IMOA®
INTERNATIONAL MOLYBDENUM ASSOCIATION

NEWSLETTER
JULY 2003

Membership

Welcome to two more new members this year.

AMPERE Alloys

**12 Mail Joliot Curie
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95310
FRANCE**

**Tel: + 33 1 3432 4007;
Fax: + 33 1 3037 0584
Email:
f.celerier@amperealloys.com
http://www.ampere.com**

Part of a distribution network in Europe for ferroalloys and non-ferrous metals for foundries.

CC Metals and Alloys, Inc

**University Corporate Centre
300 Corporate Parkway
Suite 216N
Amherst
NY 14226
USA**

**Tel: + 1 716 446 8861;
Fax: + 1 716 446 8875
Email:
blazar@ccmetals.com
http://www.ccmetals.com**

Marketing and distribution of molybdenum products in North America (USA, Mexico and Canada).

15th Annual General Meeting

Because of concerns about SARS, it was decided earlier in the year to change the venue from Shanghai.

The AGM will instead be held immediately following Ryan's Notes in the Westin Kierland Resort Hotel, Scottsdale, Arizona with an outline programme as follows:

Wednesday 29 October	- Meeting of the HSE and Executive Committee. - IMOA Dinner.
Thursday 30 October	- AGM

IMOA very much hopes to re-schedule the AGM in China in the near future.

Vacancy at IMOA for HSE Director

IMOA is seeking to appoint a full-time person to direct its extensive work programme in relation to health, safety and the environment as from 1 January 2004. The successful applicant will be based in a EU country, preferably the UK or Belgium. A full job description is available from the Secretariat but core competences are:

- The ability and confidence to direct the Association's Health, Safety and Environment work programme;
- A university degree with the necessary experience in environment science or associated discipline;
- Fluency in English as the official language of IMOA; other languages an advantage;
- The ability to deal with issues such as:
  - EU New Chemicals Policy
  - LCI/LCA
  - Global regulatory and classification issues
  - Exposure studies
- Experience in dealing with regulatory agencies especially withinthe European Union;
- Computer literacy;
- Skill at making oral and written presentations;
- Availability to travel.

Please contact Michael Maby at the IMOA Secretariat for more details.

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Molybdenum Containing Stainless Steel Spire Graces Dublin

Thanks to Catherine Houska of Technical Marketing Resources (IMOA Consultants) for the following article about the Dublin Spire.

A graceful, slender 120-meter (394 ft) high silver spire now rises from the center of Dublin. It towers over neighboring buildings and has changed the city's skyline. The new stainless steel landmark was completed in late January 2003 and has garnered international attention. Ian Ritchie Architects, London created the design and teamed with Arup's structural engineers to make it a reality.

The spire is officially called the O'Connell Street Monument. It is three meters (10 ft) in diameter at the base and tapers to only 152 millimeters (6 in) in diameter at the top. The spire is hollow with wall thickness ranging from 35-mm (1.4 in) at the base to 10-mm (0.4 in) at the top.

Ian Ritchie Architects took full advantage of stainless steel's aesthetic appeal. The highly polished finish sparkles day and night. At night, light shines through 11,884, 15-mm (0.6 in) perforations to illuminate the top 12 meters (39 feet) of the monument.

IMOA member Arcelor Group's Industeel Creusot plate mill in France produced the cut, bevelled and polished 316L (2.1% Mo) plate.

The project used 126 tonnes of stainless steel or about 2.5 tonnes of molybdenum. Type 316L was selected for its superior corrosion resistance in this coastal city. The smooth finish will enhance corrosion resistance and minimize dirt accumulation over time.

Construction required an international effort. The plate was polished in France, rolled into cylinders in Scotland, and trimmed and welded in Ireland. German flanges hold the three sections together, and the damper used to minimize swaying is from Canada.

Figure 1: *The top third of the spire is being lifted in place.*

Figure 2: *The Dublin spire rises 120 meters (394 feet) high over the city.*

manufacturers will be required to submit information specific to their company and product (i.e. identity of the manufacturer or importer, the substance, information on the manufacture and use of the substance and a statement as to whether or not information has been generated by testing a vertebrate animal). A further advantage of consortia is that each company that participates will only be required to pay one third of the registration fee.

