

1. General instructions

These instructions contain specific safety regulations for third persons carrying out work in the Oxeno-plant. Please read these instructions attentively: they have been issued for **your** safety.

Apply the measures mentioned on your

- work order;
- permit;
- work instruction;
- risk analysis

strictly.

Carry out a LMRA before commencing work and after every work interruption.

Third persons who do not follow these instructions may be asked to leave the installation. Any recurrence will mean that the person in question will be denied access to the grounds.

2. Specific points of attention for Oxeno

Signing in and out

When entering the OX-plant:

- Everybody badges in at the presence registration system in the staircase hall of F405 (ground floor).

When leaving the OX-plant, also during breaks:

- Everybody badges out at the presence registration system in the staircase hall of F405 (ground floor).

Ear protection

We recommend to wear ear protection when entering the OX-plant.

During work carried out at the following locations the use of ear protection is **compulsory** (if exposure >5 minutes):

F 417: 0 m and 6 m;

F 419: 12 m at staircase hall;

F 490: 0 m at 6 kV-pumps;

F 490: 6 m at W-4731/4732;

F 490: 18 m at W-4241 A and B;

F 491: compressor building;

F 499: 12 m at C-2311.





3. Dangerous substances

The following dangerous substances are used in the Oxeno-plant. Product information about these products is available in the control room.

















Products are used in the installation that contains the cancer-causing substance 1,3-butadiene. Some reactors (oligomerisation F 417) also contain a catalyser with the carcinogenic Ni/NiO substance.















In case of contact with one of these substances you should immediately take the following actions:







- **Immediately remove any contaminated garments.**
 - **Exception in case of contact with liquid oxygen (burns / garments stick to the skin):**
 - ➔ Crack C4 / Raffinate-1, -2, -3 / 1-butene / isobutene / isobutane / n-butane / butadiene / butyne / butenyne
- **Rinse skin and eyes with plenty of water.**
- **Warn the control room, if necessary, push the warning button.**
- **Always go the Medical Department for further treatment.**












Place	Substance	Properties	Danger symbol	
F 419 F 490 F 499	Crack C4 (CC4)	Extremely flammable liquid gas under pressure, can cause freezing; contains 1,3-butadiene, can cause cancer.		Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated. H350: May cause cancer. H340: May cause genetic defects.
F 413 F 419 F 490 F 499	Raffinate-1 and Raffinate-2 (>0,1 m-% 1,3-butadiene)	Extremely flammable liquid gas under pressure, can cause freezing; contains 1,3-butadiene, can cause cancer.		Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated. H350: May cause cancer. H340: May cause genetic defects.
F 413 F 419 F 490 F 499	Raffinate-2 (<0,1 m-% 1,3-butadiene)	Extremely flammable liquid gas under pressure, can cause freezing.		Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.
F 417 F 419 F 499	Raffinate-3	Extremely flammable liquid gas under pressure, can cause freezing.		Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.












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Place	Substance	Properties	Danger symbol	
F 413 F 419 F 487 F 499	Methanol (MeOH)	Highly flammable poisonous liquid.	  	Danger H225: Highly flammable liquid and vapour. H331: Toxic if inhaled. H311: Toxic in contact with skin. H301: Toxic if swallowed. H370: Causes damage to the eyes (blindness) and the central nervous system.
F 413 F 419 F 499	Hydrogen (H ₂)	Extremely flammable gas.	 	Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.
F 499	1-butene	Extremely flammable liquid gas under pressure, can cause freezing.	 	Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.
F 413 F 419 F 487 F 499	Isobutene	Extremely flammable liquid gas under pressure, can cause freezing.	 	Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.
F 413 F 419 F 499	Isobutane	Extremely flammable liquid gas under pressure, can cause freezing.	 	Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.
F413 F 417 F 419 F 499	n-butane	Extremely flammable liquid gas under pressure, can cause freezing.	 	Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.
F 413 F 419 F 490	Butadiene	Extremely flammable liquid gas under pressure, can cause freezing, can cause cancer.	  	Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated. H350: May cause cancer. H340: May cause genetic defects.






Place	Substance	Properties	Danger symbol	
F 417 F 419	Dibutene	Highly flammable, irritating to skin.	   	Danger H225: Highly flammable liquid and vapour. H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H411: Toxic to aquatic life with long-lasting effects.
F 417 F 419	Tributene	Colourless, flammable liquid	 	Danger H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation.
F 417 F 419	Tetrabutene	Colourless, flammable liquid.	 	Danger H304: May be fatal if swallowed and enters airways.
F 413 F 419 F 487 F 499	Methyl tertiary butyl ether (MTBE)	Highly flammable, colourless liquid with characteristic odour.	 	Danger H225: Highly flammable liquid and vapour. H315: Causes skin irritation.
F 413 F 419 F 487 F 499	Dimethylether (DME)	Highly flammable, toxic liquid.	  	Danger H225: Highly flammable liquid and vapour. H331: Toxic if inhaled. H311: Toxic in contact with skin. H301: Toxic if swallowed. H370: Causes damage to the eyes (blindness) and the central nervous system.
F 413 F 419 F 487 F 499	Caustic soda pellets	White pellets.		Danger H290: May be corrosive to metals. H314: Causes severe skin burns and eye damage.

