





1. K-CHESAR Backgrounds



1. Subject to CSR submission according to ARECs

Article 14 (Data to be Submitted When Applying for Registration of Chemical Substances)

(1) Any person who intends to apply for registration pursuant to Article 10 (3) (Article 10 clause 1 or 5) shall submit data on the following matters (hereinafter referred to as "data to support registration") as prescribed by Ordinance of the Ministry of Environment:

Provided, That in cases of a new chemical substance or an existing chemical substance subject to registration (existing substance) as prescribed by Presidential Decree, he/she need not to submit some of the relevant data as prescribed by Ordinance of the Ministry of Environment

1. The name, location, and representative of an entity that intends to manufacture or import the chemical substance;
2. Information on the identification of the chemical substance, such as the name, molecular formula, and structural formula of the chemical substance;
3. Uses of the chemical substance;
4. Classification and labelling of the chemical substance;
5. Physical and chemical properties of the chemical substance;
6. Hazards of the chemical substance;
- 7. Risks of the chemical substance, including an exposure scenario describing operational methods, exposure controls, and management measures during its life-cycle (applicable only where the quantity of the chemical substance the applicant intends to manufacture or import is at least ten tons per year);**
8. Guidance on safe use (personal protective equipment, emergency measures, etc. at the time of explosion, fire or leakage)
9. Other data prescribed by Ordinance of the Ministry of Environment.

1. K-CHESAR Backgrounds



1. Subject to CSR submission under ARECS

- When manufacturing · importing existing chemical substances subject to registration
- Enforcement date varies according to manufacturing · importing volume

-	≥100t	≥70t	≥50t	≥20t	≥10t
Enforcement date	2015.1.1	2017.1.1	2018.1.1	2019.1.1	2020.1.1

2. Contents of CSR (Enforcement decree annex 2)

- Hazard information and evaluation (include registration data)
- Exposure scenario and assessment

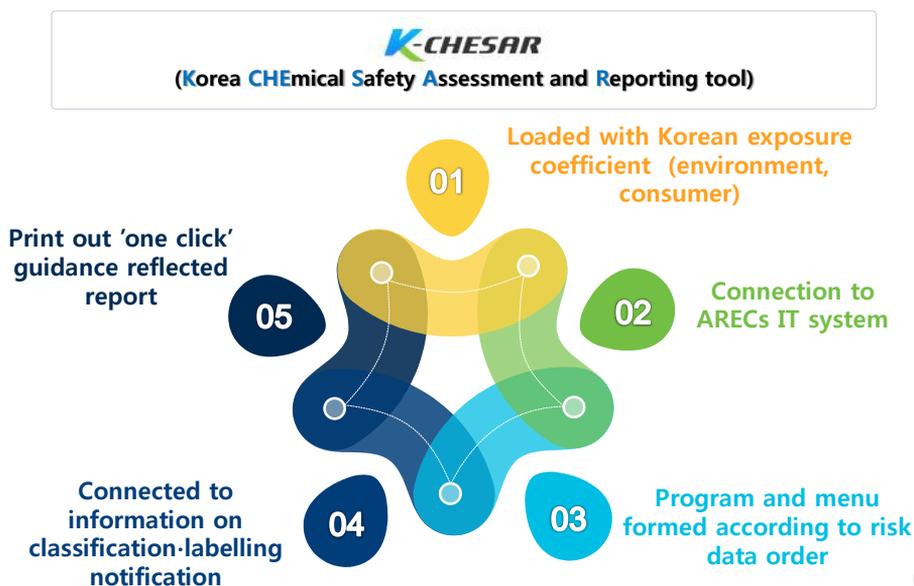
1. Summary of risk management plan	6. Hazard assessment on the environment (degradation and accumulation and etc)
2. Chemical classification, physical-chemical properties	7. Hazard assessment on the environment(ecological effect)
3. Manufacture and confirmed usage	8. Hazard assessment on human health
4. Classification and labelling	9. Persistent-accumulation assessment
5. physical-chemical risk assessment	10. Exposure assessment
	11. Confirm safety

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1. K-CHESAR Backgrounds



3. CSR drafting aid program



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2. K-CHESAR characteristics-advantages



1. Relieve redundant hazard data input through ARECS IT linkage

- Average of 26 inputs of each 47 test items for registration can be linked directly
- **Minimum 9**(environmental fate and its additional data), **max 47**(screening for reproductive/developmental)
- **1,231 criteria** from hazard data which were input into ARECs IT system can be linked