New Members /Licensees

Following pre-registration, the Agency will inform a manufacturer or importer of the identity of any previous registrants or provide details of any on-going testing in relation to identical substances. The manufacturer or importer will then need to contact the relevant company/consortium in order to obtain access to the required technical information. The individual registrant or consortium will be required to provide the new registrant, subject to the agreement of an appropriate fee, with any data submitted to the Agency as part of the technical dossier or with any on-going research and test results. Each consortium will be set up to provide the information to the new registrant by either (1) admitting the new registrant as a new member of the consortium; or (2) licensing the required information to the new registrant, both for an agreed fee.

Data Rights

Each consortium will own the exclusive rights to the technical dossier for each substance registered with the Agency for a period of 10 years from registration. Consequently, any new registrant will need to join or obtain a licence from the consortium in order to gain access to the technical dossier. Each consortium will be free to license the technical information on whatever terms it deems appropriate. However, if the parties cannot agree an appropriate fee, the Agency will impose a maximum royalty of 50% of the original cost of producing the information. Once this 10 year period has expired, the Agency will be able to provide the new registrant with the contents of the technical dossier directly.

Competition Law Compliance

The formation of industry consortia, the exchange of data among competitors, decision(s) to exclude companies from the consortia and joint licensing all raise potential competition issues under Articles 81 and 82 of the EC Treaty. As such, consortia and their members will need guidance on competition rules applicable to the operation of the consortia.

Time limits

In order to phase-in the application of the new EU chemicals policy, the Commission has provided a transitional period of 11 years within which to complete all registrations. The exact registration deadline will depend on the volume of the chemical substance manufactured or imported:

- **in excess of 1,000 tonnes or CMRs over 1 tonne - within 3 years**
- **100 - 1,000 tonnes - within 6 years**
- **1 - 100 tonnes - within 11 years.**

Sanctions

Member States will set the appropriate penalties for infringements. It is expected that the Member States will impose fines for non-compliance of up to a maximum of 10% of the annual world-wide turnover of the undertaking concerned.

Readers with interests in products other than molybdenum are welcome to contact IMOA's Counsel direct:

Scott S. Megregian, McDermott, Will & Emery, 7 Bishopsgate, London EC2N 3AQ
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The New System

There are five key elements to REACH:

• Duty of Care

- all companies that manufacture, import and use chemicals (regardless of the quantity) must ensure that their use of chemical substances does not adversely affect human health or the environment.

• Registration -

any manufacturer of a substance in the EU or importer of a substance into the EU, in volumes of 1 tonne or more must register it with the new European Chemicals Agency (to be based in Ispra, Italy). Member State authorities are responsible for reviewing the registration and on-going enforcement.

• Evaluation -

every registrant must submit a technical dossier on each substance which includes details of the substance's intrinsic properties and relevant test results. If the registrant does not have the required test data and no previous test results are available, additional testing will need to be carried out.
The registrant must submit a test proposal and receive prior authorisation from the competent Member State authority.
The relevant Member State authority will review the technical dossier submitted and any test proposals as part of a 'Standard Evaluation'. The Member State authority can also conduct a further 'Priority Evaluation' to verify the quality of the information submitted and to obtain additional information about the risks posed by the substances.

• Authorisation

- the Commission or competent Member State authority must also authorise the use of carcinogenic, mutagenic or toxic to reproduction chemical substances (CMRs) and other substances which raise concern. The relevant authority will approve the product where the risks to human health and/or the environment are adequately controlled.

• Restrictions

- certain chemical substances must comply with any restrictions before they can be manufactured, placed on the market or used. The Commission will have sole authority to amend or impose restrictions following advice from the Agency.

Required Information

The volume of each chemical substance manufactured or imported into the EU will determine the level of information required. Any manufacturer or importer of a chemical substance in quantities of more than 1 tonne must submit a technical dossier to the Agency. The technical dossier must contain details of the registrant, the chemical substance, the manufacture and use of the substance, its classification and labelling, guidance on the safe use of the substance, summaries of the standard testing information, a statement as to whether vertebrate animal testing has been conducted, any proposals for further tests and a chemical safety report. Specific physicochemical and toxicological information must also be submitted. Additional physicochemical and toxicological data are required if the manufacturer or importer sells more than 10 tonnes of a particular substance in the EU, with the data requirements increasing for quantities exceeding 100 tonnes or 1,000 tonnes. This increasing burden reflects the greater safety risk associated with larger volumes of chemical substances.

