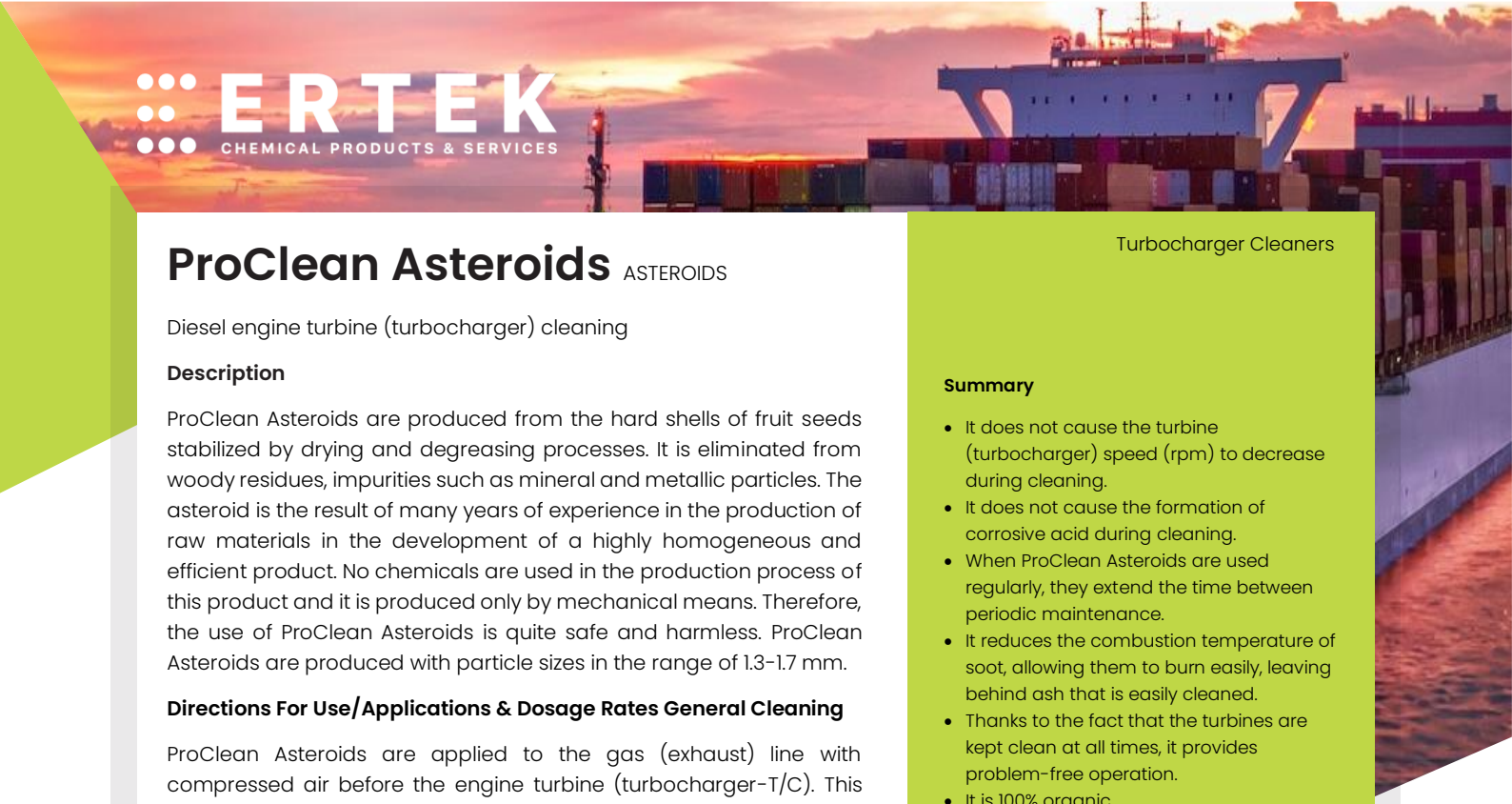


ERTEK
CHEMICAL PRODUCTS & SERVICES

ProClean Asteroids ASTEROIDS

Diesel engine turbine (turbocharger) cleaning

Turbocharger Cleaners

Description

ProClean Asteroids are produced from the hard shells of fruit seeds stabilized by drying and degreasing processes. It is eliminated from woody residues, impurities such as mineral and metallic particles. The asteroid is the result of many years of experience in the production of raw materials in the development of a highly homogeneous and efficient product. No chemicals are used in the production process of this product and it is produced only by mechanical means. Therefore, the use of ProClean Asteroids is quite safe and harmless. ProClean Asteroids are produced with particle sizes in the range of 1.3-1.7 mm.