ARECs IT
Registration data input

K-CHESAR

No redundant entry, print out as report format → **time saving**

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2. K-CHESAR characteristics-advantages



2. Risk assessment

- EU/EPA assessment coefficient built in compute no effect level automatically by clicking each criteria → utilize it for risk assessment
- Utilize foreign data for risk assessment

Assessment coefficient

Utilizing foreign data

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2. K-CHESAR characteristics·advantages



3. Exposure assessment (ex① Environmental exposure assessment drafting)



입력 (Input)

- Nationwide emission information**
- Emission information for each business**
- Chemical information**

출력 (Output)

환경배출농도 (Environment emission concentration)

Save computation result separately

- Result is needed for drafting result
- Need for controlling and confirming risk

- ▶ **Nationwide emission information**
 - Nationwide emission information needed to be put in by considering the sum of each business and medium emission
- ▶ **Exposure assessment for each business**
 - One time assessment is possible for one business
 - Running as many times as number of business is needed

⇒ **Nationwide emission volume change as business emission information change or business is added which leads to inconvenient overall re-do of exposure assessment and saving the results separately.**

2. K-CHESAR characteristics·advantages



3. Exposure assessment (ex① Environmental exposure assessment drafting)



출력 (Output)

지역 규모 농도 Regional concentration (steady-state)	농도	단위
경상성역의 전국규모 대기농도(A)	4.16E-10	mg·m ⁻³
경상성역의 전국규모 담수농도(Fresh water)	5.84E-12	mg·L ⁻¹
경상성역의 전국규모 지표토양농도(Natural soil)	9.30E-13	mg·kg ⁻¹
경상성역의 전국규모 농경지토양농도(Agricultural soil)	8.89E-13	mg·kg ⁻¹
경상성역의 전국규모 도시산업용지농도(Other soil)	1.01E-12	mg·kg ⁻¹

지역 규모 농도 Local concentration (during release episode)	농도	단위
대기PEC (Annual average local PEC in air (total))	1.32E-05	mg·m ⁻³
수질PEC (Annual average local PEC in surface water (dissolved))	5.84E-12	mg·L ⁻¹
지반PEC (Local PEC in fresh water sediment during emission episode)	4.77E-12	mg·kg ⁻¹
농경지PEC (Local PEC in agricultural soil, averaged over 100 days)	7.86E-07	mg·kg ⁻¹
도시산업용지PEC (Local PEC in grass land, averaged over 100 days)	7.86E-07	mg·kg ⁻¹
폐수처리시설 유출수 농도 (Concentration in substance in the STP effluent)	7.86E-07	mg·kg ⁻¹

환경배출농도 (Simplebox)

대기배출농도 (mg/m ³)	담수배출농도 (mg/L)	자연지배출농도 (mg/kg)	농경지배출농도 (mg/kg)	도시산업용지배출농도 (mg/m ³)	대기배출농도 (mg/m ³)	담수배출농도 (mg/L)	자연지배출농도 (mg/kg)	농경지배출농도 (mg/kg)	도시산업용지배출농도 (mg/m ³)	폐수처리시설배출농도 (mg/L)
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	1.33E-05	5.84E-12	4.77E-12	7.86E-07	7.86E-07	-
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	1.33E-06	5.84E-12	4.77E-12	7.86E-08	7.86E-08	-
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	2.22E-06	5.84E-12	4.77E-12	1.31E-07	1.31E-07	-

emission concentration and make it into DB

- need to include business emission concentration into the report
- Needed for comparison with PNEC when confirming business and nationwide environment risk
- Make DB for emission concentration because there are need to manage 속 가나 when risk exceed 1

트양 피부 접촉 노출량 = 트양 중 화학물질 농도 × 단위전환인자 × 노출체표면적 × 트양-피부 간 흡착계수 × 피부흡수계수 × 노출빈도 × 노출시간 / 체중 × 평균 노출시간

$$(L)ADD_{soil,derm} = Cs \times C_{F1.2} \times SA \times AF \times ABSd \times EF \times ED / BW \times AT$$