Pre-registration

All manufacturers or importers must pre-register all substances at least 18 months before the appropriate registration deadline expires. Once this pre-registration is made, all registrants will become a member of the Substance Information Exchange Forum. SIEF is designed to encourage the sharing of information and assess the need to conduct further studies. However, the SIEF will not replace the need for industry consortia. Manufacturers or importers will also have to notify the Agency, for labelling and classification purposes, of any registrable substances and other dangerous substances within 18 months of the entry into force of the Regulation. The Commission will provide a standard form for this purpose.

Creation of Consortia

The registration requirements place a considerable burden on manufacturers and importers. In order to reduce this burden and avoid unnecessary additional animal testing, the Commission recommends the creation of consortia by manufacturers and importers in order to prepare the detailed technical dossier on each chemical substance.

Each consortium will focus on developing the information required for each substance common to its respective members. This "common" information will constitute the vast bulk of data which must be submitted. In addition, however, individual importers or

Moly Does the Job

This case study has been kindly contributed by Dr Peter Dierschke, Materials Consultant to the Hempel Special Metals Group,Oberhausen, Germany (the company may be contacted on info@hempel-metals.com)

Molybdenum Brings Safety into Swimming Pool Buildings

Summary

In 1985 the suspended ceiling of a swimming pool in Uster, Switzerland crashed down into the pool and killed 12 bathers. Several years later, in 2001, a similar accident occurred in The Netherlands – fortunately in the second case during the night without casualties. The accidents were found to be caused by stress corrosion cracking of molybdenum-free Type 304 stainless steel fasteners and hangers that carried the weight of the suspended ceiling. While the standard grade stainless steels like Type 304 and the 2% molybdenum containing Type 316 perform well in many applications in and around swimming pools, they should not be used for safety-critical, load-bearing applications. Only highly corrosion resistant 6% molybdenum-type stainless steel can resist stress corrosion cracking in the aggressive environment that can build in spaces where maintenance cleaning is difficult or impossible.

The Application

Stainless steels are well established as corrosion resistant, low maintenance, construction materials in and around swimming pools. They are found in the pool water as ladders, stairs, and components of wave machines, around the pool, for example as diving boards, and as parts of the building like air conditioning systems, doors and windows. The widespread use is due to the good corrosion resistance, the attractive appearance, the good workability and an acceptable price. The formation of a thin but extremely dense oxide layer on the surface of stainless steels, the passive layer, protects the steel from corrosion.

Because of their corrosion resistance stainless steels are also used in structural applications in swimming pool buildings such as for hangers and fasteners of components such as suspended ceilings, wall panels or water piping and air ducts.

The Corrosion

To kill bacteria and viruses introduced by bathers, disinfecting agents, often chlorine based chemicals, are introduced to the pool water. The pool water chemistry is extremely complex: Chlorine reacts with nitrogenous compounds found in sweat and urine to form chloramines. The chloramines are highly volatile and are responsible for the characteristic "pool smell". Chloramines are, due to their high volatility, spread in the whole atmosphere of the pool. They are found to be absorbed into condensates formed on the surfaces even in the most remote part of the pool building. Because these areas are not regularly washed, they can form an extremely corrosive electrolyte containing high amounts of chlorides with low pH – value over time.

This aggressive electrolyte turned out to be capable of causing room temperature chloride stress corrosion cracking (CSCC) in Type 304 stainless steel (Figure 1). This was a surprising finding, because up to the time of the first accident, it was believed that CSCC of this stainless steel does not occur below 50 to 60 °C (120 – 140 °F).

The Solution

In the following years many corrosion investigation programs were carried out on this topic. In several working programs it was found that the molybdenum – free type 304 and low molybdenum type 316 can suffer CSCC under severe pool conditions. Even the Duplex stainless steel 2205 suffered localized corrosion in these conditions which can lead to significant reduction of the strength. Only the 6% - Mo stainless steels showed sufficient corrosion resistance.

The results of the test programs have found their way into national building regulations like the German bauaufsichtliche Zulassung Z-30.3-6 from 1999 "Bauteile und Verbindungselemente aus nichtrostenden Stählen". Figure 2 shows part of this regulation wherein four categories of corrosivity, from low to high, are defined. Category 4 "high" is used for constructions with high load of chlorides and other pollutants if concentration of pollutants can occur because the area cannot be accessed for cleaning. Under these conditions the stainless steels 1.4565, 1.4529 and 1.4547 are specified.

As a reaction to these findings, two swimming pools in The Netherlands recently changed their under-roof suspensions from galvanised steel to a 6% Molybdenum stainless steel. Figure 3 shows a fastener made completely out of alloy 926 for suspension of a ceiling construction.

