

T.C.  
ÇEVRE VE ŞEHİRCİLİK BAKANLIĞI  
ÇED, İZİN VE DENETİM GENEL MÜDÜRLÜĞÜ  
LABORATUVAR ÖLÇÜM VE DENETİM DAİRE  
BAŞKANLIĞI

Emisyon Hesaplama

HALİS EMRE GÜNEŞ  
Çevre Mühendisi

# Emisyon Hesaplama;

Emisyon hesaplamalarını tamamlamadan önce sormanız gereken iki temel soru:

- Bu emisyon nedir?
- Bu emisyon kaynağı nedir?

$$E = A * EF$$

- A, Faaliyetin Yıllık İşleme Miktarı.
- EF, Emisyon Faktörü.
- E, hesaplanan Emisyon miktarıdır.
- Hesaplama yapılırken; akış diyagramları, üretici veya tedarikçi ayrıntıları, arsa planları ile Yakıt Verileri, Raporlanabilir Kirleticiler, Kontrol Senaryosu ,İzin veya kural sınırı, Saatlik üretim kapasitesi gibi bilgilere ihtiyaç duyulur.

## Hesaplama Yöntemleri

- Sürekli Emisyon İzleme Sistemi.
- Kütle dengesi
- WebFIRE Veri Faktörleri (EPA)
- AP-42 veya diğer EPA Belgeleri,

<https://www.epa.gov/chief>

ÖRNEK :Endüstriyel Kazanlar  
AP-42'yi kullanarak CO hesaplama;

Process: 10-100 mmbtu/hr boiler

SCC: 10200602

Fuel: Natural Gas

Capacity: 84 mmbtu/hr

Control: Uncontrolled

Etkinlik Bilgisi:

\* Kaynak Sınıflandırma Kodu:

10200602

\* Proses Materyali:

Doğal gaz

\* İşlem Hızı:

673 MMscf / 1 yıl

\* Saatlik ortaya Çıkan İşlem:

8025

\* Tasarım Kapasitesi (varsa):

84 MMbtu / 1 saat

\* Yakıt Verileri (varsa):

1,001 MMbtu / 1 MMscf

\* Kontrollü kontrolsüz:

Kontrolsüz

# Clearinghouse for Inventories and Emissions Factors (CHIEF)

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Basic Information

**AP-42**

Emissions Estimation Tools

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# AP-42: Compilation of Air Emission Factors

### On This Page:

- Compilation of Air Pollutant Emission Factors (AP-42)
  - [Proposed/Revised/New Emissions Factors](#)
  - [AP-42 Proposed Factors, But Not Finalized](#)
  - [AP-42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources](#)
- Additional AP 42 Resources
  - [Historical AP-42 Information](#)
  - [AP-42 Frequent Questions](#)
  - [Older editions of AP-42, Volume 1](#)

## AP 42, Fifth Edition Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources

Chapter	Title
Cover page and Table of Contents	<a href="#">Cover page, detailed Table of Contents, Publications in Series, Insertion Instructions, and Key Word Index (PDF)</a> (26 pp, 128 K, <a href="#">About PDF</a> ). This is current through the Fifth Edition, Supplement C of AP 42. For sections and chapters added after November 1997, see the chapter web pages below.
Introduction	<a href="#">Introduction to AP 42, Volume I, Fifth Edition ( PDF)</a> - January 1995 (10 pp, 70 K, <a href="#">About PDF</a> )
Chapter 1	<a href="#">External Combustion Sources</a>
Chapter 2	<a href="#">Solid Waste Disposal</a>
Chapter 3	<a href="#">Stationary Internal Combustion Sources</a>
Chapter 4	<a href="#">Evaporation Loss Sources</a>
Chapter 5	<a href="#">Petroleum Industry</a>
Chapter 6	<a href="#">Organic Chemical Process Industry</a>
Chapter 7	<a href="#">Metal and Metal Ore Processing</a>

Emissions Estimation Tools

WebFIRE

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**1.0 Introduction to External Combustion Sources**

**1.1 Bituminous and Subbituminous Coal Combustion**

- [Final Section](#) – Supplement E, September 1998 (PDF 515K)
- [Background Document](#) (PDF 8M)

**1.2 Anthracite Coal Combustion**

- [Final Section](#) – Supplement B, October 1996 (PDF 59K)
- [Background Document](#) (PDF 249K)

