



FAQ – Frequently Asked Questions

Product safety warning for NA and NR turbochargers

1. General

Q: Which turbochargers are affected?

A: Affected are all NA and NR turbochargers.

Q: Is this a product recall?

A: No, we are talking about a product safety warning. The warning explains the risk and gives clear recommendations on how to reduce or avoid the risk until an upgrade kit is installed that makes the TC completely compliant with latest safety requirements.

Q: Do concerned customers need to take any action?

A: Concerned customers are requested to read the corresponding Alert Service Bulletin ASB2013/02/18 and Addendum "Safety Instructions" carefully, to inform their operating personnel accordingly and to follow the recommendations/advice. The advice applies to all NA and NR turbochargers regardless of any previous information. They are requested to contact us and to inform the work numbers of their MAN turbochargers, the year of production and in case of licensed production also the name of the maker.

Q: When can MAN Diesel & Turbo supply an upgrade solution?

A: MAN Diesel & Turbo is working on upgrade and/or retrofit solutions with highest priority. They will be released step by step as soon as they become available and can be ordered from MAN PrimeServ. For some turbocharger types an upgrade kit is already available or will be released for delivery soon. We have provided links to a specific website for each of our customer's NA and NR turbocharger that they had reported to us as requested in the ASB. On this web site they will find more detailed and continuously updated information on the availability of upgrade, alternative and retrofit solutions.

For some turbocharger models, in particular very old turbochargers models, it is impossible to develop an upgrade solution. In these cases, an exchange by a modern turbocharger model might be advisable. MAN will be able to offer such retrofit solutions which will not only provide containment safety, but also improve the performance of the engine.



Q: How long does it take to upgrade a specific turbocharger?

A: In case an upgrade solution for the specific turbocharger is available, it can in principle be installed immediately (depending on actual demand). For some turbocharger types upgrade solutions still need to be developed. Our customers can find expected availability dates for each of their turbochargers on the specific website. MAN PrimeServ will harmonize the further procedure with interested customers. The necessary scope of work depends on size, type and age of the specific turbocharger but typically can be carried out within 6- 24 hours.

Q: Are there any performance losses after the upgrade kit is installed?

A: The upgraded turbocharger will have equal performance since casings required to be exchanged will be replaced by equal ones of better material and/or design. If the operator has the intention to optimize the performance, a retrofit with modern TCR or TCA turbochargers is always an option.

Q: Why does MAN Diesel & Turbo come up with this product warning just now?

A: Safe products and safe working places are important cornerstones of MAN Diesel & Turbo SE's corporate responsibility efforts. This commitment includes the monitoring of our products in the field as well as timely reaction to uncovered risks. The overall field experience has proven that NA and NR turbochargers are very reliable products. In particular, they do not have a generally increased risk of a rotor failure. However, recent inhouse tests performed according to current standards revealed that these turbochargers have a risk of loss of containment in the very unlikely event of a rotor failure. Even though we have observed a limited number of incidents only, equivalent to a statistically very low number, because of the high risk associated with such failure cases, we have decided to inform our customers in order to assure a maximum of safety for their operating personnel and equipment.



2. Damage Scenarios

Q: How many incidents with failing containment have been experienced with NA and NR turbochargers in the field?

A: All in all we have observed very few containment incidents over the last 20 years within our entire NA and NR turbocharger population of almost 50,000 turbochargers. This is equivalent to a probability for a damage of clearly less than 1 per 3,100 operating years. For a risk evaluation specific to your turbochargers, please refer to the specific websites.

Q: What are the typical initiating events of a containment failure?

A: The failure of the rotating element is the typical damage which consequently leads to a containment failure.

A rotor failure will predominantly occur if there is a pre-damaged compressor wheel or turbine wheel which results in a spontaneous major unbalance of the rotor at high turbocharger speed. The reason for such a pre-damage of the mentioned components can be manifold and in particular, it can be caused by the impact of debris, poor fuel quality or improper handling.

All mentioned pre-damage risks can be reduced by the operator via a proper handling of the turbocharger.

Q: What exactly happens in case of a containment failure?

A: We have observed that grey cast iron casings and the flange connections of the turbochargers with nodular cast iron casings are not sufficiently strong to withstand extreme load situations which may for example occur in the very rare case of a rotor failure. The high kinetic energy of the rotating element is released in a sudden burst. In case of such a catastrophic breakage of turbomachinery components, there is a risk that fragments may be released, or that the casing can be dislodged from the turbocharger. Lubrication oil can be ignited and may cause an engine room fire.