Figure 1: Part of a suspension made of Type 304 damaged by Stress corrosion cracking in the atmosphere of a swimming pool.

Acknowledgement
Figure (1) Courtesy of Mr Jan Heselmans, Force Technology b.v., published in"Stainless Steel World" (December 2001).

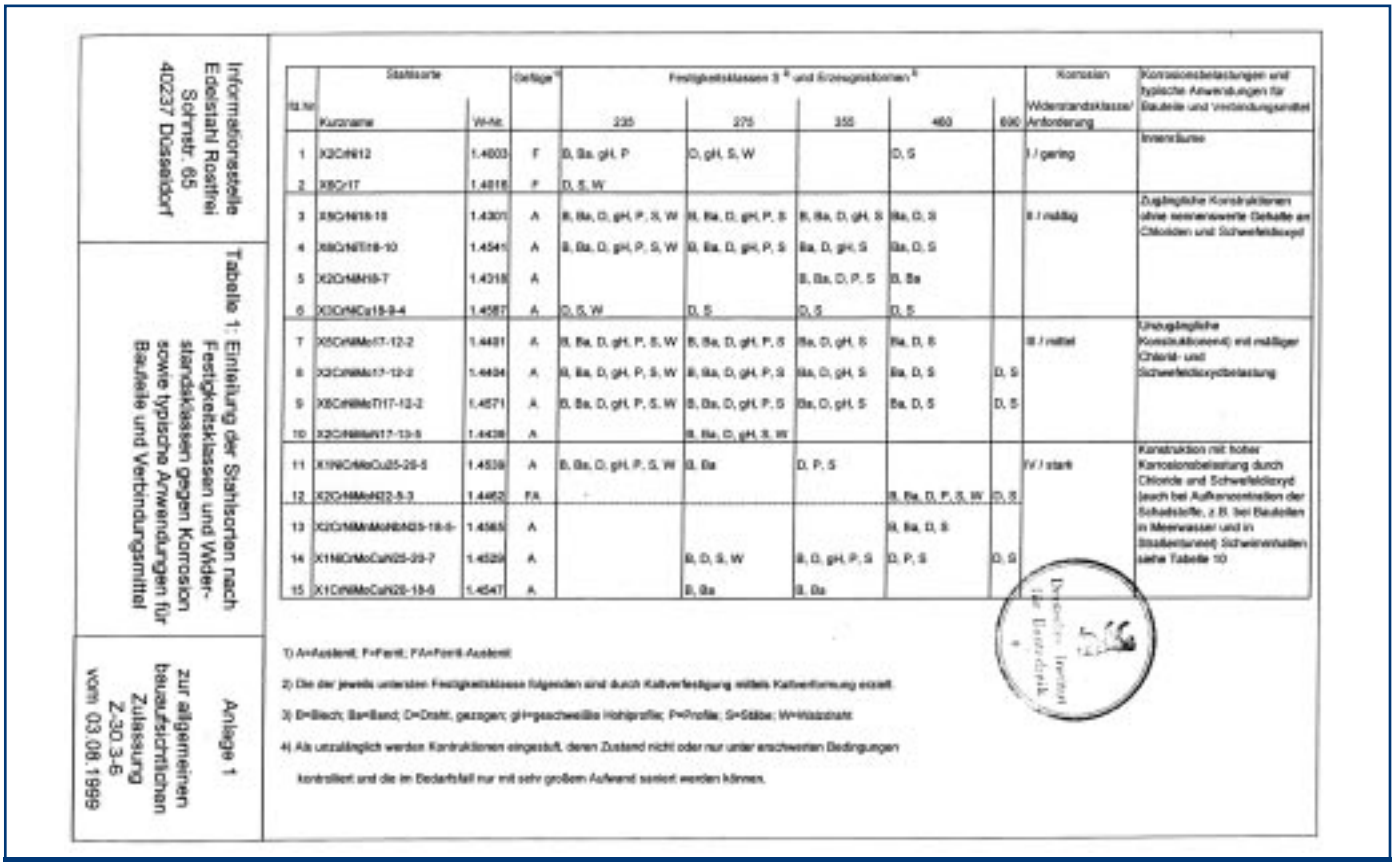

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Tabelle 1: Einteilung der Stahlsorten nach Festigkeitsklassen und Widerstandsklassen gegen Korrosion sowie typische Anwendungen für Bauteile und Verbindungsmittel

