• P1 = <b>350 psia (2413 kPa)</b></li><li>• P2 = 815 psia (5620 kPa)</li><li>• Standard flow = <b>120 mmscfd (184,040 Nm /hr)</b></li><li>• Isentropic efficiency = 82%</li></ul>	<b>Extended Field Life</b>	<b>Restage operating conditions:</b> <ul style="list-style-type: none"><li>• P1 = <b>230 psia (1586 kPa)</b></li><li>• P2 = 815 psia (5620 kPa)</li><li>• Standard flow = <b>80 mmscfd (89,360 Nm /hr)</b></li><li>• Isentropic efficiency = 82%</li></ul>
<b>Result: Met a 120 psi drop in suction pressure; significantly extended field life</b>		

## Let Us Calculate Your Benefits

Solar Turbines offers a FREE evaluation that quantifies the return you can expect from compressor restaging.

# GET THE BEST RETURN WORK WITH SOLAR TURBINES

You deserve the greatest payback from your compressor restaging project. Solar Turbines will restage your compressors with the goal to give you the highest long-term performance and return on investment.

Our global population of gas compressors exceeds 6,500. Restaging and overhaul are part of our core expertise – we have restaged more than 2,700 units. Because we designed and manufactured your equipment, we understand it down to the smallest detail. We complete all work to exacting original equipment standards to ensure that your compressors will operate like new.

We can perform the restage on-site or at one of our strategically located facilities around the world. To minimize your downtime we can furnish exchange compressor assemblies, shortening project cycle time significantly. As part of the restage, Solar also provides the necessary changes to the compressor surge control system.

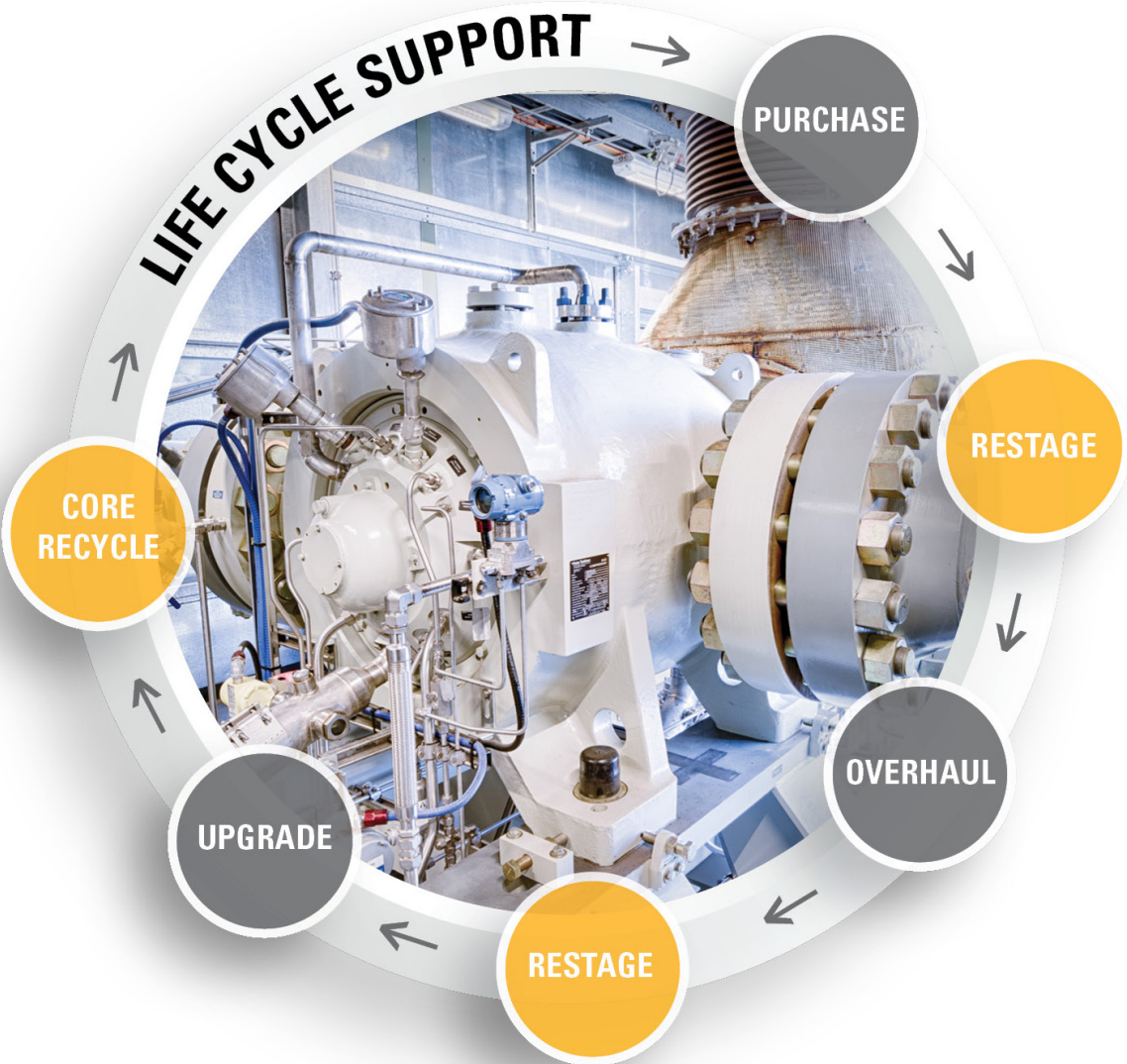
**OUR PROMISE IS SIMPLE: A QUALITY JOB, IN THE SHORTEST TIME PRACTICAL, WITH A HIGHLY ATTRACTIVE RETURN ON YOUR INVESTMENT.**



