GAS TURBINES

Table of Contents

Page

List of Figures

List of Tables

1.0 SCOPE

This data sheet provides loss prevention recommendations for gas turbines used to drive generators for electrical power and mechanical equipment such as compressors. It covers aeroderivative and industrial gas turbines, however excludes microturbines.

Industrial applications include but are not limited to; prime movers for processing applications, mechanical drive, marine, and production of power and heat.

For the purposes of this data sheet, the gas turbine assembly includes the following sections: air inlet, compressor, combustion system (may include water injected for NO_x abatement), turbine, and exhaust. The gas turbine also includes protection systems, control and monitoring systems, and associated auxiliary systems.

For fire and explosion protection information, refer to Data Sheet 7-79, *Fire Protection for Gas Turbines and Electric Generators.*

1.1 Hazards

For information on hazards associated with gas turbines, refer to FM Global Understanding the Hazard (UTH) publication Combustion Turbines (P0230).

1.2 Changes

April 2019. This document has been completely revised. Significant changes include the following:

A. Added guidance for overspeed and lube-oil protection systems, in addition to lube-oil testing.

B. Added guidance for auxiliary systems and their associated hazards.

C. Added guidance on an audit and inspection program for evaluating alternative service providers.

D. Added inspection, testing, and maintenance (ITM) strategies, where applicable, regarding intervals and associated programs.

E. Addressed flexible operation and industry trends.

2.0 LOSS PREVENTION RECOMMENDATIONS

2.1 Introduction

The recommendations in the following sections are for both aeroderivative and industrial gas turbines unless specifically stated otherwise. While aeroderivative and industrial gas turbine technologies have converged over the years, this data sheet will focus on the specific differences that have a direct impact on loss prevention. These differences include the following:

A. Maintenance of aeroderivative gas turbines is mostly done by changing out the engine (or sections of the engine) and sending it (or them) to a shop for maintenance. Most industrial gas turbines, however, are maintained onsite unless extensive repairs are needed. Some of the smaller (“package”) industrial turbines can also be maintained by changing out the unit and sending it to a repair facility for maintenance (refurbishment).

B. Aeroderivative gas turbines use rolling element bearings, while industrial gas turbines typically use hydrodynamic bearings. In some cases, an aeroderivative gas turbine may use hydrodynamic bearings in the power turbine section.

C. The lube-oil systems differ as a result of the types of bearings used. Units provided with rolling element bearings have shaft-driven, positive displacement lube-oil pumps that provide an adequate oil supply for these bearings at various speeds, negating the need for external lube-oil pumps. Units provided with hydrodynamic bearings require lubrication during startup and shutdown and are typically lubricated using ac/dc motor-driven pumps.

D. Aeroderivative gas turbines have multiple shafts. Heavy-duty and most other industrial gas turbines are single-shaft machines. However, some of the smaller industrial gas turbines also have multiple shafts.