Anlage 1
zur allgemeinen bauaufsichtlichen Zulassung
Z-30.3-6
vom 03.06.1999

lfd. Nr.	Stahlsorte Kurzname	Stahlsorte W-Nr.	Gefüge[3]	Festigkeitsklassen 3[4] und Erzeugnisformen[3] 235	275	355	460	690	Korrosion Widerstandsklasse/ Anforderung	Korrosionsbeanspruchungen und typische Anwendungen für Bauteile und Verbindungsmittel
1	X2CrNi12	1.4003	F	B, Ba, gH, P	C, gH, S, W		D, S		I / gering	Innenräume
2	X6Cr17	1.4016	F	D, S, W						
3	X5CrNi18-10	1.4301	A	B, Ba, C, gH, P, S, W	B, Ba, D, gH, P, S	B, Ba, D, gH, S	Ba, D, S		II / mäßig	Zugängliche Konstruktionen ohne nennenswerte Gehalte an Chloriden und Schwefeldioxyd
4	X6CrNiTi18-10	1.4541	A	B, Ba, D, gH, P, S, W	B, Ba, D, gH, P, S	Ba, D, gH, S	Ba, D, S			
5	X2CrNiMo18-7	1.4318	A			B, Ba, D, P, S	B, Ba			
6	X3CrNiCu18-9-4	1.4567	A	D, S, W	D, S	D, S	D, S			
7	X5CrNiMo17-12-2	1.4401	A	B, Ba, D, gH, P, S, W	B, Ba, D, gH, P, S	Ba, D, gH, S	Ba, D, S		III / mittel	Unzugängliche Konstruktionen mit mäßiger Chlorid- und Schwefeldioxydbelastung
8	X3CrNiMo17-12-2	1.4404	A	B, Ba, D, gH, P, S, W	B, Ba, D, gH, P, S	Ba, D, gH, S	Ba, D, S	D, S		
9	X6CrNiMoTi17-12-2	1.4571	A	B, Ba, D, gH, P, S, W	B, Ba, D, gH, P, S	Ba, D, gH, S	Ba, D, S	D, S		
10	X2CrNiMoN17-13-5	1.4439	A		B, Ba, D, gH, S, W					
11	X1NiCrMoCu25-20-5	1.4539	A	B, Ba, D, gH, P, S, W	B, Ba	D, P, S			IV / stark	Konstruktion mit hoher Korrosionsbelastung durch Chloride und Schwefeldioxyd (auch bei Aufkonzentration der Schadstoffe, z. B. bei Bauteilen in Meerwasser und in Stadtatmosphäre) Schwimmhallen siehe Tabelle 10
12	X2CrNiMoN22-5-3	1.4462	FA				B, Ba, D, P, S, W	D, S		
13	X2CrNiMnMoNbN25-18-5-	1.4565	A				B, Ba, D, S			
14	X1NiCrMoCuN25-20-7	1.4529	A		B, D, S, W	B, D, gH, P, S	D, P, S	D, S		
15	X1CrNiMoCuN20-18-6	1.4547	A		B, Ba	B, Ba				

1) A=Austenit; F=Ferrit; FA=Ferrit-Austenit

2) Die der jeweils unteren Festigkeitsklasse folgenden sind durch Kaltverfestigung mittels Kaltverformung erzielt.

3) B=Blech; Ba=Band; D=Draht, gezogen; gH=geschweißte Hohlprofile; P=Profile; S=Stäbe; W=Walzdraht

4) Als unzulänglich werden Konstruktionen eingestuft, deren Zustand nicht oder nur unter erschwerten Bedingungen kontrolliert und die im Bedarfsfall nur mit sehr großem Aufwand saniert werden können.

Figure 2: German building code: bauaufsichtliche Zulassung Z-30.3-6, 1999.

The Cost Savings

Most importantly, by using 6% Molybdenum stainless steel the safety of the swimming pool is increased. Additionally, the maintenance and repair cost and time for the pool are reduced and the time between necessary inspections is longer. This leads to shorter shut-down times and to direct cost saving because of increased revenue.