Place	Substance	Properties	Danger symbol	
F 417	Catalyst-oligomerisation (Ni/NiO)	Can cause cancer, may cause sensitisation.		Danger H350i: May cause cancer by inhalation. H318: Causes eye damage. H372: Causes damage to organs through prolonged or repeated exposure. H317: May cause an allergic skin reaction. H413: May cause long-lasting harmful effects to aquatic life.
F 413 F 419 F 499	Catalyst-hydrogenation	None.	None.	
F 413 F 419 F 499	Catalyst-MTBE-synthesis	Acid ion exchanger, may cause skin or eye damage.		Danger H318: Causes serious eye damage.
F 487	Catalyst-MTBE-splitter (Specialist 071)			Danger H318: Causes serious eye damage.
F 413 F 419	Carbon monoxide (CO)	Extremely flammable and toxic gas.		Danger H280: Contains gas under pressure; may explode if heated. H220: Extremely flammable gas. H360: May damage fertility or the unborn child. H331: Toxic if inhaled. H372: Causes damage to organs through prolonged or repeated exposure.
F 417	Ralox	Is flammable, the substance may form explosive mixtures with air.		Warning H410: Very toxic to aquatic life with long-lasting effects.
F 417	Zeolite - Guard bed filling	None.	None.	
F 490 F 499	Propane	Extremely flammable liquid gas under pressure.		Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.

Place	Substance	Properties	Danger symbol	
F 413 F 419 F 487 F 490 F 499	Nitrogen	Colourless, odourless gas. Danger of suffocation (lack of oxygen).	 	May cause suffocation.
F 417 F 419 F 487 F 499	Tetrabutane	Colourless, odourless, flammable liquid.		Danger H304: May be fatal if swallowed and enters airways.
F 490	White oil Wacker Silicon oil	Colourless, odourless liquid.		No dangerous good.
F 495	Marlotherm LH	Flammable, colourless liquid.	 	Danger H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H413: May cause long-lasting harmful effects to aquatic life.
F 487 F 495	Marlotherm SH	Colourless to yellow liquid.		Danger H304: May be fatal if swallowed and enters airways. H413: May cause long-lasting harmful effects to aquatic life.
F 490	NMP N-methylpyrrolidon	Liquid (organic), colourless to light yellow.	 	Danger H360D: May cause harm to the unborn child. H319: Causes serious eye irritation. H335: May cause respiratory irritation. H315: Causes skin irritation.
F 490	TBC T-butylcatechol	White crystalline solid (organic), takes on a slightly brown colour when exposed to air, phenol odour.	  	Danger H302 + H312: Harmful if swallowed or in contact with skin. H314: Causes severe skin burns and eye damage. H317: May cause an allergic skin reaction. H410: Very toxic to aquatic life with long-lasting effects.

Place	Substance	Properties	Danger symbol	
F 490	Sodium nitrite NaNO ₂	Colourless to slightly yellowish liquid.		Danger H302: Harmful if swallowed. H319: Causes serious eye irritation.
F 490	SiYPro	Orange liquid.	    	Danger H226: Flammable liquid and vapour. H304: May be fatal if swallowed and enters airways. H335: May cause respiratory irritation. H315: Causes skin irritation. H318: Causes serious eye damage. H336: May cause drowsiness or dizziness. H317: May cause an allergic skin reaction. H411: Toxic to aquatic life with long-lasting effects.
F 413 F 490	Butyne	Extremely flammable liquid gas under pressure, can cause freezing, can cause cancer.	  	Danger H224: Extremely flammable liquid and vapour. H315: Causes skin irritation. H319: Causes serious eye irritation. H335: May cause drowsiness or dizziness.
F 413 F 490	Butenyne	Extremely flammable liquid gas under pressure, can cause freezing.	 	Danger H220: Extremely flammable gas. H280: Contains gas under pressure; may explode if heated.

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F 413 F 495	Green oil (High boilers)		     <p>Danger</p> <p>H224: Extremely flammable liquid and vapour.</p> <p>H350: May cause cancer.</p> <p>H340: May cause genetic defects.</p> <p>H302: Harmful if swallowed.</p> <p>H304: May be fatal if swallowed and enters airways.</p> <p>H314: Causes severe skin burns and eye damage.</p> <p>H317: May cause an allergic skin reaction.</p> <p>H361f: Suspected of damaging fertility.</p> <p>H371: May cause damage to organs.</p> <p>H411: Toxic to aquatic life with long-lasting effects.</p>

4. Plan OX-plant