Directions For Use/Applications & Dosage Rates General Cleaning

ProClean Asteroids are applied to the gas (exhaust) line with compressed air before the engine turbine (turbocharger-T/C). This cleaning with asteroids should be done after every 24-48 hours of operation of the turbines. The frequency of cleaning varies according to the contamination status of the turbines and the increase in temperature on the exhaust side of the turbines. If the exhaust temperature is 20°C above average, cleaning should be repeated. For turbines with more than one exhaust inlet, this must be done separately for each exhaust inlet. The exhaust temperature at the turbine inlet should not exceed 580-590°C, otherwise it will cause the ProClean Asteroids to burn before it reaches the turbines and can clean. To get the most out of the ProClean Asteroids, it is necessary to run the turbines at the highest speed.

Summary

- It does not cause the turbine (turbocharger) speed (rpm) to decrease during cleaning.
- It does not cause the formation of corrosive acid during cleaning.
- When ProClean Asteroids are used regularly, they extend the time between periodic maintenance.
- It reduces the combustion temperature of soot, allowing them to burn easily, leaving behind ash that is easily cleaned.
- Thanks to the fact that the turbines are kept clean at all times, it provides problem-free operation.
- It is 100% organic.

A) Organic Properties

Physical State (20°C)	: Granular powder
Color	: Brown
Odor	: No

B) Physical Properties

pH	: -
Molecular Weight	: -