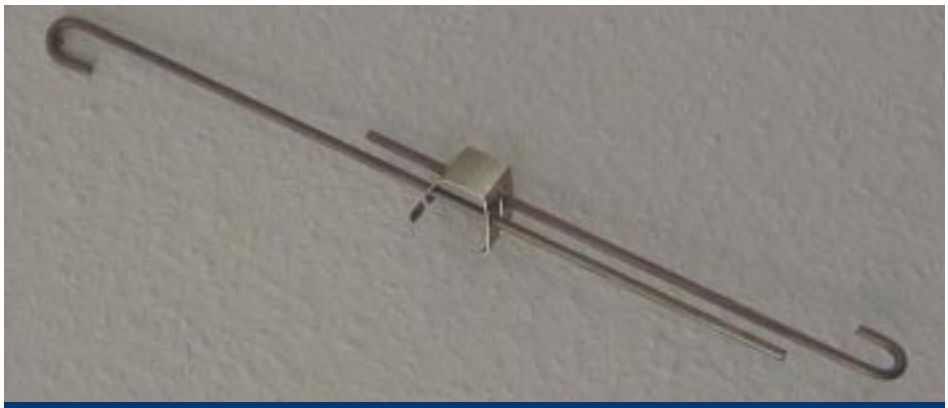

Figure 3: Hanger made of Alloy 926 for the suspension of a ceiling.

Some stainless steels used in swimming pools

Alloy	UNS No.	Werkstoff Nr.	Nominal composition %			
			Cr	Ni	Mo	Other
304	S30400	1.4301	19	9,5	-	-
316	S31600	1.4401	17	12	2,5	-
2205	S32205	1.4462	22	5	3	-
926	N08926	1.4529	20	25	6,5	Cu, N
254SMO	S31254	1.4547	20	18	6.1	N
	S34565	1.4565	24	18	4.5	Mn,N

Table 1:
Chemical composition and EN and UNS numbers of the different stainless steels.

Stainless Steel in Automobiles

The International Stainless Steel Forum (ISSF) and IMOA are jointly organizing a session on "stainless steel" at the 2004 Society of Automotive Engineers (SAE) World Congress to be held March 8-11, 2004 in Detroit. The call for papers within and outside of ISSF yielded ten relevant abstracts on stainless steels for automotive applications. This is enough to fill a full day program at the Conference. Most papers come from stainless steel producer companies, often jointly written with industry partners. IMOA's Technical Director, Dr. Nicole Kinsman is the official session organizer and Chairperson.

In the past years there have been sessions concentrating on aluminum, steel, magnesium, plastics and other materials but not one dedicated to stainless steel. Automotive engineers are often not familiar with the great properties (especially the mechanical properties) of stainless steels and are therefore not specifying them. The special session at the next SAE conference is intended to make automotive specifiers aware of the design possibilities with stainless steel.

EU New Chemicals Policy – the Facts

Counsel to the Association (McDermott, Will & Emery) has prepared the information below which provides a concise introduction to the NCP and contains proposals for the most practical and economic method of organising and preparing for compliance by the formation of consortia to save individual companies time and money.

For any company which produces molybdenum in, or exports molybdenum to, the EU, the obvious consortium to join is IMOA itself.

Introduction

The European Commission has proposed an expansive new policy requiring chemical and metallurgical manufacturers and importers to register each substance manufactured or imported into the European Union. The key provisions of the proposed system are set out in a 1200 page consultation document, known as "REACH" (standing for registration, evaluation and authorisation of chemicals), published on 07 May 2003. REACH creates a new system designed to deliver the information needed to identify the status of chemical substances in use in the EU and minimise the potential health and environmental risks from these various chemical substances.

The new system will place an obligation on individual companies to submit a technical dossier and register any chemical substance manufactured or imported into the EU in quantities of more than 1 tonne. In order to assist companies with the registration process, the Commission recommends the creation of industry consortia.
These consortia will enable the joint development, submission and sharing of information with the aim of reducing the compliance burden on individual companies and preventing unnecessary additional animal testing.

In order to help companies to organise themselves and begin the compliance process, McDermott, Will & Emery have designed a standard "Chemicals Policy Consortium Package". The package includes the necessary legal documents for the initial formation and operation of such consortia. The materials are available in a form that can be tailored to meet the particular needs of industry groups or individual companies.

Chemical Substances

The new system requires the registration of chemical substances manufactured or imported into the EU. The chemical substances that require registration are chemical elements and compounds in their natural state or obtained through a manufacturing process. Any substances previously notified under Directive 67/548/EC (which covers the labelling of dangerous substances) will automatically be considered as registered. There are special rules concerning polymers and intermediates. The Commission has also provided a list of substances which do not require registration. Finally, any substances which are the subject of other EC Directives do not require registration(e.g.medicinal products, food additives and food flavourings).

IMOA

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