**1.3 Fuel Oil Combustion**

- [Final Section](#) – Supplement E September 1999, corrected May 2010 (PDF 380K)
- [Background Document](#) – September 1998 (PDF 900K)
- [Related Information](#) – The data that supports the emissions factors are presented in summary in the background report and are reported more completely in a database. The database is a zipped spreadsheet. (ZIP 28K)

**1.4 Natural Gas Combustion**

- [Final Section](#) – Supplement D , July 1998 (PDF 230K)
- [Background Document](#) (PDF 225K)
- [Related Information](#) – The data that supports the emissions factors are presented in summary in the background report and are reported more completely in a database. The database is a zipped MS Access file . (ZIP 239K)

**1.5 Liquefied Petroleum Gas Combustion**

- [Final Section](#) – Updated, July 2008 (PDF 29K)
- [Background Document](#) (PDF 129K)



Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO<sub>x</sub>) AND CARBON MONOXIDE (CO) FROM NATURAL GAS COMBUSTION<sup>a</sup>

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO <sub>x</sub> <sup>b</sup>		CO	
	Emission Factor (lb/10 <sup>6</sup> scf)	Emission Factor Rating	Emission Factor (lb/10 <sup>6</sup> scf)	Emission Factor Rating
<b>Large Wall-Fired Boilers</b> (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS) <sup>c</sup>	280	A	84	B
Uncontrolled (Post-NSPS) <sup>c</sup>	190	A	84	B
Controlled - Low NO <sub>x</sub> burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
<b>Small Boilers</b> (≤100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO <sub>x</sub> burners	50	D	84	B
Controlled - Low NO <sub>x</sub> burners/Flue gas recirculation	32	C	84	B
<b>Tangential-Fired Boilers</b> (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
<b>Residential Furnaces</b>				

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dönüştürün ve diğer  
birleştirin

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Yorum Yap

Dosyaları

Doldur ve

$$E = A * EF$$

$$673 \text{ mmscf} * \frac{84 \text{ lbs}}{\text{mmscf}} = 56,532 \text{ lb}$$

$$56,532 \text{ lbs} * \frac{\text{ton}}{2,000 \text{ lbs}} = 28.266 \text{ to}$$

# WebFIRE Veri Faktörlerini Kullanarak Hesaplama Yapma





Güvenli <https://www.epa.gov/chief>

Uygulamalar Hava Emisyonu Ölçüm Hava Konuları | Çevre VDI Standart ayrıntıları EPA Hava emisyonları | EP Yiğün Emisyon Testi - En Sık Sorulan Yiğün T Ortam İzleme Teknoloji Diğör yer iş

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**EPA** United States Environmental Protection Agency

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- [WebFIRE](#)

**Emissions Monitoring Knowledge Base**  
[Basic information about monitoring techniques by industry type](#)

https://www.epa.gov/electronic-reporting-air-emissions/webfire

nu Ölçür | Hava Konuları | Çevre | VDI VDI Standart ayrıntıla | Hava emisyonları | EP | Yiğün Emisyon Testi - En Sık Sorulan Yiğün T | Ortam İzleme Teknoloji

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## WebFIRE

WebFIRE is EPA's online emissions factor repository, retrieval, and development tool. The WebFIRE database contains EPA's recommended emissions factors for criteria and hazardous air pollutants (HAP) for industrial and non-industrial processes. In addition, WebFIRE contains the individual data values used to develop the recommended factors and other data submitted to EPA by federal, state, tribal, and local agencies; consultants; and industries. For each recommended emissions factor and individual data value, WebFIRE contains descriptive information such as industry and source category type, control device information, the pollutants emitted, and supporting documentation.

WebFIRE includes data submitted to EPA from the [Electronic Reporting Tool \(ERT\)](#). Beginning January 1, 2012, industries are required to submit their source test data to EPA using the ERT application. This information is shared with WebFIRE and is available to the public. More information about the ERT data is available on the [Search WebFIRE page](#).

Information about updates, changes or enhancements to the system, and Frequently Asked Questions (FAQs) will be posted on this page.

## Technology Transfer Network Clearinghouse for Inventories & Emissions Factors

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## Welcome to WebFIRE

WebFIRE is the EPA's online database that contains [emissions factors](#) for criteria and hazardous air pollutants (HAP) for industrial and non-industrial processes and [multiple reports](#) submitted to the EPA using the Compliance and Emissions Data Reporting Interface (CEDRI) in response to regulatory requirements under Parts 60 and 63 of Title 40 of the U.S. Code of Federal Regulations (CFR). WebFIRE also allows you to [register](#) to receive periodic email notifications when reports are submitted to WebFIRE and to prepare [batch downloads](#) of WebFIRE emissions and facility information.