Explosion Limit	: No
Part Size	: 1.3-1.7 mm

Storage Conditions

Packaging Type	: 25 kg sack
Storage Period	: 3 years

Approvals & Certificates

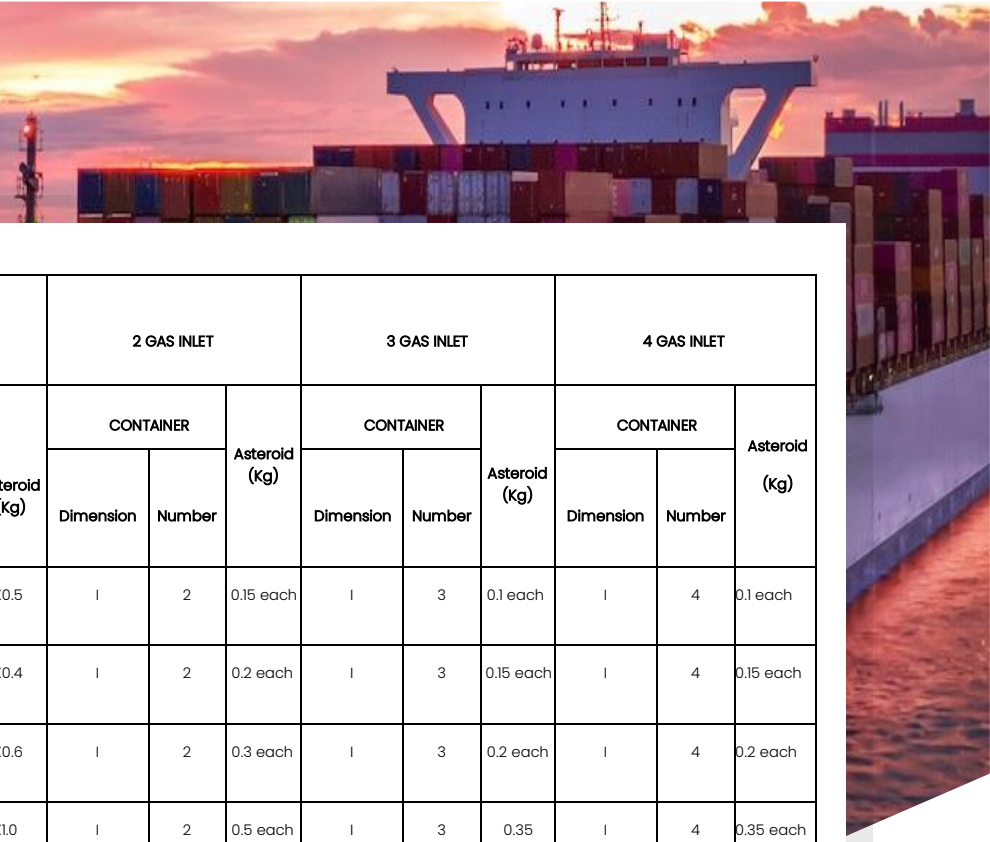
IMO ISO 14001 ISO 9001

Product No : SP-KS-062

Aydınlı-KOSB Mah. Organik Cad.
KOSB Sitesi No:1 Pk. 34776 Tuzla/ISTANBUL

T. +90 (216) 499 50 00
Pbx. +90 (216) 499 50 02

M. operations@ertekchemicals.com
W. www.ertekchemicals.com



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VTR VTC	Quantity of asteroids per türbine (TC) and cleaning process (kg)	1 GAS INLET			2 GAS INLET			3 GAS INLET			4 GAS INLET		
		CONTAINER		Asteroid (Kg)	CONTAINER		Asteroid (Kg)	CONTAINER		Asteroid (Kg)	CONTAINER		Asteroid (Kg)
		Dimension	Number		Dimension	Number		Dimension	Number		Dimension	Number	
160/161 184"	0,1... 0,2	I	1	1X0.5	I	2	0.15 each	I	3	0.1 each	I	4	0.1 each
200/201 214"	0,2... 0,4	I	1	1X0.4	I	2	0.2 each	I	3	0.15 each	I	4	0.15 each
250/251 254"	0,4... 0,6	I	1	1X0.6	I	2	0.3 each	I	3	0.2 each	I	4	0.2 each
320/321 304"	0,6... 1,0	II	1	1X1.0	I	2	0.5 each	I	3	0.35 each	I	4	0.35 each
400/401 354"	1,0... 1,6	II	1	1X1.6	II	2	0.8 each	I	3	0.55 each	I	4	0.55 each
500/501 454"	1,6... 2,0	II	1	1X2.0	II	2	1.0 each	I	3	0.7 each	I	4	0.7 each
630/631 564"	2,0... 2,4	II	1	1X2.4	II	2	1.2 each	II	3	0.8 each	I	4	0.8 each
750/751 900"	2,4... 2,8	III	1	1X2.8	II	2	1.4 each	II	3	0.9 each	I	4	0.9 each

• There are also turbines whose gas inflow is not indicated in this table.

NOTE: If asteroids are sprayed before the protection grid, the quantity of asteroids can be increased by 10-20%.

