

(Di)Nitrogen Tetroxide Specifications & DOT Shipping Information



CHARACTERISTIC	PROCURED/DELIVERED	DELIVERED (SHUTTLE ONLY)
SPECIFICATION:	MIL-PRF-26539E	SE-S-0073, Table 6.3-39
N ₂ O ₄ + NO	99.5% by wt (min)	N/A
Shuttle N ₂ O ₄ MON 3	N/A	97.0% by wt (min)
Shuttle N ₂ O ₄ MON 10	N/A	88.8% by wt (min)
MON 1 - NO Content	0.6% (min) to 1.0% by wt (max)	N/A
MON 3 – NO Content	2.5% (min) to 3.0% by wt (max)	1.5 % (min) to 3.0 % by wt (max)
MON 10 – NO Content	10.0% (min) to 11.0% by wt (max)	10% (min) to 11% by wt (max)
Water equivalent (H ₂ O + HNO ₃)	0.17% by wt (max)	0.20% by wt (max)
Chloride content	0.040% by wt (max)	0.040% by wt (max)
Particulate	10.0 mg/liter (max)	N/A
Nonvolatile residue	10.0 mg/liter (max)	10 mg/liter (max)
Iron content	0.5 ppm by wt (max)	1.0 ppm (max)

Note: There are no JBOSC filter requirements for N₂O₄ low-iron MON-10.

Usage & Other Data: Nitrogen tetroxide is chemically N₂O₄ with nitric oxide (NO) added to inhibit stress, corrosion and cracking of tankage and lower the freezing point. It is a hypergolic (spontaneous ignition without an ignitor) oxidizer when used with hydrazine family fuels. N₂O₄ MON-10 is typically used to increase the NO content of N₂O₄ MON-1 or -3 which has fallen below specification levels (NO is preferentially lost from N₂O₄ during transfer operations). Occasionally, a program will require the low-temperature freezing point quality of N₂O₄ MON-10 versus the other grades but this is usually limited to tactical missile systems. MON-10 is normally delivered in DESC-owned [SS DOT110A500W](#) (one-ton) cylinders or KSC/CCAFS DOT4BW cylinders.

Proper Shipping Name and Container Markings:

49 CFR 172.101 Hazardous Materials Table

Sym-bols	Hazardous material descriptions & proper shipping names	Hazard Class or Division	Identifi-cation numbers	PG	Label Codes	Special Provision	Packaging (173.***)			Quantity Limitations		Vessel Stowage	
							Excep-tions	Non Bulk	Bulk	Passenger aircraft/ rail	Cargo aircraft only	Loca-tion	Other

DOT Hazardous Material Codes and Regulations will explain the letters and numbers.

Sample Markings:

	Dinitrogen tetroxide	2.3	UN1067	2.3, 5.1, 8	1, B7, B14, B45, B46, B61, B66, B67, B77	Packaging (173.***)			Quantity Limitations		Vessel Stowage	
						None	336	314	Forbidden	Forbidden	D	40, 89, 90



Markings for a "bulk container" (over 119 gallon capacity) with 12"-sided placards. An authorized variance would have the identification number replace the words on the primary hazard placard (with the number at the bottom corner). Non-bulk containers would use the similar 3"-sided labels and have "UN(ID#)" nearby. The proper shipping name would also appear near the labels or placards. If the container is covered by a DOT Exemption, the number (DOT-E-xxxxx) would also appear on the container. Consult your local DOT-markings experts for clarifications.