- [Search for emissions factors](#)
- [Search for reports](#)
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## Emission Factor Functions

WebFIRE contains emissions factors developed by the EPA for criteria pollutants and HAP for industrial and non-industrial processes. For each EPA emissions factor, WebFIRE contains descriptive information such as industry and source category type, control device information, the pollutants emitted, and supporting documentation (e.g., test reports).

## Simple Search

The simple search allows you to search for emissions factor information in cases where you have limited knowledge of the emissions process of interest (e.g., the emissions process is a wood-fired boiler). You can retrieve emissions factor records by entering one or more simple terms such as source category name (e.g., dry cleaning, wood combustion, boilers), process description (e.g., spreader stoker, catalytic cracking), EPA's Source Classification Code (SCC), or any other viable search term likely to be found in an emissions factor record.

For example, if you enter in the phrase "spreader stoker," WebFIRE will display every EPA emissions factor that includes the complete phrase "spreader stoker" anywhere in the entire record. To make your search more specific, you can use the "AND" operator. For example, "spreader stoker AND PM10" will limit the results to the pollutant PM10. The "AND" operator must be capitalized. Do not use punctuation in the search window.

Enter your search term(s) in the window below and then click the "Submit Search" button. The default WebFIRE search does not include emissions factors that have been revoked by EPA (e.g., when a revised emissions factor replaces an older version). To include revoked factors in your search, uncheck the checkbox next to the search window.

Exclude Revoked Factors

For more information about the Simple Search, click on this link see the [Help Information](#). If you do not get the results you desired using the Simple Search, try using the Detailed Search below.

## Detailed Search

Cubic Feet Natural Gas Burned;  
**Quality** [i](#) -- E [Emissions Factors Applicability](#)

**SCC** [i](#) 10200602 [Details](#)  
External Combustion Boilers > Industrial > Natural Gas > 10-100 Million Btu/hr  
**POLLUTANT** [i](#) Sulfur dioxide **NEI** [SO2](#) [i](#) **CAS** [7446-09-5](#) [i](#)  
Primary Control / Secondary Control [i](#) : UNCONTROLLED ,  
**Emission Factor** [i](#) -- 6.000E-1 Lb per Million  
Cubic Feet Natural Gas Burned;  
**Quality** [i](#) -- A [Emissions Factors Applicability](#)

**SCC** [i](#) 10200602 [Details](#)  
External Combustion Boilers > Industrial > Natural Gas > 10-100 Million Btu/hr  
**POLLUTANT** [i](#) Toluene **NEI** [108883](#) [i](#) **CAS** [108-88-3](#) [i](#)  
Primary Control / Secondary Control [i](#) : UNCONTROLLED ,  
**Emission Factor** [i](#) -- 3.400E-3 Lb per Million  
Cubic Feet Natural Gas Burned;  
**Quality** [i](#) -- C [Emissions Factors Applicability](#)

**SCC** [i](#) 10200602 [Details](#)  
External Combustion Boilers > Industrial > Natural Gas > 10-100 Million Btu/hr  
**POLLUTANT** [i](#) Total organic compounds **NEI** [i](#) **CAS** [i](#)  
(TOC)  
Primary Control / Secondary Control [i](#) : UNCONTROLLED ,  
**Emission Factor** [i](#) -- 1.100E1 Lb per Million  
Cubic Feet Natural Gas Burned;  
**Quality** [i](#) -- B [Emissions Factors Applicability](#)

**SCC** [i](#) 10200602 [Details](#)  
External Combustion Boilers > Industrial > Natural Gas > 10-100 Million Btu/hr

## Benzen Hesaplama

$$E = A * EF$$

$$\text{Benzene} = 673 \text{ mmscf} * \frac{0.0021 \text{ lbs}}{\text{mmscf}} = 1.41 \text{ lbs}$$

Ton Olarak Hesaplanırsa:

$$\text{Benzene} = 1.41 \text{ lbs} * \frac{\text{ton}}{2,000 \text{ lbs}} = 0.001 \text{ ton}$$



## Yüzey Kaplama (Boyama) - Ksilen / VOC Hesaplama

Proses: Yüzey kaplama - sprej boyama

SCC: 40200101 (EPA Kodu)