2. K-CHESAR characteristics·advantages



3. Exposure assessment (ex① Environmental exposure assessment drafting)



환경배출농도(Simplebox)										
대기배출농도 (mg/m ³) (한국)	담수배출농도 (mg/L) (한국)	지면지배출농도 (mg/Kg) (한국)	농경지배출농도 (mg/Kg) (한국)	도시산업배출농도 (mg/m ³) (한국)	대기배출농도 (mg/m ³) (사업장)	담수배출농도 (mg/L) (사업장)	경관물배출농도 (mg/Kg) (사업장)	농경지배출농도 (mg/Kg) (사업장)	목초지배출농도 (mg/Kg) (사업장)	목수채리시배출농도 (mg/L) (사업장)
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	1.33E-05	5.84E-12	4.77E-12	7.86E-07	7.86E-07	-
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	1.33E-05	5.84E-12	4.77E-12	7.86E-07	7.86E-07	-
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	2.22E-06	5.84E-12	4.77E-12	1.31E-07	1.31E-07	-

PNEC			
대기PNEC (mg/m ³)	담수PNEC (mg/L)	경관물PNEC (mg/Kg)	목수채리시PNEC (mg/L)
2.10E-01	8.90E-01	7.35E-01	1.35E-01

대수RCR (한국)	담수RCR (사업장)	경관물RCR (사업장)	농경지RCR (한국)	도시산업RCR (사업장)	목초지RCR (사업장)	지면RCR (한국)	목수채리시RCR (사업장)	RCR (한국)
6.56E-12	6.56E-12	6.49E-12	6.59E-12	5.82E-06	5.82E-06	6.89E-12	-	7.48E-12
6.56E-12	6.56E-12	6.49E-12	6.59E-12	5.82E-07	5.82E-07	6.89E-12	-	7.48E-12
6.56E-12	6.56E-12	6.49E-12	6.59E-12	9.70E-07	9.70E-07	6.89E-12	-	7.48E-12

- confirm PCR
 - The comparison of PNEC from environmental hazard evaluation and PNEC from exposure evaluation model

$$\text{생태위해도(RCR)} = \frac{\text{환경 중 예측농도(P EC)}}{\text{예측무영향농도(PNEC)}}$$

- Managing level of risk
 - Modify exposure evaluation model reflecting risk management plan when risk exceed 1 as a result of safety confirmation
 - Need to adjust PNEC through securing additional hazard data

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2. K-CHESAR characteristics·advantages



3. Exposure assessment (ex① Environmental exposure assessment drafting)



Risk assessment report drafting

- Input business, nationwide exposure concentration and risk computation result according to guidance form
- Need to input model value for business and nationwide emission information

Business and nationwide emission information input

10.3.2.1. 환경 노출 값 입력

10.3.2.1.1. 환경 배출액에 따라 1:1로 입력

구분	배출량 (kg/yr)	배출률 (kg/yr)								
사업장	0.015	0	0	0.019	0.01	0	0	0	0	0

10.3.2.1.2. 환경 노출 값에 따라 1:1로 입력

구분	대기 (mg/m ³)	담수 (mg/L)	경관물 (mg/Kg)	농경지 (mg/Kg)	도시산업 (mg/m ³)	목초지 (mg/Kg)	지면 (mg/m ³)	목수채리시 (mg/L)	RCR (한국)
사업장	1.33E-05	5.84E-12	4.77E-12	7.86E-07	7.86E-07	7.86E-07	7.86E-07	7.86E-07	7.48E-12

환경배출농도(Simplebox)										
대기배출농도 (mg/m ³) (한국)	담수배출농도 (mg/L) (한국)	지면지배출농도 (mg/Kg) (한국)	농경지배출농도 (mg/Kg) (한국)	도시산업배출농도 (mg/m ³) (한국)	대기배출농도 (mg/m ³) (사업장)	담수배출농도 (mg/L) (사업장)	경관물배출농도 (mg/Kg) (사업장)	농경지배출농도 (mg/Kg) (사업장)	목초지배출농도 (mg/Kg) (사업장)	목수채리시배출농도 (mg/L) (사업장)
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	1.33E-05	5.84E-12	4.77E-12	7.86E-07	7.86E-07	-
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	1.33E-06	5.84E-12	4.77E-12	7.86E-07	7.86E-07	-
4.16E-10	5.84E-12	9.30E-13	8.89E-13	1.01E-12	2.22E-06	5.84E-12	4.77E-12	1.31E-07	1.31E-07	-