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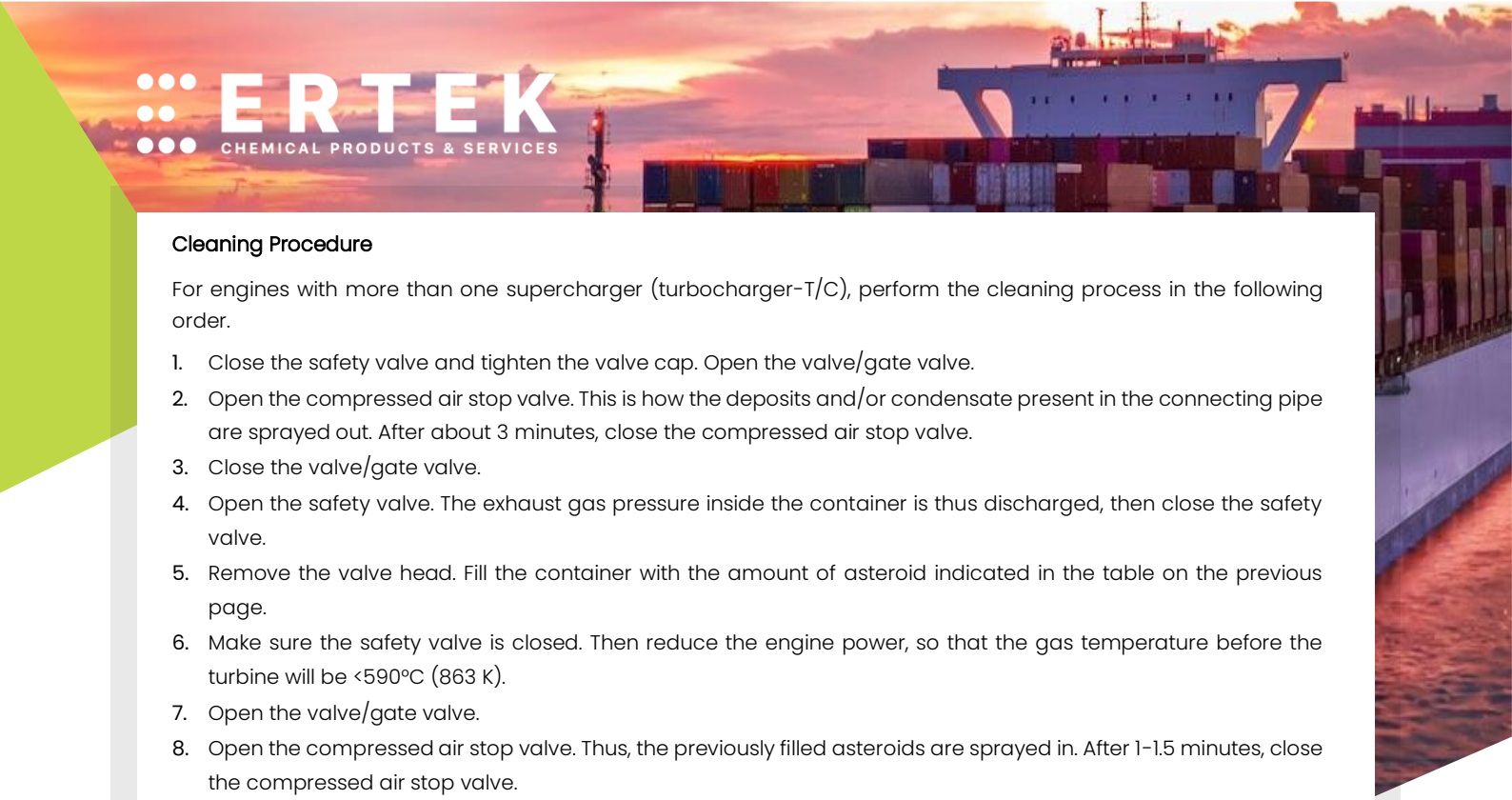

Cleaning Procedure

For engines with more than one supercharger (turbocharger-T/C), perform the cleaning process in the following order.

1. Close the safety valve and tighten the valve cap. Open the valve/gate valve.
2. Open the compressed air stop valve. This is how the deposits and/or condensate present in the connecting pipe are sprayed out. After about 3 minutes, close the compressed air stop valve.
3. Close the valve/gate valve.
4. Open the safety valve. The exhaust gas pressure inside the container is thus discharged, then close the safety valve.
5. Remove the valve head. Fill the container with the amount of asteroid indicated in the table on the previous page.
6. Make sure the safety valve is closed. Then reduce the engine power, so that the gas temperature before the turbine will be <590°C (863 K).
7. Open the valve/gate valve.
8. Open the compressed air stop valve. Thus, the previously filled asteroids are sprayed in. After 1-1.5 minutes, close the compressed air stop valve.
9. Close the valve/gate valve.
10. Open the safety valve. The exhaust gas pressure in the container is discharged in this way, then close the safety valve.
11. Procedures 1-10 should be applied separately for each turbine.

The cleaning process should be repeated at periodic intervals every 24-48 hours of the operation.

General Rules

- The gas (exhaust) inlet temperature before the turbine should not exceed 580-590°C (853-863 K).
- The spray pressure should be above 0.5 bar.
- Drain openings at the gas outlet must remain closed throughout dry cleaning.
- The average grain size of the cleaning granule should be in the range of 1.3-1.7 mm.

Attention:

During the dry-cleaning process of the turbine, a small amount of the asteroids ejected may escape through the flue line in a slightly burned form.

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