Kirletici: Ksilen, VOC

Boya: Akrilik Kırmızı



# MATERIAL SAFETY DATA SHEET

ACRYLIC RED TOP COAT Page: 1

PRODUCT NAME: ACRYLIC RED PRODUCT CODE: 007

## SECTION I -MANUFACTURER IDENTIFICATION

MANUFACTURER'S NAME: XYZ Paint Company ADDRESS: Any Street

Oklahoma City, OK 73101 REVISION DATE: August 1, 2007 EMERGENCY  
PHONE: 1-800-999-9999 DATE PRINTED: 8/29/2007 INFORMATION PHONE : 1-800-999-9999

## SECTION II -HAZARDOUS INGREDIENTS/SARA III INFORMATION

REPORTABLE COMPONENTS	CAS NUMBER	VAPOR PRESSURE		WEIGHT PERCENT
		mm Hg	@Temp	
Xylene	1330-20-7	21	100	8.0
Toluene	108-88-3	22	68	0.0
MEK	78-93-3	23	72	2.0
SILICA	14808-60-7	0	0	75.0
VOCs		21	100	25.0

## SECTION III -PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 180 deg F SPECIFIC GRAVITY (H2O=1): 1.34 VAPOR DENSITY: HEAVIER THAN AIR  
EVAPORATION RATE: LOWER THAN ETHER

COATING V.O.C.: 8.75 lbs/gal MATERIAL 8.75 lbs/gal SOLUBILITY IN WATER: NEGLIGIBLE  
APPEARANCE AND ODOR: CLEAR AND PIGMENTED COATINGS WITH CHARACTERISTIC ODOR

## SECTION IV -FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: 67 Deg F METHOD USED: TCC FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: .9 UPPER:  
12 EXTINGUISHING MEDIA: USE APPROVED CLASS B FIRE EXTINGUISHER OR EXTINGUISHING SPECIAL  
FIREFIGHTING PROCEDURES:

FULL PROTECTIVE EQUIPMENT INCLUDING SELF-CONTAINED BREATHING APPARATUS IS RECOMMENDED TO PROTECT FROM  
COMBUSTION BY-PRODUCTS. COOL CLOSED CONTAINERS WITH WATER FOG TO PREVENT PRESSURE BUILDUP.

### UNUSUAL FIRE AND EXPLOSION HAZARDS:

KEEP CONTAINERS TIGHTLY CLOSED. VAPOR IS DENSER THAN AIR AND CAN TRAVEL AND COLLECT IN LOW SPOTS. ISOLATE  
FROM HEAT, ELECTRICAL EQUIPMENT, SPARKS AND OPEN FLAME. CLOSED CONTAINERS MAY EXPLODE WHEN EXPOSED TO  
EXTREME HEAT. DO NOT APPLY TO HOT SURFACES. CAN CAUSE SPONTANEOUS COMBUSTION. (CONTAMINATED RAGS, ETC.)

$$E = A * \text{VOC İçeriği} * (\text{Xylene: VOC})$$

$$\text{Toplam VOC} = 800 \text{ gal} * \frac{8.75 \text{ lbs}}{\text{gal}} = 7,000 \text{ lbs} = 3.5 \text{ tons}$$

$$\text{Xylene} = 3.5 \text{ tons} * \frac{0.08}{0.25} = 1.12 \text{ ton}$$

Tehlikeli Olmayan VOC:

$$\text{VOC (non-HAP)} = \text{Total VOC} - \text{Xylene}$$

$$\text{VOC (non-HAP)} = 3.5 \text{ tons} - 1.12 \text{ tons} = 2.38 \text{ ton}$$

# MSDS KULLANMA

2 Bileşim / Bileşenleri hakkında bilgiler			
· Kimyevi tanımlama			
· Tarifi: Tehlikesiz; katkılar ihtiva eden ve aşağıda belirtilen maddelerden oluşan karışım.			
· İhtiva ettiği tehlikeli maddeler:			
CAS: 108-88-3 EINECS: 203-625-9	toluene	Repr. Cat. 3; Xn, Xi, F; R 11-38-48/20-63-65-67	%10-25
CAS: 106-11-0 EINECS: 215-535-7	xylene	Xn, Xi; R 10-20/21-38	%10-25
CAS: 111-76-2 EINECS: 203-905-0	2-butoxyethanol	Xn, Xi; R 20/21/22-36/38	%< 2,5
CAS: 96-29-7 EINECS: 202-496-6	2-butanone oxime	T, Xi; R 43-48/25-52/53	%< 2,5
· Ek uyarılar: belirtilmiş olan tehlike işaretlerinin metnini Bölüm 16'dan alınız			