PNEC			
대기PNEC (mg/m ³)	담수PNEC (mg/L)	경관물PNEC (mg/Kg)	목수채리시PNEC (mg/L)
2.10E-01	8.90E-01	7.35E-01	1.35E-01

대수RCR (한국)	담수RCR (사업장)	경관물RCR (사업장)	농경지RCR (한국)	도시산업RCR (사업장)	목초지RCR (사업장)	지면RCR (한국)	목수채리시RCR (사업장)	RCR (한국)
6.56E-12	6.56E-12	6.49E-12	6.59E-12	5.82E-06	5.82E-06	6.89E-12	-	7.48E-12
6.56E-12	6.56E-12	6.49E-12	6.59E-12	5.82E-07	5.82E-07	6.89E-12	-	7.48E-12
6.56E-12	6.56E-12	6.49E-12	6.59E-12	9.70E-07	9.70E-07	6.89E-12	-	7.48E-12

11.1.1. 환경

표 6-3 환경에 대한 안전성 확인-사업장

매체	매체	구분	PNEC	PNEC	PNEC(P)PNEC	비고
대기	대기 (mg/m ³)	1 - 시나리오 1-사업장	5.84E-12	8.90E-01	6.56E-12	
경관물	경관물 (mg/Kg)	1 - 시나리오 1-사업장	4.77E-12	7.35E-01	6.5E-12	
포양	포양 (mg/Kg)	1 - 시나리오 1-사업장	7.86E-07	1.35E-01	5.8E-06	
목수채리시	목수채리시 (mg/L)	1 - 시나리오 1-사업장	7.86E-07	1.35E-01	5.8E-06	
목수채리시	목수채리시 (mg/L)	1 - 시나리오 1-사업장	7.86E-07	1.35E-01	5.8E-06	

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2. K-CHESAR characteristics·advantages



3. Exposure assessment (ex. ② Environmental exposure assessment using K-CHESAR)



- ▶ Prevent redundant input by linkage between chemical information and emission information
 - chemical information reflected from K-CHESAR input data
 - can upload business emission information using DB
- ▶ can compute exposure concentration with one click
- ▶ can sum up nationwide emission information automatically

물성정보

분자량 (kg/kmol)	37.997	Biodegradability test result	not biodegradable
녹는점 (°C)	-220	kdeg.air (°C)	3.506E-06
육탄화/물 분배계수	3.9E-02	kdeg.water (°C)	1.197E-25
증기압 (Pa)	1.013E+05	kdeg.sed (°C)	3.13E-25
증기압 측정온도(°C)	-188	kdeg.soil (°C)	3.13E-25
용해도 (g/L)	1.0E+04	Koc-QSAR 화학등급	
용해도 측정온도 (°C)	20	유기탄소 분배계수 (L/kg)	1.96E+00
물질 발암여부	비발암		

사업장 규모 배출정보

사용량	10	톤/년	조업일수	365	일/년
하수처리시설사용여부	No		하수처리시설용량		명
배출량정보		배출계수정보			
대기로의배출량	0.015	톤/년	대기로의배출계수	2.5E-04	
담수로의배출량	0	톤/년	담수로의배출계수	0.0E+00	계수 선택
토양으로의배출량	0	톤/년	토양으로의배출계수	0.0E+00	

배출량산정근거
 - 수계, 토양 : 물질의 특성 및 취급 공정 상 수계, 토양으로의 배출 없음.
 - 대기 : 배출계수를 통한 배출량 산정
 ※배출계수 = EU배출계수 × (1-배출저감시설 효율)

계산하기

2. K-CHESAR characteristics·advantages



3. Exposure assessment (ex. ② Environmental exposure assessment using K-CHESAR)



- ▶ Business, nationwide emission concentration and risk can be seen at once
 - emission concentration and risk result can be seen
 - Expressed in red and green
- ▶ compute and confirm human indirect exposure from environment
 - Can see human indirect concentration and risk computation result from environment without separate computation
 - Expressed in red and green

시나리오1-사업장1

환경
노출

작업자
노출

소비자
노출

사업장 규모 농도 환경을 통한 간접 노출 결과

타입	PEC	위해도
대기PEC (ng/m³)	1.332E-05	-
수계PEC (ng/l)	5.842E-12	6.564E-12
저토PEC (ng/kg)	4.773E-12	6.497E-12
농경지PEC (ng/kg)	7.861E-07	1.048E-07
목초지PEC (mg/kg)	7.861E-07	1.048E-07
하수처리시설 유출수 농도 (ng/l)		