A containment damage creates a substantial risk for the health and safety of operating personnel including the risk of bodily or even fatal injury and a risk of damage to adjacent machines or property, including the risk of fires.

Q: What areas/components of the turbocharger are affected? Compressor side, turbine side, or both?

A: Both compressor and turbine side of the rotor can fail. In most cases that we know of, the compressor section has been affected. Broken off turbine blades did not cause any containment failure on the turbine side so far.



Q: At what engine loads did the containment protection fail?

A: The vast majority of containment incidents occurred at high engine load. However, for turbochargers with grey cast iron casings there is no clear line between a safe and an unsafe load condition. Regarding a safe rotating speed of turbochargers with nodular cast iron casings, please refer to the specific websites.

Q: Was there any incident where not only parts but also fire came out of the turbocharger?

A: Yes, in one incident a fire was reported. But in this case it was extinguished immediately without major consequential damages.

Q: Is there any risk for health and safety in case of a containment damage?

A: As described in the ASB, in case of a containment damage we cannot exclude a substantial risk for the health and safety of operating personnel including the risk of bodily or even fatal injury and a risk of damage to adjacent machines or property, including the risk of fires.

Q: Are large turbochargers more dangerous than small turbochargers?

A: For large as well as small turbochargers a containment breach may occur when the high kinetic energy of the rotating element is released in a sudden burst and the casing is not capable to retain the fragments from being ejected. In case of a containment breach, both for large and for small turbochargers, there exists a substantial risk for the health and safety of operating personnel including the risk of bodily or even fatal injury and a risk of damage to adjacent machines or property, including the risk of fires.



3. Operation

Q: How can the risk that is connected to a containment failure be reduced?

A: The risk can be significantly reduced by following the instructions defined in the Addendum to ASB2013/02/18. Please note that most of these instructions reduce the risk that a rotor failure will occur at all. For some turbocharger models, we have been able to establish a safe rotating speed; please refer to the specific turbocharger websites for more details. There you will also find continuously updated information about the availability of upgrade kits and alternative solutions.

Q: What are the dimensions of the “hazardous area”?

A: The hazardous area spans an area approx. 6 m from the silencer in axial direction, approx. 2.5 m in axial direction from the turbine side. In radial direction the hazardous area describes approx. a 30 m radius. Please refer to the detailed drawing shown in the Addendum to ASB2013/02/18.

Q: Why was the hazardous area enlarged from 2.5 meters to 30 meters in radial direction?

A: Experience from individual containment failure cases has shown that fragments released from the casings may endanger an area exceeding the formerly defined danger zone. For this reason the new enlarged hazardous area was defined. Naturally, the risk connected to a containment breach decreases with increasing distance from the turbocharger.

Q: How to handle the wet cleaning procedure and maintenance procedures?

A: As described in the Addendum to ASB2013/02/18, turbine dry cleaning is to be conducted at reduced engine load according to the description of turbine wet cleaning in the manual. This means the turbine dry cleaning is to be conducted at an engine load of 15% at most. At such reduced engine load, according to our technical analysis there is no risk of a containment failure. Therefore, at such reduced engine load operating personnel may be allowed to enter the hazardous area to carry out the cleaning procedure and the other daily maintenances which require entering that area. However, please follow always the safety instructions of your turbocharger manual, and avoid staying within the hazardous area without reason.

Q: In the Addendum to ASB2013/02/18 MAN Diesel & Turbo SE advises to stop the engine after a surging of the turbocharger and inspect the compressor wheel for a pre-damage. However, during heavy seas, when surging frequently occurs, the main engine cannot be shut down. How to cope with this situation?



A: In case of a surging of the turbocharger foreign particles, which may stay in the charge air cooler, can enter the suction area of the compressor and pre-damage the compressor wheel. If the engine cannot be shut down for inspection immediately, we recommend operating personnel to stay out of the hazardous area until the engine can be shut down for an inspection of the compressor wheel.

Q: In the Addendum to ASB2013/02/18 MAN Diesel & Turbo SE advises to contact the MAN Diesel & Turbo Service Department for further assistance if we find traces of foreign object damage (FOD) impact or rubbing marks on the insert piece or compressor wheel and not to re-start the engine without prior consultation. However, the large majority of compressor wheels examined in service have FOD impacts. Can MAN Diesel & Turbo define more precisely which impacts are relevant?

A: Unfortunately it is not possible to define any critical values. In most cases we can provide a quick and clear advice based on a quality digital photograph of the affected part(s).

In case of any further questions please contact: TC-ASB-Feedback@mandieselturbo.com