# DON'T DELAY GET YOUR PROFITS FLOWING

## GAS COMPRESSOR RESTAGE

Every day you operate at peak efficiency puts more money in your pocket. Solar Turbines can complete your restaging quickly and with minimal impact on your daily operations. The first step is a **free compressor evaluation**. Experts from Solar Turbines will perform an analysis of your current and future operating conditions you wish to evaluate. If the analysis points to restaging, we'll give you a budget proposal that includes your equipment's new performance capability and a financial analysis, including net present value and the payback period you can expect.



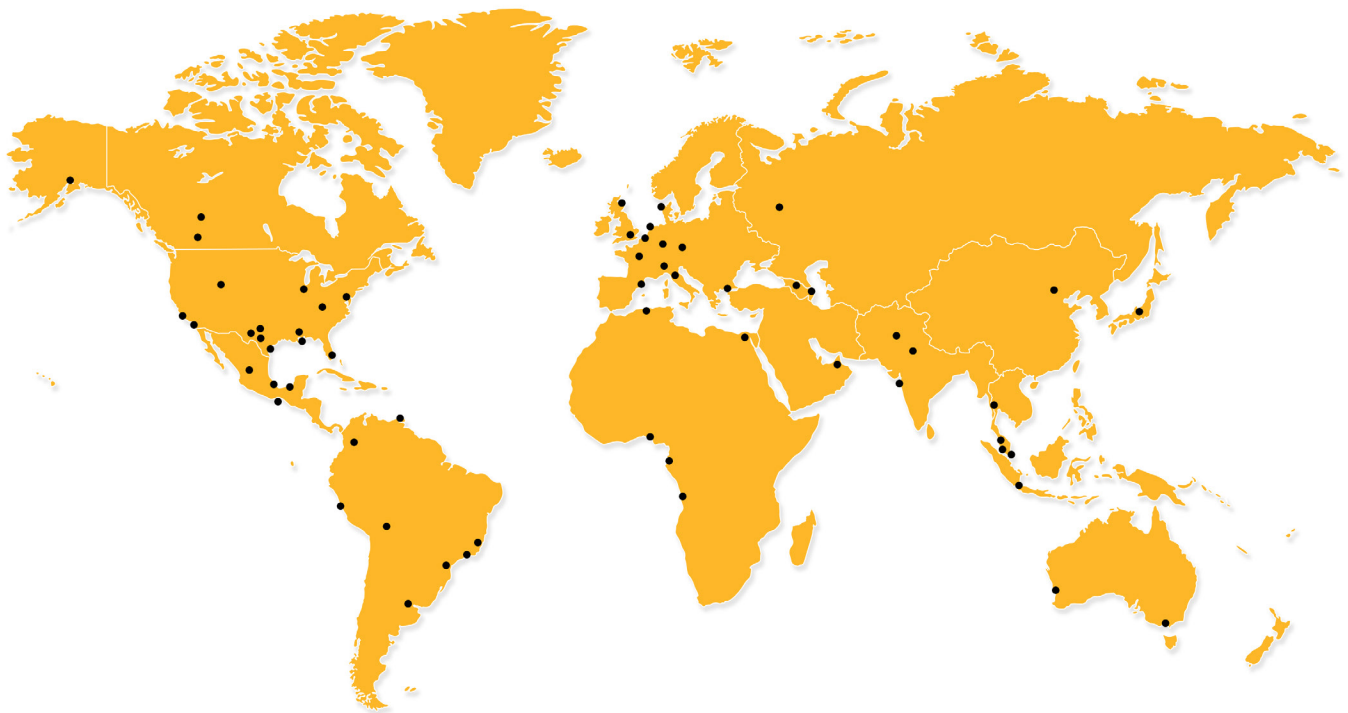


# COMPRESSOR RESTAGING SERVICE THAT POWERS YOUR FUTURE

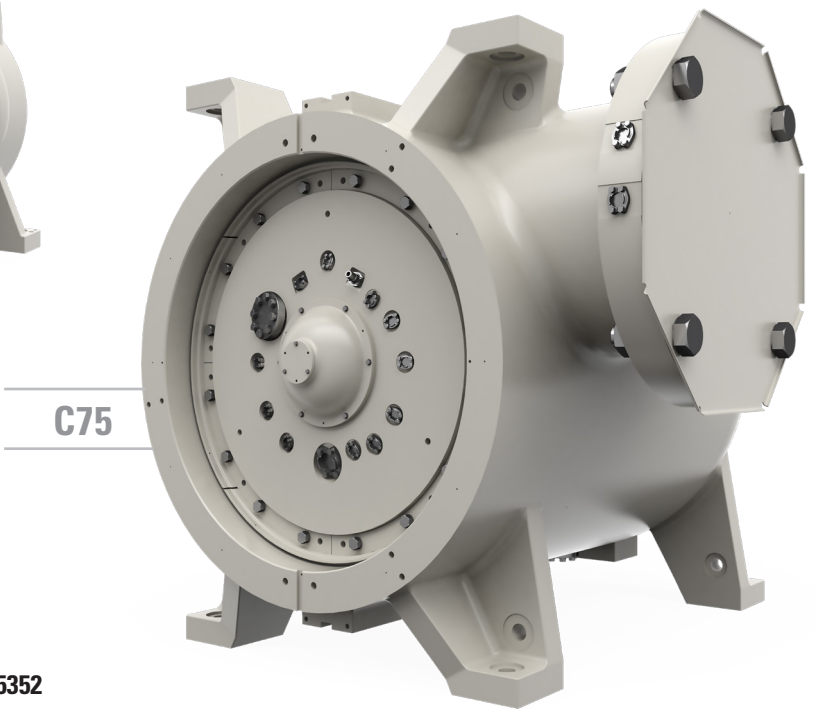
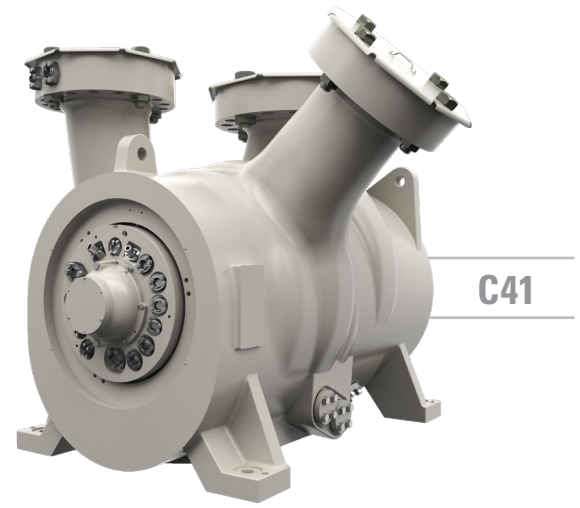
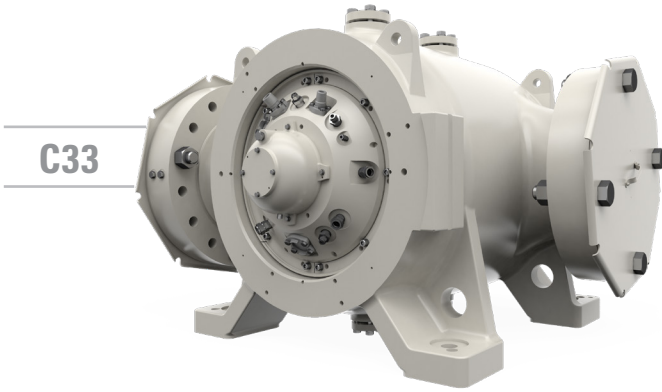
The worldwide sales and service organization at Solar Turbines is dedicated to your success. Our culture of customer care is the foundation of our commitment to the highest quality customer experience – from your initial inquiry throughout the lifecycle of your equipment. The Solar team is dedicated to ensuring reliable, efficient performance that precisely fits your needs. Find out more about our gas compressor restage solutions at [SolarTurbines.com](http://SolarTurbines.com).

**POWERING THE FUTURE THROUGH SUSTAINABLE, INNOVATIVE ENERGY SOLUTIONS**

## Solar Turbines - Sales and Service Locations



# COMPRESSOR RESTAGING FOR MAXIMUM PERFORMANCE



## CONTACT US

For more information and to locate the office nearest you, visit [solarturbines.com](http://solarturbines.com), call 1-619-544-5352 or email [infocorp@solarturbines.com](mailto:infocorp@solarturbines.com)

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