2. K-CHESAR characteristics·advantages



4. Risk management plan, process description and actions included in exposure scenario [K-CHESAR usage]

- Can input relevant information using exposure scenario DB
- Risk level can be changed after modeling
- Actions, process description and risk management plans are automatically input and user can put in additionally

1. Base DB

3. Print out

2. Assessment model

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3. Comparison with EU CHESAR



	EU CHESAR	K-CHESAR
Substance information and hazard information input	<ul style="list-style-type: none"> Input information on IUCLID and import information through file or server Hazard information and chemical can not be edited within EU CHESAR 	<ul style="list-style-type: none"> Linkage between K-CHESAR and ARECS IT system Hazard information and chemical can not be edited within K-CHESAR
Hazard evaluation	<ul style="list-style-type: none"> Can not perform hazard evaluation within EU CHESAR Input hazard evaluation result directly into IUCLID and reflected to EU CHESAR through file or server 	<ul style="list-style-type: none"> Can perform hazard evaluation using input data Computed hazard evaluation result is applied immediately
Exposure scenario	<ul style="list-style-type: none"> Randomly form exposure scenario Exposure scenario formed according to use step and usage regardless of business 	<ul style="list-style-type: none"> Randomly form exposure scenario Exposure scenario formed according to use step and usage after considering user business
Exposure assessment	<ul style="list-style-type: none"> Perform exposure assessment for each scenario(environment, process and products) External prediction model value can be utilized and used Can write description on exposure variables 	

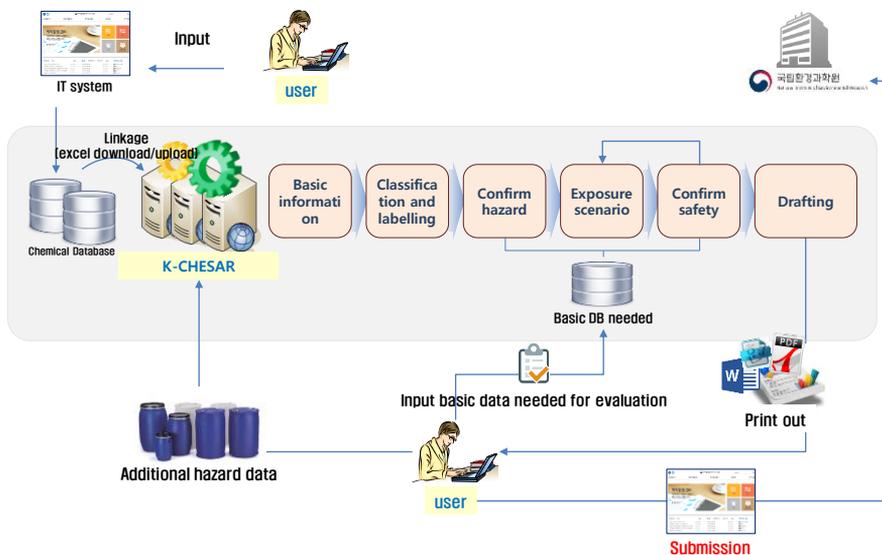
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3. Comparison with EU CHESAR



	EU CHESAR	K-CHESAR
Exposure evaluation	<ul style="list-style-type: none"> Can input worker/consumer scenario exposure variables together. Exposure evaluation module(EUSES, ECETOC TRA worker, consumer) 	<ul style="list-style-type: none"> Input worker/consumer scenario exposure variables separately Include Korea Exposure evaluation model, ECETOC TRA worker, consumer)
Risk management plan	<ul style="list-style-type: none"> Additional risk management plan is suggested which reflected exposure variable included in exposure evaluation 	<ul style="list-style-type: none"> Exposure variables are automatically reflected in risk management plan and can be added or edited
Print out	<ul style="list-style-type: none"> Can print out 'exposure evaluation and safety confirmation' and full report 	<ul style="list-style-type: none"> Can print out full or partial report for each procedure
Etc.	<ul style="list-style-type: none"> Iconized each step progress when drafting risk data 	<ul style="list-style-type: none"> Marked progress in risk assessment drafting and can memo at the each process

4. Program usage diagram



5. Program dissemination



K-CHEGAR guidance webpage open(June 29th)
 Address : <http://kchesar.kcma.or.kr>



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