Maddeye özel CAS  
numarası

**ÖNEMLİ:** Emisyon hesaplamalarını büyük ölçüde basitleştirmek için, her bir üründe VOC'ler için ağırlık yüzdeleri (ağırlıkça %) elde etmeniz önerilir. Ağırlık yüzdesi ve hacim yüzdesi aynı şey değildir. Ağırlıkça yüzde olarak MSDS'de veya diğer teknik veri sayfasında listelenmiyorsa, tedarikçi ile iletişime geçerek istemek gerekir.

Malzeme Yoğunluğu: Birim hacme göre malzemenin ağırlığıdır.VOC içeriği değildir.

Toplam Uçucular: Bu sayı, genellikle ağırlıkça% veya hacim olarak% olarak ifade edilir; bu madde ne kadar buharlaştığını gösterir. Tipik olarak su, tüm VOC'leri içerir.

### 9 Fiziksel ve kimyevi özellikler

- Genel bilgiler	
<i>Biçim:</i>	<i>Sıvı şekilde</i>
<i>Renk:</i>	<i>Ürün adına göre</i>
<i>Koku:</i>	<i>Karakteristik</i>
- Durum değişikliği	
<i>Erime ısı / Erime ısı alanı:</i>	<i>Belirlenmemiştir.</i>
<i>Kaynama ısı / Kaynama ısı alanı:</i>	<i>110°C</i>
- Alev alma ısı:	< 23°C
- Tutuşma ısı:	500°C
- Kendiliğinden tutuşabilme özelliği:	Ürün kendiliğinden tutuşmaz niteliktedir.
- Patlama tehlikesi:	Ürünün patlama tehlikesi yoktur, ancak patlam Hava karışımlarının oluşması mümkündür.
- Patlama sınırları:	
<i>Alt:</i>	<i>1,1 Vol %</i>
<i>Üst:</i>	<i>7,0 Vol %</i>
- Buhar basıncı 20°C'de:	29 hPa
- Yoğunluk 20°C'de:	1,140 g/cm <sup>3</sup>
- Çözülme kabiliyeti / karışma kabiliyeti sıvı:	Karıştırılmaz ya da düşük ölçüde karıştırılabilir.
- Çözücü madde oranı:	
<i>Organik çözücü madde:</i>	<i>%29,6</i>
<i>VOC (CE)</i>	<i>29,59 %</i>
- Katı madde oranı:	%57,0

VOC İçeriği ağırlıkça % olarak

verilmişse yapılacak hesaplama;

$$1,140 \text{ gr/cm}^3 * (29,59/100) = 0,337 \text{ gr/cm}^3 = 337 \text{ gr/lt}$$

Kullanılan boya miktarı 5.000 litre

$$5.000 * 337 = 16,85 \text{ ton VOC}$$

## Kütle Dengesi Kullanılarak VOC Emisyonlarının Hesaplanması

### SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	12.19 lb/gal	1460 g/l
SPECIFIC GRAVITY	1.47	
BOILING POINT	277 - 292 °F	138 - 144 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	26%	
EVAPORATION RATE	Slower than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N/A	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)		
	2.11 lb/gal	253 g/l
	2.11 lb/gal	253 g/l
		Less Water and Federally Exempt Solvents
		Emitted VOC

### SECTION 10 — STABILITY AND REACTIVITY

STABILITY — Stable

CONDITIONS TO AVOID

None known

INCOMPATIBILITY

None known

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

Örnek 1: Yoğunluk ve kullanılan malzeme miktarı

(hacimce) ile hesaplama;

Kullanılan Boya Miktarı - 5.000 Litre

VOC İçeriği - 253 g/lit

5.000 litre \* 253g/lit = 1,25 ton VOC

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**SOLUBILITY IN WATER:** Not soluble in water.

**APPEARANCE AND ODOR:** Clear colorless liquid, mild odor.

**pH of 5% SOLUTION:** N/A

**VAPOR PRESSURE:**

**EVAPORATION:** Not determined

**SPECIFIC GRAVITY:** 0.75 - 0.79

**VAPOR DENSITY:** Not determined

**OTHER PROPERTIES:**

**FREEZING POINT:**

**PERCENT VOLATILE:**

Sadece özgül ağırlık verilmişse; Ürünün yoğunluğunu elde etmek için ürünün özgül ağırlığını ve suyun yoğunluğu kullanılır (8,34 lb / gal): (Amerika MSDS dir)

$0,79 * 8,34 = 6,59$  lbs/galon

## 2 Bileşim / Bileşenleri hakkında bilgiler

· Kimyevi tanımlama

· Tarifi: Tehlikesiz katkılar ihtiva eden ve aşağıda belirtilen maddelerden oluşan karışım.

· İhtiva ettiği tehlikeli maddeler:

CAS: 108-88-3 EINECS: 203-625-9	toluene	Repr. Cat. 3; Xn, Xi, F; R 11-38-48/20-63-65-6	%10-25
CAS: 1330-20-7 EINECS: 215-535-7	xylene	Xn, Xi; R 10-20/21-38	%10-25
CAS: 111-76-2 EINECS: 203-905-0	2-butoxyethanol	Xn, Xi; R 20/21/22-36/38	%< 2,5
CAS: 96-29-7 EINECS: 202-496-6	2-butanone oxime	T, Xi; R 43-48/25-52/53	%< 2,5

· Ek uyarılar: belirtilmiş olan tehlike işaretlerinin metnini Bölüm 16'dan alınız

## BİLEŞENLERİ AYRI AYRI HESAPLAMA

Kullanılan Boya Miktarı – 5.000 litre

Ürün Ağırlığı – 1,140 kg/lt

Toluen % 25 (En yüksek)

Ksilen içeriği % 25 (En yüksek)

5000 litre x 1,140 kg/lt x (25/100) = 1.425 kg Toluen

5000 litre x 1,140 kg/lt x (25/100) = 1,425 kg Ksilen



## VOC Emisyonlarının Kontrolü

### Kontrol Cihazlarının Türleri

#### Yakma;

- Rejeneratif geri kazanım brülörlerinin kontrol verimliliği  $> \% 95-98$
- Reküperatif geri kazanım brülörlerinin kontrol verimliliği  $\% 98$
- Termal geri kazanımların kontrol verimliliği  $> \% 98$

Ayrıca kaplama aktarım verimliliğini de düşünülmalıdır.

#### Farklı Kaplama Yöntemleri İçin Kaplama Adımı ile Toplam Emisyonun Yüzdesi

Kaplama Yöntemi	Uygulama	Ön Kurutma	Fırınlama
Püskürtme kaplama	30 - 50%	10-30%	20-40%
Daldırma kaplama	5-10%	10-30%	50-70%
Akış kaplama	30-50%	20-40%	10-30%
Rulo kaplama	0-5%	10-20%	60-80%

- Tesisin kaplama hattı% 98 kontrol etkinliği ile bir termal oksitleyiciye yönlendirildiği varsayılırsa;
- Toluene Kontrolsüz Emisyonlar – 1,425 ton
- Ksilen Kontrolsüz Emisyonlar – 1,425 ton
- $1,425 \times (1 - 0.98) = 0.0285$  ton Etilbenzen
- $1,425 \times (1 - 0.98) = 0,0285$  ton Ksilen



## KONTROL EKİPMANLARI HESABI

## **Yakalama Verimi:**

**Toplanan ve kontrol ekipmanına yönlendirilen hava emisyon yüzdesi.  
Çoğu kontrol cihazı% 100 yakalama verimliliğine sahiptir.**

## **Kontrol Verimliliği:**

**Hava akışından kontrol cihazıyla çıkan hava kirleticisinin yüzdesi.**

## Taş ocadı - Birincil Kırma Hesabı

Süreç: Birincil Kırma  
SCC: 30532001  
Kirlenici: PM10  
Kontrol: Su Püskürtme



$$E = A * EF * (1 - \text{Kontrol Verimliliği})$$

$$\text{PM 10} = 1,361,120 \text{ tons} * \frac{0.0024 \text{ lb:}}{\text{ton}} = 3,267 \text{ lbs}$$

Kontrol hesabı

$$\text{PM 10} = 3,267 \text{ lbs} * (1 - 0.777) = 729 \text{ lbs}$$

Ton Olarak:

$$\text{PM 10} = 729 \text{ lbs} * \frac{\text{ton}}{2,000 \text{ lbs}} = 0,36 \text{ ton}$$